

A REPORT
ON THE ROUGH DRAW FIRE
SAFETY ZONE EVACUATION 8-16-03



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Introduction:

Maryland Crews #3 and #4 were mobilized to the Rough Draw fire in the Gallatin National Forest in Montana on August 10, 2003. Crew #3 included 4 state employees, 9 volunteer and career firefighters, and 7 NCCC Americorps volunteers, Crew #4 included 3 state employees, 11 volunteer and career firefighters, and 6 NCCC Americorps volunteers. Both crews were listed as Type 2-IA.

The Rough Draw fire started by lightning during the week of August 3rd, and had grown to approximately 300 acres when the Maryland crews arrived. The scope of work included fire line construction, portable pump setup and hose lays, direction of air attack, mopup, gridding, cold-trailing, brush pile burning, and other line preparation for burnout operations. Both crews served a full fourteen-day tour and were demobilized from the incident on August 24, 2003.

Because the two crews were the only hand crews assigned to the incident for the first several operational periods, they were assigned tasks normally reserved for type 1 resources, but not beyond the scope or abilities of a type 2-IA crew. On several occasions during operational shift briefings, IMT members cited the excellent production and willing attitude of the Maryland crews in steep terrain and adverse fire conditions (see Crew Performance Rating ICS 224).

What follows are the findings of my investigation of the events of August 16, 2003, based on first-person examination of the incident scene, first-person on-scene interviews, after-action interviews, written first-person narratives, photographic and digital video evidence, and official documentation provided by overhead.

The Operational Period:

On August 16, 2003 Maryland #3 was assigned to prepare for and support a burnout operation on Division A of the Rough Draw fire (see attached Division Assignment List ICS-204). Also assigned were the Salmon River IHC, two Division Supervisors (DIVS), one Safety Officer (SOFR), and a lookout Field Observer (FOBS) positioned on Livingston Peak, opposite the Mission Creek drainage.

A Fire Weather Watch was posted for the operational period due to a cold frontal passage between 1600 hrs and 1800 hrs bringing strong west to northwest winds and the potential for the fire to make strong runs as the fire aligned with upslope fuels (see attached fire weather forecast and fire behavior forecast).

Prior to beginning their work assignment after arriving on Division A, Maryland #3 CRWB Chuck Hecker, CRWB-T Dan Bunker, and SQWBs Martin Callahan, John McCarthy, and Earl "Bud" Reaves participated in an LCES briefing with DIVS Todd Richards and Al Sands. Also present were Salmon River IHC Superintendent Jim Allen and SOFR Don Stein. During this briefing the crew

overhead were shown several marked routes leading to a safety zone, which was a steep (80-90% slope) boulder field on the east side of the Mission Creek drainage.

After this briefing, each SQWB briefed their squads on the nature of the assignment and visited the locations of each escape route and safety zone. Access to the uppermost escape route was less than one chain (66 feet) as it was adjacent to the trail where the burn was to be anchored. A portable pump site had been placed in service on Mission Creek to support the burnout and mopup.

At approximately 1600 hrs, DIVS requested an updated fire weather forecast and spot forecast from Rough Draw Communications. At approximately 1615 hrs the Incident Meteorologist (IMET) attempted to contact DIVS with an update, but the transmission was incomplete due to a repeater change.

At approximately 1630 hrs the forecasted weather event occurred as a passing thunder cell caused strong down slope (northwest) winds of approximately 25-35 mph. Air Operations Branch Director (AOBD) Alex Stone, circling the division in a fixed-wing aircraft, advised the DIVS that the fire was increasing in intensity, and helicopter bucket drops were ordered to suppress active torching. Two bucket drops were made. Minutes later, the AOBD reported that the fire was "well established" and was going to cross Mission Creek.

