

Incident Summary Page for the 100 Fires Project

Incident Name: Butte Fire Part of the Long Tom Complex	Incident Date & Time: 08/29/1985 @ 16:00
Incident Location: Salmon/Challis National Forest, 32 air miles northwest of Salmon, Idaho	Incident Size: 28,000 acres
Types of resources involved: Three hotshot crews, two type 2 crews, an engine strike team, two dozers, and miscellaneous overhead...in total 118 souls were burned over, an entire division	# of Fatalities/injuries: N/A
Reason this fire was selected for the 100 Fires list: <ul style="list-style-type: none"> ➤ Fire made a notable impact within the wildland fire service 	
Conditions leading up to the event:	
<p>The topography of the Salmon River corridor and adjacent landscape is characterized by steep, unforgiving terrain with open grassy slopes and a pine/fir fuel component (Fuel Model 2) on southern aspects near the river and a heavier pine/fir intermix (Fuel Models 8 and 10) on northern aspects and higher elevations. The topography transitions into more rounded features at the ridges and mountaintops as elevation increases. The uppermost terrain is composed of a more closed canopy mix of Douglas-fir, Alpine fir and Lodgepole pine. The elevation ranges from 3200' on the river to 8200' at the uppermost sites. The Butte Fire was established on the mid-elevation slopes of Owl Creek, a southwest to northeast oriented side drainage of the main Salmon River and aligned with prevailing and upriver afternoon winds.</p> <p>Drought conditions were present throughout the area in the spring and early summer of 1985. Several large fires were burning by early July and perhaps as a harbinger of what was to come, on July 4, fire shelters were deployed by 82 firefighters on the Lake Mountain Fire. This incident was the first large scale fire shelter deployment. The Lake Mountain Fire was 30 air miles to south of the Long Tom Complex. There were no injuries reported.</p> <p>The Butte Fire was part of a complex of four fires (Long Tom Complex) that started in late June and initially was contained on August 5 after the area received wetting rain and snow at the higher elevations. The fire escaped containment on August 24 and displayed increased activity for three successive days, August 27, 28, and 29, with runs of 1000 acres, 2000 acres and 3500 acres on those respective days.</p>	
Brief description of the event:	
<p>Due to the increasing difficulty of holding containment lines under increased fire activity, the Incident Management Team opted to implement an indirect strategy using dozers and hand crews to build and prep indirect line along the ridge top at the head of the Wallace Creek drainage (a tributary of Owl Creek) then begin interior burnout using a helitorch. Safety zones (300' x 400') were constructed every quarter mile on the ridge top. Resources were deployed along these lines with instructions to prep and burnout as the helitorch developed interior heat and pulled in air from the perimeter.</p> <p>On August 29 a helitorch operation commenced in the Owl Creek drainage east of and near its confluence with Wallace Creek. By mid-afternoon firefighters in Division A became concerned about the location of the fire as the smoke column from the burnout operation appeared to merge with and influence the main fire in Wallace Creek. Division A Supervisor asked air attack about this and the response was that <i>"the fire is air miles away"</i> from their location. This turned out to be incorrect since the fire in Wallace Creek became very active and began moving upslope toward resources working in Division A.</p> <p>By 16:00 it was obvious the fire was making a significant run toward containment lines threatening firefighters positioned along Division A. Firefighters retreated into the constructed safety zones along the ridge and into a large clearcut area that offered better refuge from the approaching fire front. In all, 118 firefighters were burned over, 73 of which survived by deploying fire shelters. Five firefighters were hospitalized for smoke inhalation, heat exhaustion and dehydration.</p>	
Fire behavior factors that were present during the event:	
<p>The area was experiencing long term drought and problematic fire behavior activity nearly 2 months before this event. 1000 hour fuels at a nearby Remote Automated Weather Station (RAWS) measured 8% moisture content prior to the run.</p> <p>The fire displayed increasing fire behavior activity during the previous shifts with rapid transitions from individual and group tree torching to independent crown fire activity. Several resources reported having to retreat into safe areas during the two days prior to the entrapment.</p>	

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The fires position on the landscape was aligned with the prevailing up canyon winds on south and southwest aspects.

The burnout operation in Owl Creek may have influenced fire activity in Wallace Creek as the smoke column from the burnout merged with the fire in Wallace Creek.

Post-fire investigation into the meteorological conditions present revealed that a reverse wind profile and unstable lower atmospheric conditions contributed to the explosive growth of the Butte Fire and other nearby fires on August 29, 1985. This helped further the understanding of the importance of the Haines Index as another tool for heightened situational awareness.

Operational lessons available for learning from this incident:

Indirect strategy using large scale burnouts in the Northern Rockies especially in Lodgepole pine/Alpine fir vegetation types have a low probability of success. Burnouts can be spotty with a dirty burn but can turn explosive under the right conditions.

Having solid lookouts on the ground in areas that could see the location of the fire and burnout operation was difficult given the terrain, so there may have been an over-reliance on using aerial resources as lookouts particularly when they are focused on conducting a firing operation on another Division. Never rely on aviation resources as your only lookout.

The Salmon River country is notorious for difficult, deadly fires. Four significant events have occurred here in the past, all within a few air miles of each other: 1979 Ship Island Fire, 2 shelters deployed, 1 fatality; 1985 Lake Mountain Fire, 82 shelters deployed; 1985 Butte Fire, 118 entrapped with 73 shelters deployed; 2003 Cramer Fire, 2 shelters deployed, 2 fatalities.

