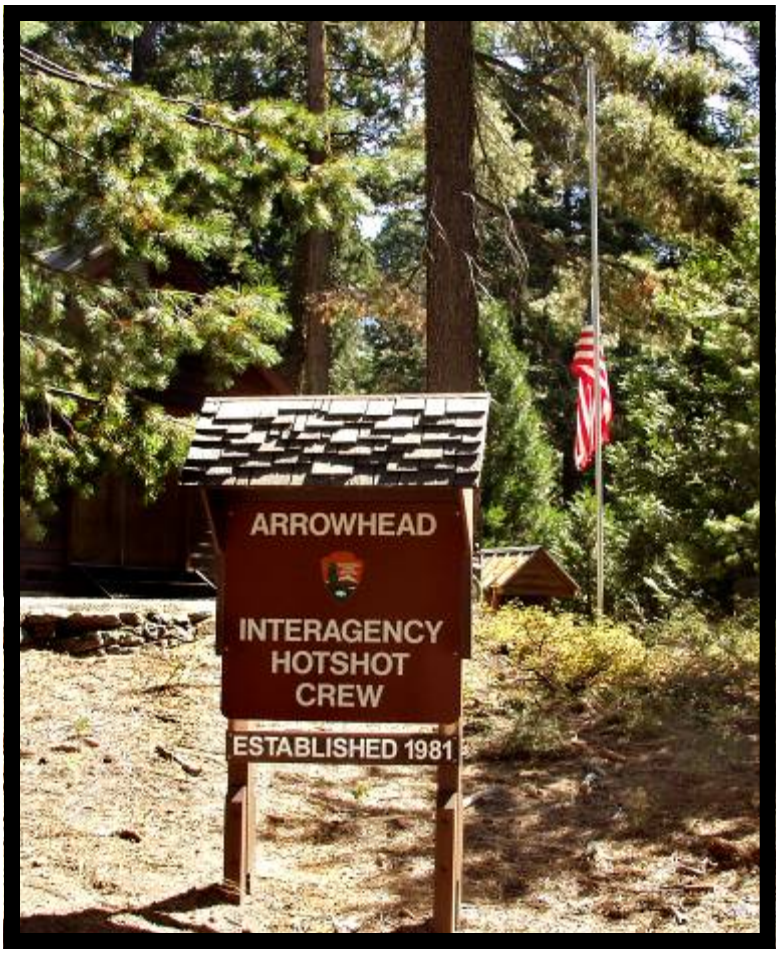
Holmes Accident Investigation

Sequoia and Kings Canyon National Parks



December 13, 2004

U.S. Department of the Interior
National Park Service

In Memory of Daniel P. Holmes

January 16, 1978 – October 2, 2004

On Saturday, October 2, 2004, the falling top of a white fir tree in Kings Canyon National Park squelched a bright light of positive energy and boundless life. At Dan Holmes's October 7 funeral in Rochester, New Hampshire, Dan was honored with a hero's farewell — complete with fire engines, bagpipes, and the Arrowhead Hotshots. Dan was a member of the Arrowhead Hotshots, an elite crew of firefighters who routinely travel the country tackling the largest forest fires.

Although Dan lived only a short time, he made an indelible mark on everyone he met. From his infectious smile to his trademark quote, "peace out," Dan was the type of guy who imparted a bit of goodness on everyone. His enthusiasm for life led him to delve into climbing with unmatched passion; working in Mount Rainier and Denali National Parks, he attained the summits of both landmark peaks with a relatively small amount of experience. He also went on a climbing stint in the Southern Alps of New Zealand. We have never seen anyone pick up anything with such gusto – and thus was the path of his life. Dan packed more into his 26 years than most people manage to fit into a lifetime.

In reality, Dan's death is a bitter, yet joyous occasion; it is a celebration of how he lived, which was always about the moment, and more than all else, the beauty of nature and life itself. If any of us could live life with just half of Dan's enthusiasm, we would be achieving something grand indeed. Peace out, Dan! Wherever you are, my brother, we're sure you're smiling in the thin air of a mountain summit.