The Evacuation:

Prior to the forecasted weather event, the Maryland #3 crew was positioned along the trail (fire line) and was using the hose lay to wet down the west (green) side of the trail in advance of the planned burnout to be ignited by the Salmon River IHC, which were positioned on the trail above Maryland #3. Bud Reaves' squad was on the uppermost portion of the trail (nearest the escape route), Martin Callahan's squad was located in the middle, and John McCarthy's squad was positioned below. Each squad had personnel on hose lines wetting the area.

As frontal passage began and fire activity increased, Maryland #3 assembled on the trail for a possible retreat to the safety zone, and a decision was made by the DIVS to continue wetting down the line. The crew continued as directed. Several minutes later, upon receiving word from the AOBD that the fire was crossing the drainage, crews were verbally directed by the DIVS to retreat to the pre-identified safety zone via the marked escape route.

During the evacuation, several crew members hesitated to turn off the hose lines they had been using, and were urged by the SQWB's to leave them and move to the escape route. As they entered the boulder field, hand tools, chainsaws, fuel containers, and fusees were cached at the base of the safety zone. As the crew started the step climb up into the safety zone, they observed that with the exception of the Salmon River IHC Superintendent, all of the IHC

crewmembers were already well up and assembled in the safety zone approximately 200 yards up from the escape route.

A lookout posted by the IHC crew used a "crewnet" radio frequency (commonly used for inter-crew radio communications and not available to non-crew personnel) and not an assigned incident tactical frequency, thus no warning was given to Maryland #3 until the DIVS received information from the AOBD to move to the safety zone, and subsequently relayed the warning to Maryland #3 CRWB's.

As Maryland #3 crewmembers made their rapid, but orderly ascent into the safety zone via the escape route, the fire made a strong run as it crossed Mission Creek, and a running crown fire burned into the area of the trail and hose lay. DIVS Todd Richards, DIVS Al Sands, Salmon River IHC Superintendent Jim Allen, SOFR Don Stein, Maryland #3 CRWB Chuck Hecker and CRWB-T Dan Bunker positioned themselves between the ascending crewmembers and the fire, took a head count, and did not begin their further ascent until all crewmembers were above them. Because the rocks were large and loose, the crew spread out while climbing with their hands and feet to avoid dislodging rocks on the personnel below them.

SQWB Bud Reaves and FF/EMT Tracey Lewis were the last crewmembers to evacuate into the safety zone, and were slowed by the steepness of the terrain and shortness of breath as a result of fatigue. FF/EMT Lewis was carrying a large red medical pack on her back, which made climbing difficult, and resisted several offers from crewmembers to carry it for her. She sustained second-degree burns on her buttocks and was later treated in camp with no lost time. SQWB Reaves stopped twice to catch his breath, and at one point was urged by Salmon River IHC Superintendent Jim Allen as he passed to hurry and keep climbing. At no time did any crewmember physically push, carry, or otherwise transport another firefighter to reach the designated safety zone.

Reaves was then joined by FF Keith Golden, who remained with him, checked his welfare and urged him to continue. Reaves and Golden reached a place occupied by DIVS Todd Richards and SOFR Don Stein, halfway between the escape route and the crews now assembled in the safety zone, and stopped to rest. They remained there for several minutes until the smoke from the diminishing flame front became uncomfortable, and the group moved up to join the rest of the assembled crews. CRWB Chuck Hecker sustained a burn from an ember that lodged in his shirt collar and was later treated in camp with no lost time. No other injuries were reported.

The Safety Zone:

As the crews reached the designated safety zone, additional head counts were taken, and all personnel were accounted for. The Salmon River IHC was slightly above and just south of Maryland #3, but members of both crews were

next to each other and interacting. Several crewmembers took photographs, and a Salmon River IHC member was filming the fire behavior and Maryland #3 evacuation with a digital video camera. He later provided these images to CRWB Chuck Hecker (see avi. files); analysis of the footage supports and corroborates accounts provided by Maryland #3 overhead in after-action interviews.

