

Investigation Findings

The Investigation Team identified a large number of findings based on their review of the events that led to the Thirtymile Fire fatality incident. As specified in the procedure established in the agency's Accident Investigation Guide (2001), the findings have been organized into four subject categories:

- Environment of the location of the incident
- Equipment involved in, or contributing to, the incident
- People involved in, or contributing to, the incident
- Management issues or principles associated with the incident

In addition, there were two critical moments in time—the *entrapment* of the 14 crewmembers, and the *deployment* of fire shelters. The entrapment occurred when the fire crossed the road and cut off the escape route for the 14 firefighters and the two civilians. Shelter deployment occurred when people got into their fire shelters.

For purposes of organization, the findings are displayed in three time phases relative to the entrapment and shelter deployment. Findings about events and situations that occurred *prior to entrapment* are described first. These are followed by findings associated with the *entrapment phase*, which includes everything between the moment of entrapment and the moment of shelter deployment. The findings conclude with the *deployment phase*, which includes everything from the moment of deployment until the crew was evacuated, effectively ending the incident.

Findings are defined as fact-based conclusions, or relevant facts themselves. The findings, taken together, should provide a complete understanding of what occurred. The goal of the Investigation was to speak to the needs of as wide an audience as possible; thus the Investigation Team sought to provide a comprehensive set of findings.

Summary of Significant Findings

Although there were many findings identified for each of the four subject categories, the investigation team identified a smaller set of findings that were considered to be of significant importance to understanding the underlying causal factors that are associated with this incident. The significant findings are listed below and also presented at the beginning of each subject category.

Significant Environment Findings

- The combination of weather (at or near historic extremes for temperature and relative humidity, and the extended drought in the region) and fuel conditions (complex fuels on the canyon floor, extremely low moisture content of both the live and dead fuels) created extraordinary circumstances for fire growth on July 10th.
- Potential fire behavior was consistently underestimated throughout the incident.

Significant Equipment Findings

In spite of the ready availability of water, relatively little water was applied to the fire during the initial attack phase. This was largely due to operational problems with pumps and hoses, as well as delays in availability of a Type III helicopter.

Significant People Findings

- The fatalities and injuries all occurred during fire shelter deployment. Failure to adequately anticipate the severity and timing of the burnover, and failure to utilize the best location and proper deployment techniques contributed to the fatalities and injuries.
- Leadership, management, and command and control were all ineffective due to a variety of factors, such as the lack of communication and miscommunication, fatigue, lack of situational awareness, indecisiveness, and confusion about who was in control.
- Two civilians were involved in the entrapment due to a failure to properly close a potentially hazardous area.

Significant Management Findings

- All 10 Standard Fire Orders were violated or disregarded at some time during the course of the incident. (See on Standard Fire Orders Section, page 40)
- Ten of the eighteen Watch Out Situations were present or disregarded at some time during the course of the incident. (See Watch Out Situations Section, page 42)
- Records indicated that personnel on the Thirtymile Fire had very little sleep prior to their assignments, and mental fatigue affected vigilance and decision- making.
- District fire management personnel did not assume incident command when the size and complexity of the fire exceeded the capacity of the NWR #6.
- The NWR #6 crew was dispatched for assignment to the Libby South Fire. When redirected to the Thirtymile Fire local managers assigned a qualified individual (Daniels) from the NWR #6 as Incident Commander (IC). Because there was no redelegation of duties he remained Crew Boss and trainer for Kampen. Thus Daniels assumed collateral duties as IC (responsible for communications) and Crew Boss trainer. Kampen viewed himself as both IC (responsible for strategies and tactics) and Crew Boss in a trainee assignment. Command roles on the Thirtymile Fire were unclear and confusing to those in command of the incident, to the rest of the crew, and to others associated with the fire.

Environment Findings

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Prior to Entrapment

Fuels:

1. The fuel moisture content of dead woody fuels (10 hour at 3%, 100 hour at 5%, and 1000 hour at 10%) were at historic lows for the day of the event (calculations based on weather data from First Butte Remote Automated Weather Station). The moisture content of the live fuels was generally less than 100% (based on measurements taken in the vicinity of Lake Chelan, Washington).
2. Ladder fuels were abundant at the point of origin, on the east slope of canyon, and throughout the canyon floor.
3. Fuels in the riparian zone near the point of origin and throughout the canyon were dry enough to support surface fire and torching throughout the evening of July 9th and into the morning of July 10th.
4. Crown fuels were dense and surface fuels were continuous on the slopes east of the river. Crown fuels were discontinuous and surface fuels were less abundant on the rocky slopes west of the river.

Weather:

5. Abnormally dry conditions were experienced for this time of year. The 2000-2001 winter was the second driest winter in the past 30 years.
6. The day of the event, temperatures reached 94° F and relative humidity reached a low of 8% on the Chewuch River canyon floor. These readings were consistent with the near record high temperatures in the area (101° F at the North Cascade Smokejumper Base) and near record low relative humidity (RH 5% at the North Cascade Smokejumper Base).
7. The National Weather Service issued twice daily Fire Weather Forecasts on July 10th. Okanogan Dispatch received these forecasts but did not transmit the afternoon forecast to the Methow Valley District or Thirtymile Fire personnel.