-Brit Rosso and Ryan Heinsius

Report of the Daniel Holmes Serious Accident Investigation Team

December 13, 2004

INVESTIGATION TEAM

James A. Loach
Team Leader
NPS

Dan Horner
Chief Investigator
NPS

Vern Hurt
Accident Investigation Advisor/Safety Manager
NPS

Kevin Chambers
Agency Representative/Investigator
BLM

Dave McCandliss
Agency Representative/Investigator
USFS

CONTENTS

PREFACE

The intent of this report is to gather all pertinent data about the Daniel Holmes fatality. Firefighters can review and use this information to learn from the actions taken by Sequoia and Kings Canyon National Parks (SEKI), the Arrowhead Hotshots, and other firefighters on October 2, 2004.

The hazard that falling green trees and snags represent to firefighters cannot be overstated. Holmes was the 20th firefighter to be killed by a snag since 1960. The Daniel Holmes Serious Accident Investigation Team (SAIT) convened to determine the causal facts and provide recommendations on how to reduce the chance of another occurrence of a similar accident.

The team wishes to express our sincere gratitude to those who participated in this investigation, as well as condolences to family, friends, park staff, and Arrowhead Hotshots for the tragic loss of Daniel.

EXECUTIVE SUMMARY

On Saturday, October 2, 2004, at 12:46 p.m., firefighter Daniel Holmes, age 26, was transitioning from a tree size-up to a hose relocation task. A burning piece from the top of a snag fell and struck him on the head. Upon impact, he was rendered unconscious and did not regain consciousness. After placing him on a backboard, other crew members moved the injured firefighter to a safe location and provided further medical attention; he was then transported by park ambulance to a helicopter landing location for transport to Fresno, California. Resuscitation efforts began immediately, but were not successful. Holmes was pronounced dead at 1:58 p.m.

This accident occurred on the Grant West Omnibus Prescribed Burn, located in the Grant Grove area of Kings Canyon National Park. Daniel was a member of the Arrowhead Interagency Hotshot Crew, based at Sequoia and Kings Canyon National Parks.

INCIDENT OVERVIEW

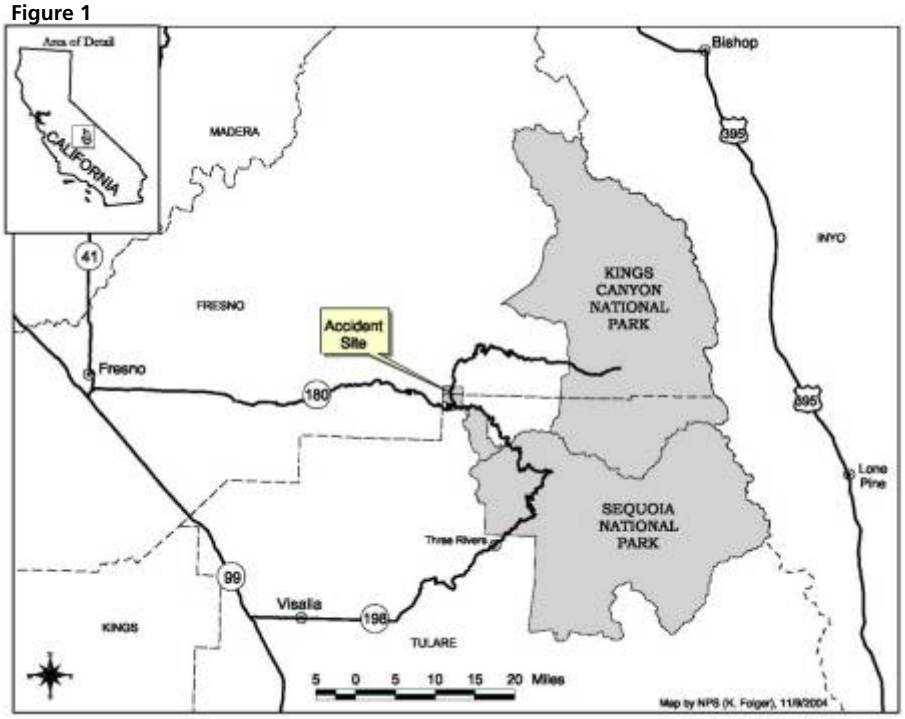
Background

Sequoia and Kings Canyon National Parks (SEKI) have an active prescribed fire program. Prescribed fire is one tool included in a comprehensive approach to managing forest structure and composition. The use of prescribed fire provides the combined benefit of enhancing ecosystem balance and reducing the severity of uncontrolled wildfires. The long history of fire management in Sequoia and Kings Canyon National Parks has demonstrated the value of focused fire applications and the need to continue fuels reduction efforts. Prescribed fire will continue to provide the reduction of high fuel loading under controlled conditions, whereas a wildfire burning through this area may occur during extreme conditions, cause widespread damage, and threaten visitor safety and private property.