Notable impact or historical significance for the wildland fire service from this incident:

The pre-planned "safety zones" located along ridge tops were inadequate at best. The large clear-cut area was a far better option but it was also hit directly by the fire front and was extremely uncomfortable as the fire approached and burned through the site. In 1985 there was little science behind how large a cleared area needs to be to be considered a safety zone considering fuel type, topography, and number of resources. The 1985 season, and other shelter deployment events, prompted efforts to answer this question. After years of research into the factors that need consideration when choosing or constructing a truly safe area, US Department of Agriculture, Northern Region Fire Lab scientists Brett Butler and Jack Cohen published their findings in an effort to find solutions to this dilemma.

As with many other shelter deployment incidents, post-fire follow-up tended to place emphasis on improving the fire shelter and promoting its benefits. A far better outcome would have been to consider the health and welfare of those involved and to promote better understanding of entrapment avoidance through heightened situational awareness training. This event impacted the lives and careers of many experienced fire professionals at a time when little thought was given to the mental health of firefighters who experienced traumatic events. Today, more professional resources are made available to assist firefighters in need when these events occur.

Links to more information on this incident:

<https://lessons.wildfire.gov/incident/butte-fire-entrapment-1985>

https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd504382.pdf

<https://www.fs.usda.gov/sites/default/files/fire-management-today/63-4.pdf>

https://lessonslearned-prod-media-bucket.s3.us-gov-west-1.amazonaws.com/s3fs-public/irdoc/lake_mountain_report_1985.pdf

Video:

➤ <https://www.youtube.com/watch?v=2DFggibCDbs>

This summary page was proudly provided by:
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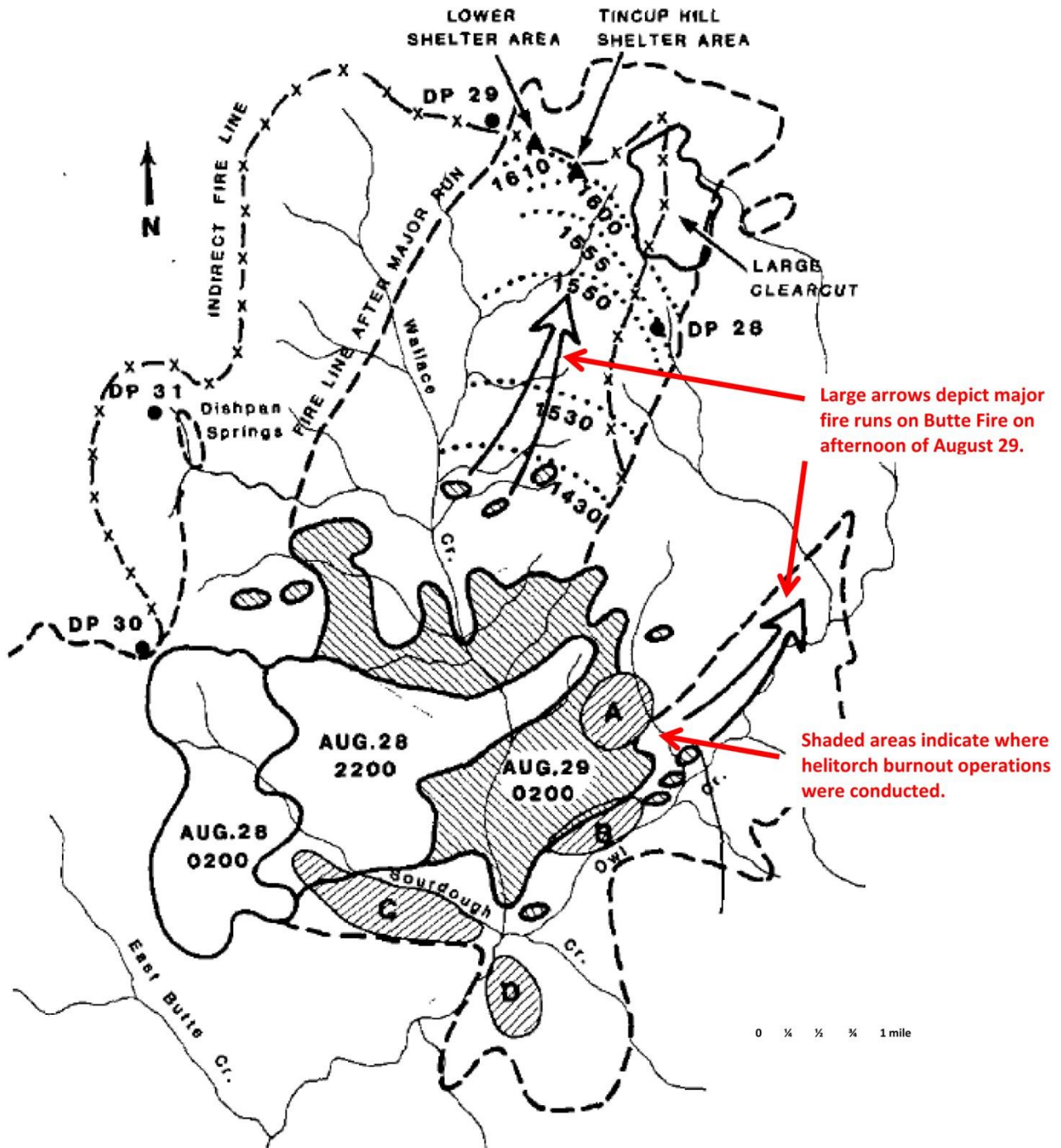
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Firefighter Erin Law stands watch as Strike Team Leader Larry Sears walks a D6 bulldozer and operator into their safety zone just minutes before the fire burned through the clearcut. Flame lengths were estimated to be 150'+ as the flaming front reached the

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This map represents Figure 1 from Richard C. Rothermel and Robert W. Mutch's article "Behavior of the Life-Threatening Butte Fire: August 27-29" that appeared in *Fire Management Today* in 1986 and was reprinted in the publication in 2003.