8. No Spot Fire Weather forecast was requested for the Thirtymile Fire. The Spot Fire Weather forecast from the previous evening for the Libby South Fire was used to brief NWR #6 crew.
9. All fire weather forecasts matched observed weather conditions for the incident area.
10. No Fire Weather Watches or Red Flag Warnings were in effect or required within existing policies.
11. On the day of the deployment, the weather pattern over the Pacific NW region consisted of a southwest flow aloft with weak disturbances embedded in that flow.
12. On July 10th atmospheric conditions were conducive to the formation and vertical development of fire columns. At Spokane, the mid-level Haines Index was a 6, the high level Haines index reached a 4 (predicted 3-4).
13. There was no site-specific data available to determine if an inversion existed over the fire.

Topography:

14. The SW to NE orientation of the deep "V" canyon aligned with afternoon ridgetop and up-canyon winds.
15. Slopes were steep (with slopes 70% to 100%) on both sides of the canyon. There was little slope or stream gradient on the canyon floor.

Fire Behavior:

16. The forest fuel types support crown fire behavior and the Chewuch River canyon had experienced "stand replacing" fires previously.
17. Torching and short-range spotting occurred within fuels on the canyon floor throughout the night and early morning.
18. At mid-morning, fire intensity increased with more frequent torching and increasingly longer spotting distances.
19. At about 3:20 p.m. the fire made a strong upslope run on the slope east of the river and was also approaching the road near the entrapment area.

Entrapment Phase

Fuels:

20. The area where the fire initially crossed the road contained closely spaced conifers and conditions were drier than conditions next to the river.

Weather:

21. With the exception of the fire-induced winds, there was no significant general wind pattern affecting the fire at the time of the entrapment.

22. On-site weather conditions (relative humidity, atmospheric instability, and temperature) were conducive to extreme fire behavior and large column development.

Fire Behavior:

23. Smoke limited visibility from the air during the entrapment.
24. The direction of the fire in the canyon floor was generally parallel to the road. At the location of entrapment the road became perpendicular to the direction of the fire movement up the canyon floor. The fire crossed the road in this area at 4:34 p.m.
25. Helicopter 13N observed a fire induced wind of 20 mph from the south at the time of entrapment.
26. The fire accelerated and gained momentum as it spread up canyon. Falling embers created numerous spot fires ahead of the fire on the canyon floor, and on both east and west canyon walls.
27. Numerous spot fires were propagated from falling embers.

Deployment Phase

Fuels:

28. Sparse fuels on the rocky area south of the deployment area lessened the surface fire intensity at the two deployment sites.
29. The deployment site on the rock scree slope was upwind from, and adjacent to, areas of trees and brush (Fuel Model 10) and consisted of rock interspersed with woody debris and duff.
30. The deployment site on the road was a smooth, level, dirt surface with some brush on both sides.
31. After the burnover at the deployment area, there were leaves and needles "frozen" (not burned) on the trees and bushes indicating the wind direction.

Weather:

32. High winds experienced during fire shelter deployment and burnover were fire induced and were estimated in excess of 50 mph.

Topography:

33. The shelter deployment area consisted of a road, a sandbar, and a river, with a rocky area to the south and a rock scree slope to the west.
34. Fire shelters were deployed in two sites: on the road and on the rock scree slope.
35. Ten people utilized the shelter deployment sites on the road. All 10 survived within their shelters. This site was flat and significantly lower in elevation than the rock scree slope.

36. The deployment site on the rock scree consisted of a jumble of six inch to six-foot diameter rocks. This site was about 96 feet west of the road surface and 25 vertical feet above the road in an area with a 25% slope.
37. The shelter deployment site in the rock scree was utilized by 6 crewmembers, 4 of whom died. The two crewmembers that survived left the site after being in their shelters two to three minutes.
38. The rocks on the scree slope became extremely hot and remained so for an extended period of time.

Fire Behavior:

39. Sparse fuels on the rock area east of the river and the presence of the river lessened surface fire intensity in the shelter deployment area.
40. At the time of the deployment there were crown fires on the slope east of river and on the canyon floor. Ember showers created numerous spot fires. Crewmembers reported large embers were falling in the area.
41. A crown fire in the canyon floor and the associated convection column moved rapidly through the deployment site. Individuals on the scene referred to the column "rolling over" or "falling."
42. Following the deployment, active crown fire activity continued approximately 4 miles up the canyon and uprooted hundreds of trees and consumed a 40-acre alder patch on the river flat.

Equipment Findings

Significant Equipment Findings

In spite of the ready availability of water, relatively little water was applied to the fire during the initial attack phase. This was largely due to operational problems with pumps and hoses, as well as delays in availability of a Type III helicopter.