During this time, Maryland #3 overhead described their crew's demeanor as shaken, but controlled and composed. Several crewmembers joked with the Salmon River as they recounted the event. Both DIVS and SOFR checked on the welfare of each crewmember, as did the Maryland #3 overhead. At one point a member of the Salmon River IHC addressed both crews, emphasizing the importance of LCES (lookouts, communication, escape routes, and safety zones) and physical conditioning. He further stated that this situation was "no joke" and serious injury could have occurred.

Shortly after frontal passage and the fire behavior subsided, a rain shower passed over the area. Some crewmembers huddled under space blankets and rain gear. Both crews remained in the safety zone for approximately two hours while bucket drops were ordered to cool down the area and secure the trail for egress from the division.

After the area was secured, crews made an orderly exit from the safety zone, descending in groups of two or three to avoid dislodging rocks. During this time another stronger thunderstorm occurred and soaked both crews. After assembled on the trail below, crews observed that the pump site, hose lay, sling load, and tool cache had all been destroyed by the fire. The crews then made their descent to the trailhead and the busses parked at the 63 Ranch, where ranch staff provided them with coffee. After boarding the crew bus, both DIVS addressed the Maryland #3 crew briefly and commended them for their teamwork and professionalism.

After-Action and Debriefing:

Upon returning to base camp the Maryland #3 crew was met by members of Maryland #4 and myself. I spoke briefly with the CRWB's and several crewmembers, and then made arrangements for the food unit and showers to remain open for the crew. During this time, I met Eastern Area IARR Steve Upton, and advised him of the situation and requested he speak with the Maryland #3 overhead and initiate a report of the event. He met with Maryland #3 overhead and myself in the dining tent, but did not collect much information. I remained with the crew and recounted their account of the incident.

On August 17, 2003 at 0700 hrs Operations Section Chief Trainee Duane Archuleta conducted an After-Action Review using the Incident Response Pocket Guide. In attendance at this review were Maryland #3 overhead to the SQWB level, Salmon River IHC overhead, Both DIVS, and SOFR Don Stein. The group discussed the incident and lessons learned. During the discussion, the use of

"crewnet" radio frequencies was identified as an obstacle to effective tactical radio communication, and crew overhead were instructed to debrief their respective crews. According to accounts, IMT members took no notes during the review. The Human Resources Specialist was made available to any crewmember wishing to discuss the incident.

After the review, Maryland #3 overhead were advised by DIVS that they could remain in camp for the operational period on August 17, 2003 to rest and debrief, which they opted to do. Crew overhead contacted the State Fire Supervisor to report the incident, and returned to work on the division for the operational period on August 18, 2003.

I visited the incident scene on August 18, 2003 and began a review of the incident with SOFR Don Stein and Maryland #3 overhead and crewmembers (see attached photographs). On August 19, 2003 IARR-T Robert Hartlove arrived in camp to interview Maryland #3 overhead and initiate a report (see attached IARR Report).

At no time were any Maryland #3 overhead or myself advised not to discuss the incident by IMT members or overhead. Maryland #3 and #4 demobilized from the incident on August 24, 2004 after completing a full fourteen-day assignment, and received an outstanding evaluation from the DIVS.

Conclusions:

After an extensive review of the events of August 16, 2003 that included a first person investigation of the incident scene, first-person on scene interviews, after-action interviews, written first-person narratives, analysis of photographic and digital video evidence, and a review of official documentation from overhead, several observations and conclusions can be drawn from this investigation:

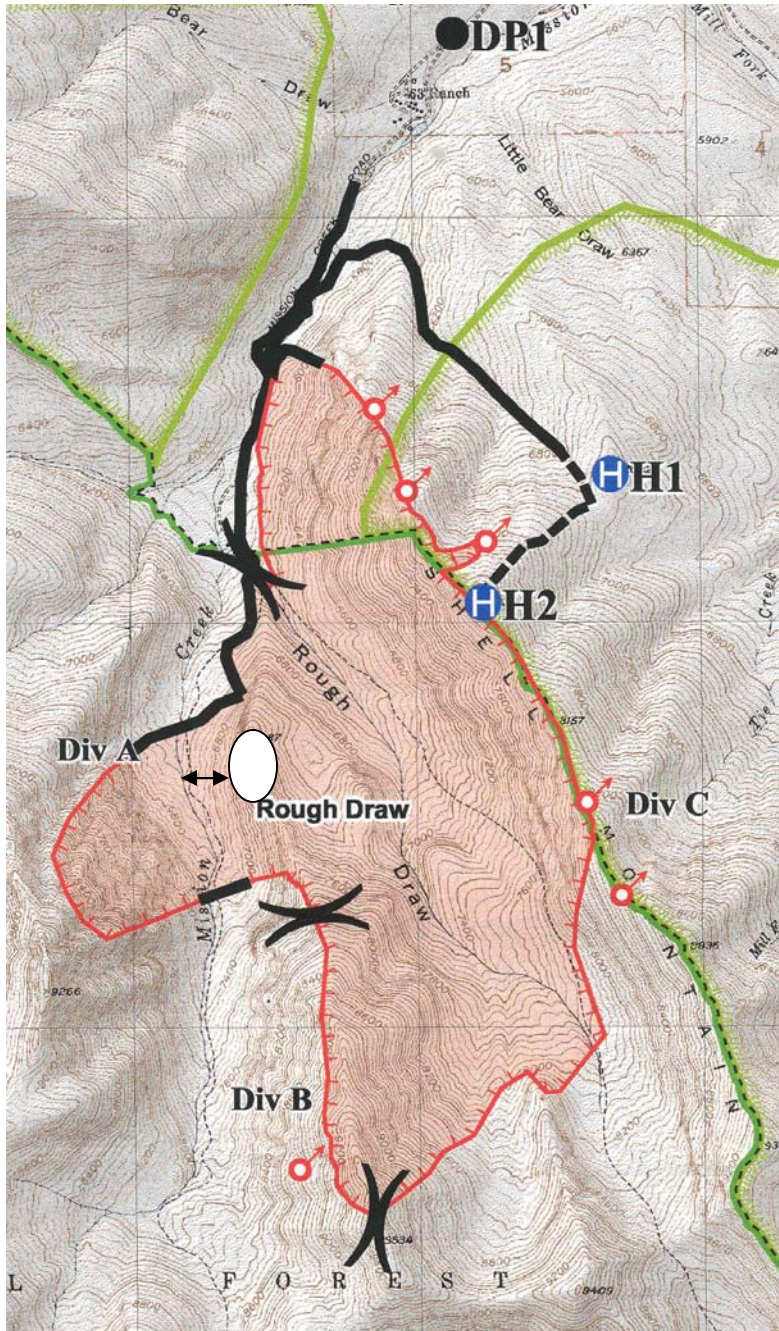
- Adequate and accurate fire weather information was provided in the Incident Action Plan, and during the operational briefing at 0600 hrs on August 16, 2003 (see attached). Forecasted frontal passage occurred as predicted.
- The work assignments given to Maryland #3 during the operational period were well within the scope of duties for a Type 2-IA crew.
- Maryland #3 overhead and crewmembers received a detailed LCES briefing prior to beginning work for the operational period, and the objectives for the operational period were clearly given and understood. At no time did any crewmember express discomfort or safety concerns with the nature of the assignment.
- Safety zones and escape routes were clearly marked and accessible to all crewmembers. Although steep and rocky, the designated safety zone provided adequate protection to all retreating firefighters.