The 2004 Grant West Omnibus Prescribed Burn was located in the Grant Grove area of Kings Canyon National Park (figure 1). This area has been burned multiple times since 1990 in a maintenance burning program. In the late 1990s, a tussock moth infestation caused considerable die-off of white fir, a predominant tree species at the Grant Grove elevation in the western Sierra Nevada.

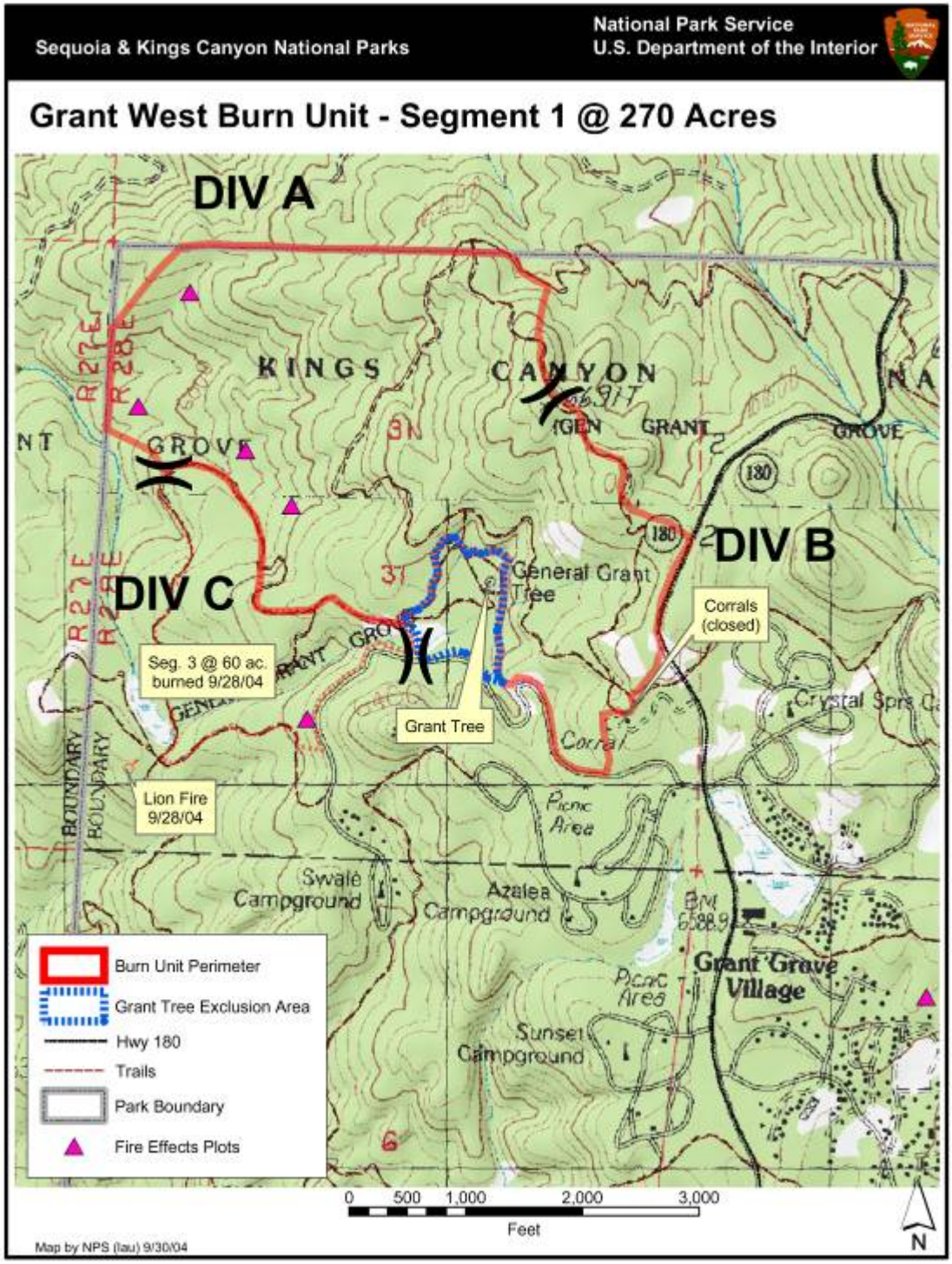
A 60-acre section of the unit was successfully burned on Tuesday, September 28. Crews planned to begin ignition of 270 acres on October 2 (figure 2). One day prior, while determining permission to burn, the San Joaquin Valley Unified Air Pollution Control District issued a "proceed with caution" advisory, as smoke dispersal forecasts were less than optimal. On October 2, weather and burning conditions were favorable and managers proceeded with the scheduled test burn.