Prior to Entrapment

1. Water handling resources were made available to the Entiat IHC at about 1 a.m. on July 10th but the IHC Supervisor released the following equipment and personnel:
 - Engine #704 (slip-on pumper on a 4wd pickup) and 3-person crew
 - Chase truck and 3-person crew plus 2 other people
 - Mark III pump, wye gates, over 1,000 feet of hose
2. At 2:15 a.m. the Entiat IHC Superintendent requested water handling equipment and an aircraft for morning delivery -- two Mark III pumps, 1,500 feet of 1½-inch hose, 800 feet of 1-inch hose, 10 wyes, 10 nozzles, and 10 reducers.
3. The water handling equipment arrived with the NWR #6 crew at 9:04 a.m., and was put in use at around 11 a.m. when the NWR #6 began work.
4. The delivery of water for NWR #6 fire suppression activities was ineffective because of an inability to keep the pumps running continuously.
 - The hose layout (e.g., arrangement, size of hoses, and pressure reducers) was not conducive to optimal water operations, and limited the amount of water that the crew applied to the fire.
 - At least three lengths of 1-inch hose were blown.
 - The pumps were not in continuous operation due to mechanical and/or operator problems.
5. The lack of a reliable and consistent water supply operation in conjunction with escalating fire behavior led to a decision to change the tactics from water suppression to direct hand line construction.
6. At least four pulaskis broke during operations on east side of the river. One handle split. The heads came off of three apparently new pulaskis.
7. Aviation resources were continuously over the fire from about 1:00 p.m. and there were no reported equipment malfunctions on any of the aircraft.
8. No vehicle problems were reported throughout the incident.

9. The following aviation resources were assigned mid to late afternoon on July 10th:
 - One Type III helicopter
 - One SEAT (single engine air tanker)
 - Two Type I Airtankers
 - One Type II Airtanker (PBY)
 - One Air Attack
 - One Leadplane
10. The NWR #6 crew had eight handheld radios. There were minor problems with some handheld radios, however there was adequate communications capability with incident personnel, assigned aircraft, and dispatch.
11. The Okanogan Forest Dispatch radio system tape recorder was not operational; therefore there are no voice-recorded tapes for July 9th and 10th.

Entrapment Phase

12. Fourteen firefighters were shuttled to support Engine #701 using two vans. One 11-passenger van remained at this site.

Deployment Phase

13. At least one firefighter deployed without gloves, and his hands received third degree burns. There were extra gloves at the deployment site. Post accident investigation found two pair of leather gloves in one of the fireline packs.
14. The civilians arrived in shorts, shirts, and sandals and decided to change into their own personal long pants, long sleeve shirts, and ball caps.
15. There were additional gloves available at the deployment site in individuals' fire packs.
16. Firefighters did not prepare the deployment sites nor remove shelters until deployment was imminent (when embers began falling).
17. Crewmembers made no mention of any difficulty in opening the plastic shelter bags. Some of the fire shelters bags had been modified per the safety alert (0151-2828 MTDC).
18. It was difficult for some firefighters to deploy their shelters due to strong, turbulent winds.
19. The fire shelter is designed to protect one person. However one of the shelters was used to protect a firefighter and two civilians. All three survived, two with minor burns.
20. Several crewmembers recalled from their fire shelter training that rockslides are potentially effective deployment sites.
21. The road was an effective deployment site. Shelters deployed in this area experienced either minor or no heat damage.

22. Some of the firefighters deployed in the light brushy fuels on the edge of the road. Smoke and fire were present inside these shelters. At least two people that deployed near light brushy fuels had minor burn injuries.
23. Contrary to training, some firefighters dropped their packs immediately next to shelters occupied by themselves or others leading to burns to the occupant of the shelter in at least one case.
24. Some of the firefighters deployed in ways contrary to current training, e.g., head toward fire and with packs (and fusees) inside shelter. The remains of a pack, including fusee slag, were found under the shelter of one of the deceased.
25. As per training, people on the road were communicating with each other while they were in their shelters.
26. Survivors on the road stayed in their shelters about 15 minutes. Then they moved to the river and used the shelters for protection from the embers.
27. Inspection of the shelters after deployment revealed several tears and abrasions. It can not be determined how this damage occurred due to the extensive movement of the shelters during and after the deployment.
28. The rock deployment sites were exposed to high levels of radiant and convective heat (in excess of 500° F) that led to rapid and significant damage to the fire shelters (delamination and the loss of portions of the reflective layer).
29. Fuels in the rocks, proximity to trees both below and adjacent to the deployment site, and the position of the site on a slope in a slight draw contributed to the more severe conditions present at the fatality site. Six people deployed in a 15 to 20 foot wide cluster in the rocks; four died, one was seriously injured, and one had minor injuries.
30. The two survivors of the upper deployment site got out of their shelters after two to three minutes. One of them proceeded directly to the river and the other sought shelter in the rock scree slope before moving to the van.
31. Cracks and crevices between the rocks made it impossible to keep heat, flames, and combustible gases out of the shelters. Although rock areas are identified as a suitable deployment site in training materials, the difficulty of obtaining an effective seal with the shelter in rough terrain with large rocks is not addressed.
32. Conditions outside shelters at both deployment locations were unsurvivable in the first few minutes of the event. Fusees ignited outside the shelters at both deployment sites (this occurs at about 375° F). Fire shelters offered survivable conditions to 12 people.
33. The crew van had minor damage (melted license plate frames, front and back). Conditions were survivable inside the van. There was no melting evident of any interior feature.
34. The civilian's truck with a fiberglass camper shell was parked about 75 feet up canyon from the crew van next to burnable fuels and was consumed by fire.