- The use of “crewnet” radio frequencies by the Salmon River IHC provided for a quick evacuation for their crew, but this information was not shared with Maryland #3 overhead. The call to retreat was provided by the DIVS via the AOBD, who had a clear view of the event.
- The evacuation into the safety zone was hurried, but orderly. Overhead insured that tools and flammable materials were cached, and personnel accountability was in place. Although several squad members initially hesitated in an attempt to shut down hose lines, at no time did any crewmember attempt to remain on the trail.
- Physical conditioning, a heavy pack, and fatigue slowed the evacuation of two crewmembers. While it was admirable that other crewmembers “took care of their own”, fitness of firefighters, especially on IA crews, should warrant further review by DNR-FS Fire Staff. At no time was any firefighter physically pushed, carried or otherwise transported by another crewmember during the incident.
- Overall, the crew and its overhead performed with decisiveness and composure, and observed all LCES functions correctly and completely without serious injury.
- Photographic, digital video, and after-action interviews support and corroborate accounts provided by Maryland #3 overhead and those provided by DIVS. Photographic evidence and audio tapes of after action interviews of Maryland #3 overhead are included as part of the official record of this investigation.
- After an After-Action Review, Maryland #3 crewmembers were allowed to remain in camp for the operational period of August 17, 2003. The Human Resources Specialist availed himself to the crew and checked on their welfare several times throughout the day of August 18, 2003.

Respectfully Submitted,

Will Williams, Education Specialist
CRWB Maryland #4

Incident Map: ←→ Escape Route ○ Safety Zone



August 16, 2003 Fire Weather Forecast From IAP:

FIRE WEATHER FORECAST

FORECAST NO. 2

NAME OF FIRE: Rough Draw Complex

PREDICTION FOR: Day SHIFT

UNIT: Livingston R.D Gallatin N.F

SHIFT DATE: Saturday August 16

TIME AND DATE

FORECAST ISSUED: Friday August 15 1900

SIGNED: *J. Brent Alexander*
Incident Meteorologist

WEATHER DISCUSSION: Another round of warmer temperatures expected today however a little cooler versus yesterdays readings. A change is in the offing with a cold front expected to push through the area between 1600 and 1800 late this afternoon to early evening. This front will provide cooler temperatures for Saturday night and Sunday and provide a wind shift...more westerly. This system is expected to be the one which finally dislodges the grip of the upper level ridge which has dominated the area for the past several days. Thus a fire weather watch has been posted and stay tuned for an update to a Red Flag if it warrants it. Watch has been issued due to the wind shift... gusty winds just before and backside of the front. Humidities will also eventually go up... thanks to the cooling with northwesterly winds. Rebound in temperatures early next week but not the near record levels we have seen the past couple of days. Humidities will also slowly go down.

WEATHER FORECAST:

...Fire Weather Watch due to cold frontal passage...

SKY/WEATHER: Partly cloudy. Widely scattered showers and thunderstorms in the area so slight chance.

LAL: 2

TEMPERATURES (Max): 83 to 87

HUMIDITY (Min): 29 to 33 pct

20 FT WINDS:

RIDGETOP - East...southeast 5 to 8 mph becoming south...southwest 8 to 12 mph with gusts to 24 mph by late morning and lasting through most of the rest of the afternoon. Main cold frontal passage by 1800 which would provide a westerly wind shift.

SLOPE/VALLEY - Upslope...upcanyon 3 to 6 mph developing by 1000 but shortly giving way to south...southeast winds by the noon hour 6 to 9 mph with gusts to 16 mph. Slippery Rock fire more prone to see the southerly winds than the Rough Draw due to exposure.

HAINES INDEX: 4 Low

OUTLOOK FOR NEXT SHIFT: Saturday Night: Sky/Weather: Becoming mostly cloudy. Chance of showers and thunderstorms especially after midnight.

Min Temperature: 46 to 53

Max Humidity: 72 pct to 82 pct

20 FT WINDS: Ridge winds west 9 to 13 with gusts to 25 mph through the evening then becoming west...northwest 5 to 9 mph with gusts to 16 mph after midnight. Slope and valley winds a mixture of downslope...downcanyon 2 to 4 mph and stronger westerly winds with gusts possible to 18 mph in the exposed canyons. Cold frontal passage by early evening. Again Slipper Rock fire more exposed to the cold frontal passage.

EXTENDED FORECAST: Sunday: Sky/Weather: Mostly cloudy with a chance of showers and thunderstorms.