Figure 1



INCIDENT OVERVIEW

Figure 2



INCIDENT OVERVIEW

Prior to any burning on this unit, local crews prepared the burn area. The park's prescribed fire managers laid out the holding line. It was constructed and a hose lay was installed. Numerous snags near the line were evaluated as safety hazards or as potential sources where fire might escape the burn area. The crews felled some of these; if a snag was not cut down, a line was constructed around the base to keep fire from the tree.

The dead white fir (figure 3) that was the source of this accident (accident snag) was located approximately twelve feet inside the fireline and was over 146 feet tall. During burn preparation, experienced firefighters who were red-card certified fallers, evaluated the tree and determined that it was not a substantial safety hazard or fire escape risk. A line was scraped around its base to exclude fire. The snag was considered sound even though the crown had lost its bark.

Factors considered by the fallers to determine soundness included:

- condition of the bark at all levels of the tree
- condition of limbs
- presence of red needles attached to the branches
- presence of previous burn scars, cat faces, cracks in the trunk, other damage to the base of the tree, or accumulation of heavy fuels near the base of the tree where fire could gain a foothold
- signs of significant insect or fungous infestation
- other obvious factors that could indicate danger

Personnel preparing the unit specifically remembered evaluating this tree, determining it was sound and choosing not to remove it prior to igniting the unit.

Figure 3: The accident snag is the center snag in this photo.

INCIDENT OVERVIEW

On the morning of October 2, burn personnel from SEKI and elsewhere gathered at Grant Grove in readiness for the burn. Two overhead staff members were involved with the burn in a training capacity: the prescribed fire burn boss trainee and the ignition specialist trainee. Briefing for overhead personnel was held at 8:00 a.m. and a general briefing was held at 9:00 a.m. Most firefighters confirmed that snag hazards were emphasized several times during the briefing by various overhead personnel. This was consistent with the Incident Action Plan (IAP).