People Findings

Significant People Findings

- The fatalities and injuries all occurred during fire shelter deployment. Failure to adequately anticipate the severity and timing of the burnover, and failure to utilize the best location and proper deployment techniques contributed to the fatalities and injuries.
 - Leadership, management, and command and control were all ineffective due to a variety of factors, such as the lack of communication and miscommunication, fatigue, lack of situational awareness, indecisiveness, and confusion about who was in control.
 - Two civilians were involved in the entrapment due to a failure to properly close a potentially hazardous area.
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Prior to Entrapment

1. At about midnight on July 9th, the Type 4 initial attack IC reported an estimated size of the fire and observed fire behavior. He reported to Okanogan Dispatch and the district duty officer, "it will grow tonight; will not hold; will hit slope and get larger."
2. The NWR #6 consisted of people from two ranger districts. People from each ranger district trained at two different basic 32 hour fire-training camps.
3. The Lake Wenatchee and Leavenworth Ranger Districts were recently administratively consolidated and they maintained separate district identities at both work locations.
4. The NWR #6 crewmembers were contacted beginning at midnight to be at the Twisp Ranger Station by 7:00 a.m. Some crewmembers slept in the vehicles on the way to the incident (averaged two to three hours of sleep).
5. When NWR #6 assembled, not all members knew each other -- two of the squads were a mixture of people from the two different districts.
6. The Forest's requisite briefing, utilizing the Forest safety briefing card, was conducted onsite as NWR #6 took over incident from Entiat IHC. The Forest developed this safety briefing card as a safety precaution, although there is no national standardized briefing format for Type 3 and Type 4 incidents in the NWCG Fireline Handbook, as there is for Type 1 and Type 2 incidents.
7. The NWR #6 crew was given a GPS map of the immediate fire area by the Entiat IHC. They were not given a map or aerial photos of the Chewuch River Basin.
8. Two civilians drove up the Chewuch River road in the early afternoon, passing the fire and fire personnel en route to the Thirtymile Campground. There was no contact between the firefighters and the civilians at this time.

9. At approximately 3:35 p.m. the fire grew to more than 100 acres as it expanded up the east canyon wall. The IC trainer and IC trainee acknowledged that they had "lost the fire" but did not modify safety practices (escape routes, safety zones) or change tactics after moving back to the west side of the river.
10. At approximately 4:00 p.m., Engine #701 attacked a spot fire near the road about 1/2 mile up the canyon from the lunch site. Engine #701 requested and received assistance from NWR #6 squads 1 and 2. In the absence of changed tactics, Engine #701 received the assistance of the IC and the two squads.
11. While NWR #6 crewmembers and Engines #701 and #704 worked on spot fires along the east side of the road, Air Attack provided fire size information to the IC. This information was not passed along to the crewmembers.
12. Lookouts were not posted to monitor the fire while the NWR #6 crew worked on the spot fires on the east side of road after the 3:00 p.m. lunch break.
13. The District AFMO relayed to the IC that previous fires had crossed the road and burned both sides of the canyon.

Entrapment Phase

14. Air Attack informed the IC that there were spot fires west of the road at 4:34 p.m.
15. When confronted by a wall of flames across the road, the IC decided not to drive through the fire. It was too late to get through and not everyone was in the van -- ten were in the van and four were on foot. All the crewmembers and their gear were then loaded into the van and the group retreated up the canyon away from the fire.
16. The IC evaluated three different sites on their way to the selected "safe area", concluding that none of them afforded adequate protection in the event of deployment.
17. The crew took no action to improve the prospective deployment site; the IC decided not to improve the site as he thought the road was adequate.
18. There was nearly continuous communication between the IC and Air Attack about the fire behavior and conditions in the deployment zone.
19. While in the deployment area some people were socializing, some felt safe, and some were scared. Some crewmembers reported "hanging out," "taking pictures," "watching the show," and making journal entries.
20. Six of the eight Naches Ranger District crewmembers at the deployment site clustered together. They sat on a rock about 30 feet above the road. One Naches Ranger District crewmember left the group of five in the rocks to join the people on the road.
21. One Squad Boss (Taylor) moved up into the rock scree to check on the fire and said to the IC, "This is a good place to deploy. I'm going to stay up here." He eventually changed his mind and thought the scree slope was not a good place to deploy. He briefly returned to

- the road and recommend to the IC that the crew should prepare the road site for deployment. He then returned to the scree slope to observe the fire.
22. The IC attempted to bring the separated crewmembers on the rock scree back to the group on the road, but it is unknown whether they all heard the directive.
 23. About fifteen minutes prior to deployment, two civilians arrived from the north (up canyon) in their pickup. They were met by two crewmembers and directed to the IC who told them to "stay calm." Prior to deployment the civilians had time to put on long sleeved shirts, long pants, hats, and gather water and a towel.
 24. The civilians felt they were "largely on their own" although they remained on the road with the crew. The civilians reported that they were not "given advice on how to prepare or what to do." They "did not observe any effort to plan for deployment."