Max Temperature: 73 to 77 Min Humidity: 33 to 37 Pct 20 FT WINDS: West to northwest 8 to 12 mph with gusts to 19 mph. Canyons and sheltered areas more variable and lighter.

EXTENDED OUTLOOK: Monday through Wednesday highs in the mid 70s to lower 80s with a warming trend. Minimum RH's in the upper 20s to middle 30s. Normal upslope...upcanyon with westerly ridge winds as the day progresses. Some gustier winds possible Tuesday... Wednesday time frame but not a significant wind event.

OBSERVED WEATHER: Friday, August 15th Weather: Mostly Sunny except for haziness due to smoke. Cumulus and thunderstorms buildups distant to the south and west. Max Temp: 88 to 92 Min RH: 22 to 27 Pct Winds: Dominated by upslope...upcanyon but some easterly winds starting early afternoon and occasional gusts to 25 mph the rest of the afternoon. Peak winds on the Slippery Rock fire between 1700 to 1900. Rough Draw more dominated by upslope...upcanyon.

August 16, 2003 Fire Behavior Forecast From IAP

FIRE BEHAVIOR FORECAST

FORECAST NO. 5
NAME OF FIRE: Rough Draw PREDICTION FOR: Day SHIFT
UNIT: Gallatin National Forest SHIFT DATE: August 16, 2003
TIME AND DATE SIGNED: Larry McCoy
FORECAST ISSUED: August 15, 20:00 FIRE BEHAVIOR ANALYST

WEATHER SUMMARY:

"FIRE WEATHER WATCH FOR STRONG WEST TO NORTHWEST WINDS"
(See attached fire weather forecast)

FIRE BEHAVIOR

GENERAL: The moderating effect of higher relative humidity and cooler temperatures will be offset by the strong and gusty afternoon winds. Higher humidity will only affect the fine dead fuel moisture and since fire behavior in these fuels is more dependant on the 10, 100, and 1000hr fuel moistures expect significant fire activity again today. Backing into the wind or downhill movement will be associated with very slow spread in surface fuels as it moves down logs and from rollouts. Wind will be the primary mover of the fire today with rates of spread from active crown fire on the steep slopes reaching ½ mile per hour. Max spotting distance ¼ mile but generally within 8-10 chains. Spotting will not be as big a problem as yesterday with the higher humidity dropping the P(I)'s to 50%

SPECIFIC:

Rough Draw: Winds and higher humidity will be favorable for keeping fire from moving across Mission Creek. Spots on the east aspect of Shell Mountain will be affected by eddying west winds across the ridge which will pull fires upslope. Torching will put embers into the wind stream creating spot fires down slope. These will then heat up and make strong runs back up into the black. As the winds turn more northwesterly and across the slope fire can get aligned with fuel and wind for a strong push to the southeast along the east face of Shell Mountain.

Speculator 1: Strong afternoon winds will cause spotting across containment lines. These spots will build slowly so should be well within the capability of hand crews if discovered early. In the event that the fire escapes winds will push fire along the contour to the east and down slope into Boulder Creek.

Slippery Rock: Winds are favorable for keeping the fire high up on the mountain. Spots downhill from the main fire to the west will heat up and run back up into the black. Wind will push fire slowly off the ridge and down into Sheep Creek. The main push could come from an end run at the southern edge coming out of Cottonwood Creek to the east.

AIR OPERATIONS: Strong winds will make for hazardous flying conditions especially near ridge tops and in canyon bottoms.