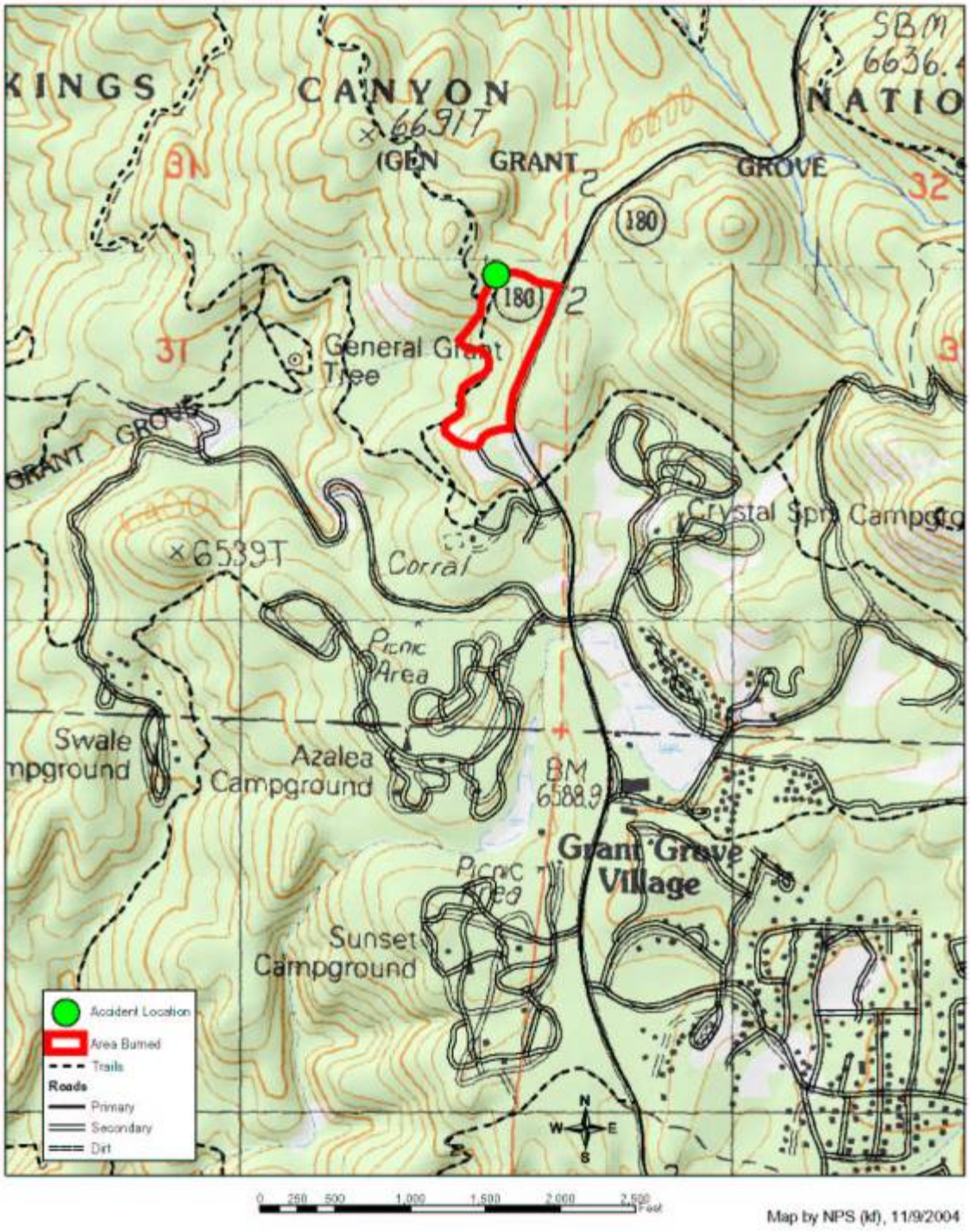
The IAP identified the first objective as "safety first: conduct all burn operations with strict attention to the safety of all burn personnel, other park personnel, and the public." The safety message contained eight points, the second of which was, "Watch out for snags throughout the unit. There are several tussock moth snags in the area." The IAP also indicated that the Medical Plan (ICS Form 206) was attached. However, the Medical Plan was not a part of the IAP as it was distributed at the general briefing. Some firefighters recalled medical procedures being explained at the general briefing, and others did not.

Following the general briefing, crews regrouped into their modules and most module leaders reemphasized snag hazards.

At 10:42 a.m., all fireline personnel were in place at the burn unit and the prescribed fire burn boss and burn boss trainee determined that operations would begin with a test burn at the eastern edge of the burn unit (figure 4). This test burn would allow them to evaluate burning conditions, particularly smoke dispersion. The test burn was larger than normal so that sufficient smoke would be generated to accurately evaluate smoke dispersion. It showed the dispersion was to the northeast, a very favorable condition. Winds were light and variable, generally from the southwest.

During this test burn, an area of brush and short trees located downhill and southeast of the accident snag caught fire. Witness firefighters reported that this torching generated a column of embers which rose to the top of the accident snag. An adjacent sugar pine was scorched 60 feet above the ground. Within minutes, firefighters saw smoke coming from top portions of the accident snag in an area where the bark was gone and a secondary crown had formed. Minutes after that, flames were observed.