Deployment Phase

25. Crewmembers reported the fire was "coming very fast, roaring" and was preceded by ash and a "fire snow storm." The IC directed the crewmembers to "get your shelters out and use against the ash" in order to protect them from falling embers.
26. Winds increased and flames came over the river and the road. People on the road heard the IC yell, "deploy!" Many crewmembers relayed the call to deploy. People on the road deployed their shelters and dropped in place where they were.
27. Several survivors recalled and properly applied some information from fire shelter training prior to and during the burnover.
28. Six people deployed in the rocks at slightly different moments. Taylor deployed first and observed a group of five (Tom Craven, Jason Emhoff, Karen FitzPatrick, Jessica Johnson, and Devin Weaver) running uphill in front of the flames just prior to their deployment.
29. While in their shelters, the IC attempted to calm crewmembers. He yelled instructions to the crewmember that had the civilians in her shelter. Others talked, reassured each other, and prayed.
30. The two surviving crewmembers that deployed in the rocks initially heard others nearby praying, talking, and screaming. One of the crewmembers estimated that within one-two minutes he heard no more voices from those that deployed on the rocks.
31. Thom Taylor saw the upper left corner of his shelter begin to burn and fill with smoke. There were portions that had burned away. After about two to three minutes in the shelter he "ran through some flames down through rocks onto the road and jumped in the water."
32. Jason Emhoff had no gloves and could not hold onto the shelter because of his burned hands. He left his shelter after a few minutes and moved through the scree field to avoid the heat and flames. He eventually reached the road and got in the van -- he avoided the river due to his recent EMT training and his concern with possible shock from the cold water.

33. Air Attack and the IC maintained continuous communication during the deployment. Air Attack was also communicating with the Forest.
34. After approximately 15 minutes, the IC determined it was safe to emerge from the shelters, and encouraged by Taylor who was already in the river, directed the people to get in the river.
35. While in the river, the IC checked on the peoples' conditions, identified who was injured, and communicated this to Air Attack. After multiple head counts, the IC determined that four people were missing.
36. After the determination that several crewmembers were missing, there was a high state of anxiety and confusion as to what actions should be taken. Squad Boss Taylor then coordinated the rescue operations with the Entiat IHC Superintendent.
37. The Entiat IHC organized for the rescue. The Entiat IHC overhead, EMTs, and the NWR #6 Crew Boss Trainee made multiple attempts to get to the deployment site. They turned back at least once due to heat from the fire and had to remove several trees that had fallen across the road. They arrived at the site about 30 minutes after the deployment.
38. Upon arrival the Entiat IHC Superintendent assumed control of the accident scene and remained until the scene was turned over to local law enforcement.
39. Air Attack initiated off-incident emergency medical response and notification by contacting Okanogan Dispatch.
40. The NWR #6 and Entiat IHC EMTs provided initial triage and medical attention to four crewmembers and one of the civilians.
41. The IC (Daniels) asked the Entiat IHC for assistance in checking on the people who had deployed on the rocks. This was not possible because the rock scree slope was too hot, with burning material and rolling rocks. The Entiat IHC Superintendent attempted to discover signs of life in the four shelters, but got no response.
42. All four fatalities were from the Naches Ranger District.

Management Findings

Significant Management Findings

- All 10 Standard Fire Orders were violated or disregarded at some time during the course of the incident. (See Standard Fire Orders Section, page 40)
- Ten of the eighteen Watch Out Situations were present or disregarded at some time during the course of the incident. (See Watch Out Situations Section, page 42)
- Records indicated that personnel on the Thirtymile Fire had very little sleep prior to their assignments, and mental fatigue affected vigilance and decision- making.
- District fire management personnel did not assume incident command when the size and complexity of the fire exceeded the capacity of the NWR #6.
- The NWR #6 crew was dispatched for assignment to the Libby South fire. When redirected to the Thirtymile Fire local managers assigned a qualified individual (Daniels) from the NWR #6 as Incident Commander (IC). Because there was no redelegation of duties he remained Crew Boss and trainer for Kampen. Thus Daniels assumed collateral duties as IC (responsible for communications) and Crew Boss trainer. Kampen viewed himself as both IC (responsible for strategies and tactics) and Crew Boss in a trainee assignment. Command roles on the Thirtymile Fire were unclear and confusing to those in command of the incident, to the rest of the crew, and to others associated with the fire.

Note: Additional findings noted below with an asterisk () illustrate the fundamental finding that incident management was confusing and unclear.*

Prior to Entrapment

1. All Forest personnel involved and those assigned to the incident had the required annual refresher training (standards for survival, LCES, and shelter deployment training) and work fitness testing.
2. * All personnel assigned to the fire were qualified for the positions they held, however there were a few crewmembers who perceived that the NWR #6 Crew Boss trainee was being promoted too quickly by being "fast tracked" (not a formal program).
3. The decision to suppress the fire was consistent with the Okanogan National Forest Land and Resource Management Plan and the standards and guidelines for the Chewuch River Research Natural Area.
4. It was the Lake Wenatchee and Leavenworth Districts and Naches District FMOs' practice in the crew formation process to emphasize mixing experience levels and ensuring there

was a chainsaw-qualified person per squad. Kampen followed this practice in organizing the crew.