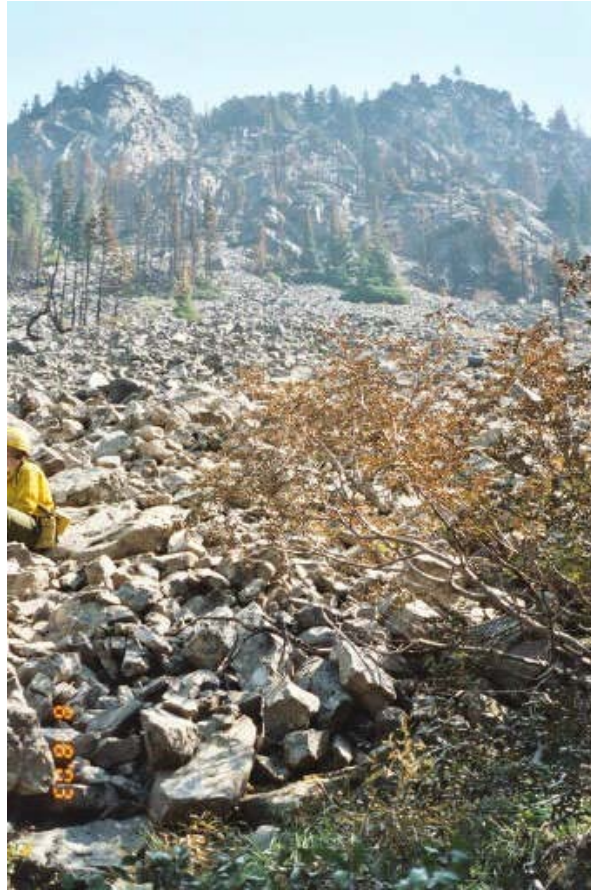
SAFETY: Strong winds mean extreme fire behavior with the potential to shut off escape routes in short periods of time. These conditions call for contingency escape routes and safety zones. Spend extra time to make them known.

Incident Photographs:



Marked escape route into safety zone

*Safety zone as viewed from
escape route*



*Crew perspective from
safety zone*





*MDS #3 and Salmon River
IHC in safety zone after
evacuation*



*After-incident view
from safety zone*



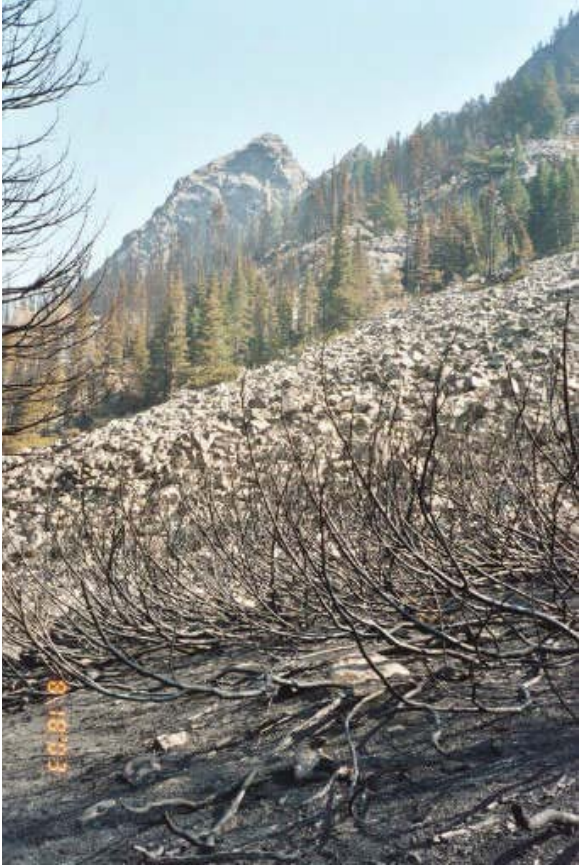
*Northwest view from
safety zone*



*South view from safety zone to
Elephant Head Mountain*



*South view from
trail/fire line*



*North view of safety zone from
escape route*

Burned over pump site



*Burned over tool cache site
at base of safety zone*



Appendices:

- Crew Performance Rating (ICS Form 224)
- Report of OSC1(T) and DIVS
- IARR Report from Robert Hartlove
- Narrative of CRWB Chuck Hecker
- Narrative of CRWB (T) Dan Bunker
- Narrative of SQWB Earl "Bud" Reaves
- Narrative of SQWB Martin Callahan
- Narrative of SQWB John McCarthy
- Audio tapes of after-action interviews