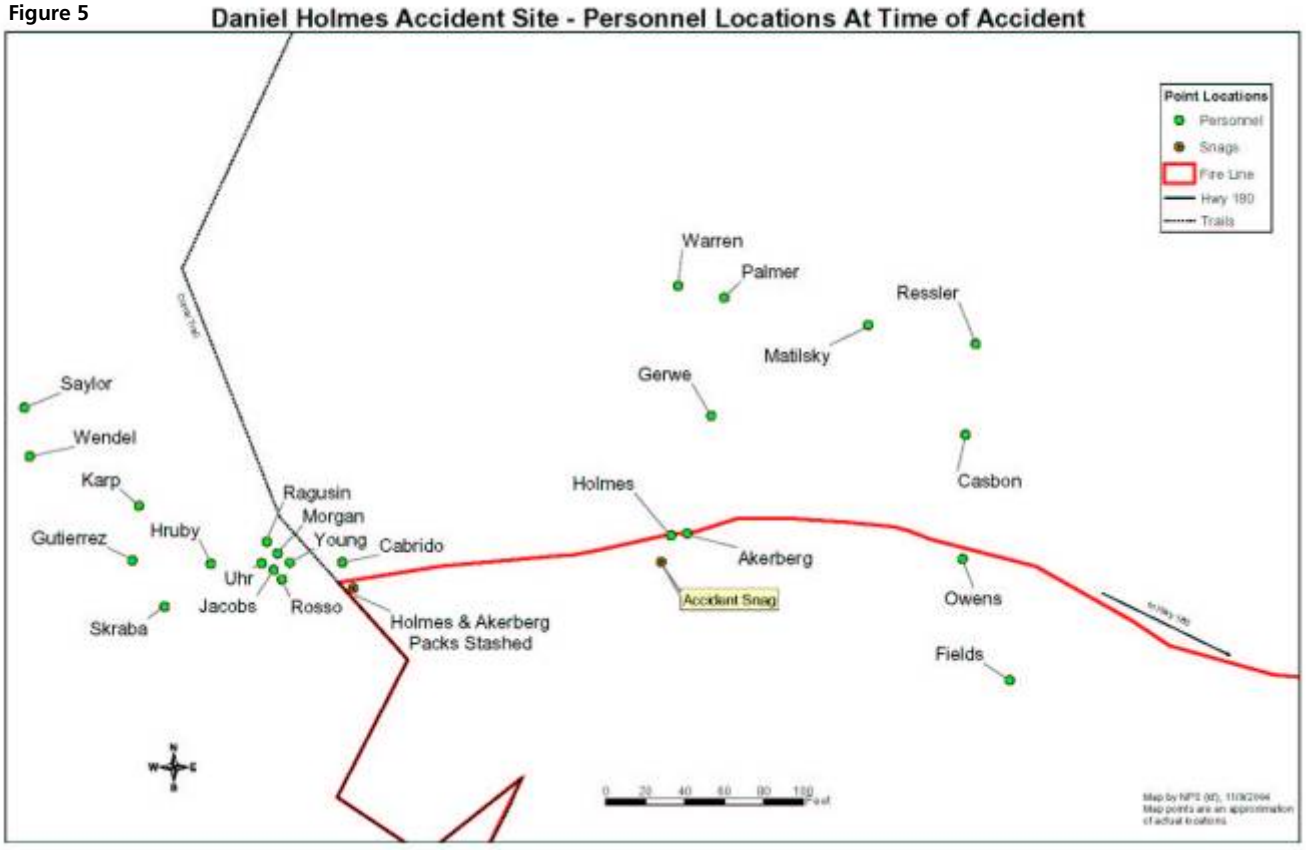
Figure 4 **Grant West I Prescribed Fire - Test Burn Area**



INCIDENT OVERVIEW

Upon successful completion of the test burn, Prescribed Fire Burn Boss Ben Jacobs and Prescribed Fire Burn Boss Trainee Leslie Uhr provided the Burn Plan Execution Go/No-Go Checklist to the Division B Supervisor Dave Allen for signature. Jacobs and Uhr moved west, up the line, to a location within sight of the accident snag, bringing the checklist to Division A Supervisor Brit Rosso. Rosso was aware of the fire in the top of the snag and now considered it a spot fire risk on the down wind side of the unit. He determined that the snag now needed to be felled. He called in a Class C falling team from the Arrowhead Interagency Hotshot Crew to evaluate the burning snag.