5. * During initial action, about midnight, Engine #704 Supervisor was offered and declined incident command. He cited multiple concerns including size, complexity and inability to find good anchor points. This information was passed to Okanogan Dispatch (not known if this was passed along to District Duty Officer.)
6. During transition from District initial attack crew to the Entiat IHC at 1:00 a.m., additional resources (Engine #704, pumps, hose, and 7 crewmembers) were on scene and offered to stay and assist. The Entiat IHC Superintendent released the resources, but ordered similar equipment (and more) within one hour.
7. * At about 10:00 a.m. the District FMO requested that the road be closed. District management did not scout the road for civilian traffic nor close the road until after 3:00 p.m.
8. During transition from the Entiat IHC to NWR #6 the Entiat IHC Superintendent, and District and Forest Fire staff conferred and established mopping up spots east of the river as highest priority.
9. When Kampen briefed the crew he used the Forest's standard safety briefing card and the Libby South Fire spot forecast from 6:00 p.m. the previous night.
10. On July 9th and the morning of July 10th, the priority and focus of District Fire staff was on the Libby South Fire. The Thirtymile Fire was considered "basically a mop-up show."
11. The Okanogan National Forest 1997 Fire Management Action Plan states that a fire situation analysis will be prepared for any extended attack fire, although the 1995 national policy does not require this. No fire situation analysis was done on the Thirtymile Fire on July 9th or 10th. The Okanogan Fire Plan is currently being revised and is estimated to be completed in 2002.
12. The helicopter did not arrive at the fire in the morning as requested. The sequence of events was:
 - The Entiat IHC Superintendent ordered an aircraft and a crew at 2:15 a.m.
 - The Entiat IHC Superintendent ordered the aircraft for morning delivery.
 - At 5:26 a.m. Okanogan Dispatch contacted the Entiat IHC Superintendent to clarify the aircraft request. A Type 3 helicopter with long line, bucket, and reconnaissance capability was ordered.
 - At 5:30 a.m. Okanogan Dispatch ordered helicopter 13N from Wenatchee Dispatch for a 10:00 a.m. delivery time at North Cascades Smokejumper Base (NCSB).
 - Helicopter 13N (an exclusive local use resource based at Wenatchee) was not available until after 7:00 a.m. due to the pilot rest limitations. (The earliest the pilot could be legally contacted was 7:00 a.m. since he was on duty until 9:00 p.m. the previous night and required 10 hours of off duty time.)

- The IC was informed during the briefings (completed by 11:00 a.m.) by the Forest FMO that a helicopter would be available for their use.
 - Helicopter 13N left Wenatchee at 9:53 a.m. and arrived at the NCSB at 10:30 a.m.
 - At 11:52 a.m. Okanogan Dispatch notified the IC that helicopter 13N was available at NCSB.
 - At 12:08 p.m. the IC ordered the helicopter 13N to be launched.
 - The helicopter manager for 13N reported mid to late morning "...dispatch for the Okanogan called me to tell me to fly to the Thirtymile Fire." When the helicopter manager contacted the District AFMO about landing locations he was informed by the District AFMO that he "... didn't think we could dip water out of the Chewuch River because of environmental issues with salmon smolts." The District AFMO said he would "check into it."
 - The helicopter manager contacted Okanogan Dispatch about where they could conduct dipping operations.
 - At 12:30 p.m. the IC contacted Okanogan Dispatch and asked for the estimated time of arrival of the helicopter.
 - At 12:42 p.m. an Air Attack was launched and a SEAT (single engine air tanker) was launched at 1:28 p.m. with water (not retardant).
 - At 2:00 p.m. the District FMO approved the use of helicopter 13N.
 - At 2:17 p.m. helicopter 13N was en route to the fire.
 - At 2:35 p.m. 13N was at the helibase at 8-Mile Camp hooking up to their 75-gallon bucket.
 - At 2:38 p.m. 13N left the helibase at 8-Mile Camp for the fire.
 - The helicopter worked the fire until about 4:15 p.m. when it refueled and returned to the fire around 4:30 p.m.
13. The earliest that 13N could have been available was 9:30 a.m., if action had been initiated at 7:00 a.m. to start the pilot's duty time. This is 5 hours earlier than it actually arrived on the fire. This 5 hour difference is related to the following:
- 13N arrived at NCSB at 10:30 a.m., and was available to the incident upon request by the IC.
 - IC Trainee (Kampen), through IC (Daniels) requested that 13N launch for the fire at 12:08 p.m.
 - For this request, there was no delay associated with endangered species considerations.
 - * Okanogan Dispatch sought to resolve concerns about dipping from the Chewuch River prior to releasing 13N. This took about two hours, and when the FMO was contacted he immediately gave permission at 2:00 p.m.