Figure 5



The falling team consisted of Falling Boss Mark Gerwe, Class C Faller Trainee Jake Akerberg, and swamper Daniel Holmes. Akerberg did the size-up of the snag with Gerwe nearby to observe and consult (figure 5). The initial plan was to drop the snag inside the fireline to the west. This would have been challenging because the snag had a slight lean to the north. Rosso suggested a second option would be to

break the hose lay which ran along the line; put out lateral hose lines to the side where the snag was leaning; fall it across the line; and immediately attack it as a spot fire. Since the burn was currently contained to the test area with no other holding concerns, and there were adequate personnel available to accomplish this task, the falling team decided that this was the better plan. According to Akerberg and Gerwe, Akerberg and Holmes had finished the sizing-up task and were passing under the snag, moving east along the fireline, on their way to assist other firefighters reconfigure the hose lay. At this point there were at least 15 other firefighters with a view of the snag, although no one was specifically assigned to be a lookout.

Several firefighters saw the top of the snag fall and yelled a warning. Others looked up and saw the snag top as it was falling. Several firefighters said that it made a whistling sound during its 2.5 to 3-second fall (figures 6 and 7).

Akerberg and Holmes were passing directly under the snag when multiple warning yells were made. Witnesses said that the two had begun to run to the east and had traveled no more than two steps when the tree top came down end-wise on Holmes' helmet, cracking its shell in two places. He was immediately knocked to the ground. A large ash cloud formed, blocking the vision of most observers. Holmes was knocked unconscious. It was apparent to the first persons rendering aid that he had a serious head injury.

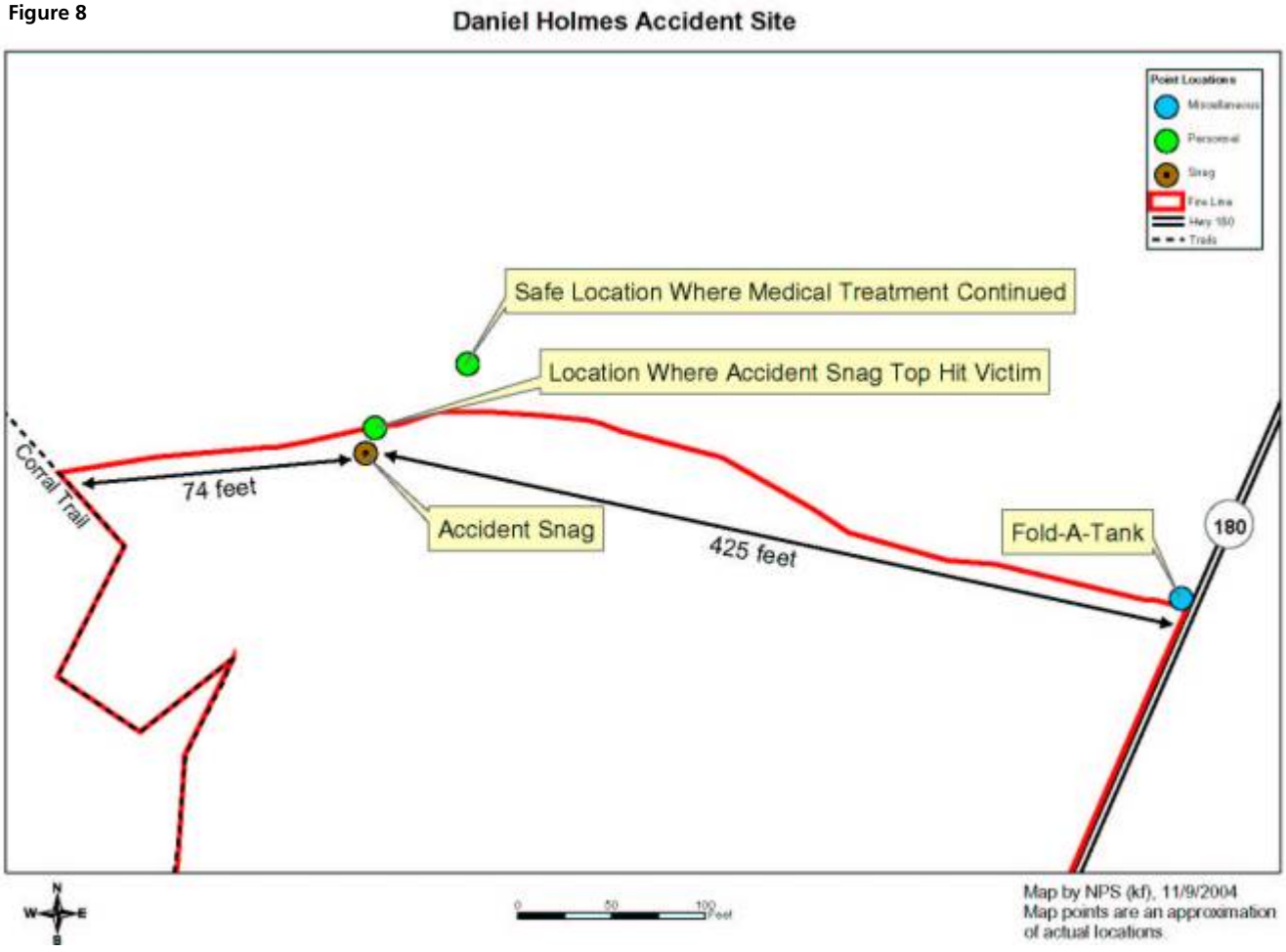
Figure 6: Piece of burning snag that hit the victim is shown in the foreground. (taken at approximately 6:25 p.m. on October 2, 2004)