- There is no clear or consistent process on the Forest for helicopter bucket operations with respect to endangered species issues in relation to fire suppression operations.
 - The Department of Interior memo (September 21, 1995) addressing endangered species considerations states that there are "no constraints...if they place firefighters in danger." It also states that "impacts to endangered species by helicopters during fire suppression activities have to be considered within the context of all other ground activities and the fire itself."
 - * The District AFMO and ultimately the Okanogan Dispatcher were unclear on the appropriate course of action to take, delaying the release of the helicopter.
14. * The Incident Commander was not kept apprised of the status of orders, resulting in multiple repeat resource orders.
 15. * Around 2:30 p.m. Kampen (the NWR #6 Crew Boss Trainee and IC Trainee) suggested to Kyle Cannon (the Entiat IHC Assistant Superintendent) that the Entiat IHC could take over the fire. Cannon declined and stated that "this is nothing we want to mess with either, we did not have any anchor, spots everywhere. There wasn't anything we could do."
 16. * At 3:25 p.m. the District AFMO met with IC (Daniels) and asked if he was comfortable retaining incident command. Daniels agreed to retain incident command.
 17. * After confirming that Daniels would retain IC, the District AFMO gave direction to others to check out the campground at the end of the road.
 18. * Forest procedure as outlined in the Forest Mobilization Guide for "collaboration between Incident Commander and District Duty Officer" was not followed. The District AFMO, who was not District Duty Officer at that time, was on-site and provided strategic and tactical directions on the incident, such as the need to keep the fire contained on the east side of the road, but he did not take control of the incident.
 19. Several individuals noted by 3:00 p.m. that the perceived "initial attack effort" had been lost. Containment was no longer possible with the on-site resources.
 20. Around 3:30 p.m. the District AFMO met with Ellreese Daniels and Pete Kampen to discuss their concern that the initial attack had not contained the fire.
 21. * The elements of fire complexity dictated a transition from initial to extended attack. The IC did not revise the strategy and tactics to address these changed circumstances.
 22. * There was no clear distinction between the management of initial attack and extended attack in terms of policy or procedural requirements for tactical modifications, adjustments for safe practices, or changes in command.
 23. * The IC did not request engines. The Air Attack ordered two engines about 2:30 p.m.
 24. * Engine #701 was originally dispatched to work helispot, dust abatement, air crash rescue, and helicopter management. The Engine #701 Supervisor informed those on Engine #704 and the two firefighters in a chase vehicle that their assignment was to keep the fire east of the road as per dispatch direction.

25. * Between 3:24 and 3:27 p.m. Engines #701 and #704 arrived on the fire scene and did not check in with the IC or obtain a tactical briefing.
26. At approximately 4:00 p.m., Engine #701 attacked a spot fire near the road about 1/4 mile up the canyon from the lunch site. At this time, there was continuous unburned fuel between the lunch site and the spot fire. Engine #701 requested and received assistance from NWR #6.

Entrapment Phase

27. At approximately 4:34 p.m. the NWR #6 crew received direction from the NWR #6 Crew Boss Trainee (Kampen) and the Entiat IHC Superintendent to pull out and they complied.
28. The NWR #6 Crew Boss Trainee plus the six crewmembers of Squad 3 barely escaped as the fire began to burn at the edge of the road.
29. The IC (Daniels) and 13 NWR #6 Squad 1 and 2 crewmembers retreated south (10 in the van and four on foot) toward their lunch site, but their escape route was blocked by a wall of flames across the road. The IC then:
 - turned around, loaded all the crewmembers and their gear into the van, and retreated north up the canyon away from the fire
 - evaluated and rejected three separate rock scree sites as unsuitable
 - selected a "safety zone" (final deployment area)
30. It was later determined after the incident that the deployment area was not a "safety zone" because conditions were not survivable without deploying shelters.
31. The IC informed the crewmembers that the road was the safe place to be and repeatedly attempted to tell those in the rocks above the road to come to the road, but it is unknown if they all actually heard the directive. He was in constant contact with Air Attack and continually told the crewmembers and the civilians to remain calm.
32. * After arriving at the deployment site the crew dispersed to several locations:
 - Eight crewmembers (the IC and seven crewmembers) and the two civilians were on the road
 - Five crewmembers (one Squad Boss and four crewmembers) were on a couple of boulders about 30 feet from the road
 - One crewmember (a Squad Boss) was scouting up in the rock scree and eventually reached the conclusion that it was not as good a deployment site as the road
33. * The crew did not physically gather together on the road even after repeated attempts by the IC to bring them together; however, it is unknown if all those on the rocks actually heard the instructions.
34. * Although adequate time to prepare for shelter deployment was available, leadership did not prepare the crew for a possible burnover or initiate actions to control the situation.

Deployment Phase

35. After burnover, the IC directed the crewmembers out of their shelters and into the river.
36. Post-burnover rescue operations were well managed and coordinated by Entiat IHC.

Standard Fire Orders

All ten Standard Fire Orders were violated or disregarded at one time or another during the course of the incident. The following are some examples of these situations.

1. Fight fire aggressively but provide for safety first.

The tactics implemented provided for aggressive suppression but lacked critical safety procedures, including mandatory escape routes.

2. Initiate all actions based on current and expected fire behavior.

Aggressive attack with over-extended resources continued in spite of onsite indicators of an increased rate of spread, multiple spots, and crown fire.

3. Recognize current weather conditions and obtain forecasts.

- Although received by Okanogan Dispatch, no afternoon fire weather forecast was transmitted to the Thirtymile Fire or the Methow Valley District.
- No Spot Weather Forecast was requested by management or incident commanders.

4. Ensure that instructions are given and understood.

- Instructions were given without any direct tie to strategy or tactics at the time of the entrapment.
- At the deployment site instructions were given and not all were adhered to, but it is unknown whether they were heard or understood by all.
- Instructions were coming from multiple sources adding to the confusion.

5. Obtain current information on fire status.

- Air attack was utilized but due to smoke conditions could not always see the ground.
- No assigned lookouts were used after 2 p.m.

6. Remain in communication with your crew members, supervisors and adjoining forces.

Although the communication equipment was adequate, the lines of communications on the incident were poor due to lack of a plan and poorly established command structure. There was no viable strategy established during the afternoon of the incident.

7. Determine safety zones and escape routes.

After the 3 p.m. lunch break, the crews were up canyon doing a frontal assault and had no alternative escape route or safety zone identified. They had nowhere to go when their only escape route was cut off.

8. Establish lookouts in potentially hazardous situations.

No lookouts were established during the burning period beyond what could be seen from the road and from air attack, who had limited visibility of the fire due to smoke.

9. Retain control at all times.

Leadership was fragmented and ineffective at all levels during the afternoon of July 10th. Resources were being ordered and directions given by others than the IC. While a suitable deployment site was found and orders were given there was no evidence of strong leadership on the deployment site to implement the orders as given.

10. Stay alert, keep calm, think clearly, act decisively.

- Supervisors, managers, and firefighters failed to stay alert and recognize changing conditions.
- Fatigue and collateral duties impeded the abilities of key leadership to think clearly and to act decisively to use available time on the shelter deployment site to prepare for the turnover.

Watch Out Situations

The following ten Watch Out Situations were present or disregarded at one time or another during the course of the incident as evidenced by the following non-inclusive set of examples.

Safety zones and escape routes not identified (*Watch Out Situation # 3*)

- When they were working on the spots there was no clear instruction on safety zones or escape routes.
- The lunch site was not a safety zone and there were no safety zones up canyon from the point of the fire origin once the fire behavior became severe.
- The shelter deployment site was not a safety zone.

Unfamiliar with weather and local factors influencing fire behavior (*Watch Out Situation # 4*)

- Fire fighters were unaware of the near record ERC readings and how that affected fire behavior.

Uninformed about strategy tactics and hazards (*Watch Out Situation # 5*)

- Chosen strategy and tactics were not achievable or viable due to fuel and environmental conditions.
- Hazards were never properly recognized, evaluated, and addressed.
- It was not recognized that the tactics needed to be changed when the fire began to leave the riparian area.

Instructions and assignments not clear! (*Watch Out Situation # 6*)

- Instructions were given without any direct tie to strategy or tactics at the time of the entrapment.
- At the deployment site instructions were given and not all were adhered to, but it is unknown whether they were heard or understood by all.
- The incident commander did not make sure that all instructions were complied with.
- Many people throughout the incident gave instructions.

Constructing fire line without a safe anchor point (*Watch Out Situation # 8*)

- When action was taken on the spot fires at the head of the main fire there was no secure anchor point.

Attempting frontal assault on fire (Watch Out Situation # 10)

- After the lunch break, two squads and two engines were actively suppressing spot fires ahead of the main fire.

Unburned fuel between you and the fire (Watch Out Situation # 11)

- When engaged in suppression actions on the spots there was a large amount of unburned fuel between the main fire and the spots about 150 to 300 yards away.

Cannot see main fire, not in contact with anyone who can (Watch Out Situation # 12)

- Air attack could not see the entire fire; no one could see the part of the fire that presented the greatest hazard.
- Terrain smoke and vegetation blocked firefighters view of the main fire.
- A look out who could continually view the main fire was not posted.

Spot fires frequently cross line (Watch Out Situation # 16)

The NWR #6 crew experienced spots across their control lines from when they began work at approximately 11:00 a.m. on July 10th.

Terrain and fuels make escape to safety zones difficult (Watch Out Situation # 17)

The identified safety zone did not satisfy the defined characteristics of a true safety zone.

Epilogue

The Investigation Team endeavored to provide meaning and context to this incident in the hope that our efforts will create a greater sense of urgency and commitment to safety. The Forest Service and all organizations involved in wildland fire suppression, and especially each individual, need to rededicate themselves to the fundamental principle that a choice for safety is the right choice -- every time.

Rebecca Welch had little experience to draw on as she watched the approaching fire. Her only assets at this time were her judgment, her training, and the fire shelter itself. But at a critical moment she decided to move to the road. There she positioned herself along the roadside, and moments later deployed her fire shelter, even sharing the precious space inside with two civilians, saving their lives as well. The simple choices she made had profound impacts on the lives of three people.

Safety is an uncompromising master. Most people compromise safety routinely in their daily activities, usually with no consequences. But neglect of safety eventually leads to "near misses," and near misses lead to accidents, some with tragic consequences.

Fire suppression can be a dangerous business, and it has a history of tragic deaths. Safety and fire suppression need not be mutually exclusive, and safety must come first. We need to drive this message home with every agency, every crew, every manager, and every wildland firefighter involved in fire management and suppression.