Figure 7: Top of snag. Aerial photo taken after the accident.

Medical Response

Eight of the Arrowhead crew members, as well as other fire personnel, are Emergency Medical Technicians (EMTs). The Arrowhead EMTs carry two ten-person first aid kits while in the field. Akerberg, Gerwe, Gutierrez, and Hruby provided immediate care (figure 8). Holmes' spine was stabilized by hand and efforts were made to keep his airway open. Fearing they might injure him further by moving him without a backboard, the EMTs treated the firefighter where he fell, directly under the burning snag. A dedicated lookout was posted. Hoses were deployed to cool hot surface areas, reduce smoke, and extinguish falling embers. Holmes was bleeding from his mouth, ears, and nose; fluids were bubbling in his airway, and he had a weak pulse.

Figure 8



Emergency Response

At 12:48 p.m., an ambulance and park medic were requested by Uhr. At the same time, Rosso sent Arrowhead personnel to get medical equipment. Shortly thereafter, a medical helicopter was requested for transport to a trauma center. No park medic was on duty at Grant Grove. Ranger/EMT Nate Inouye arrived by patrol vehicle where the fireline intersected the road. The Grant Grove ambulance arrived moments later. Medical gear, oxygen, and a backboard were shuttled up the fireline to the accident scene. At 1:03 p.m., Inouye took the lead of the patient's care with fireline EMTs continuing to assist.

Holmes was placed on the backboard and his spine immobilized. At 1:07 p.m., he was carried out from under the snag to a safe area. Suction was used to clear his airway; an oral airway was also inserted. Oxygen was administered by mask. He was carried to the road by firefighters and placed in the ambulance. While the ambulance was en route to meet the helicopter, Holmes stopped breathing and was ventilated by a bag-valve-mask device. His pulse stopped, and CPR was administered by Inouye and Arrowhead EMT Hruby.

The ambulance arrived at the helispot at McGee Overlook. An automatic external defibrillator (AED) was attached and it initially indicated that no shock should be administered. CPR was performed for four or five cycles. One shock was eventually delivered with the AED with no results. CPR was continued until the helicopter arrived, at which point the flight nurse and paramedic took over the resuscitation. At 1:58 p.m., the helicopter crew ended the resuscitation efforts and pronounced Holmes dead.

Post Accident Actions

Holmes' body was kept in the NPS ambulance and driven back to the Grant Grove fire station. The rangers stayed with the body until Travis Shaw, Tulare County deputy coroner, arrived at 5:15 p.m. and took over custody. At 5:59 p.m., Miller Memorial Chapel of Visalia transported the body for the county.

On Monday, October 4, Dr. Gary Walter, M.D., performed an autopsy at Miller Memorial Chapel to determine cause of death and collect samples for toxicology laboratory tests.

INCIDENT TIMELINE

Time Information Sources:

SEKI Dispatch Center Radio Log (a)
SEKI Fire Dispatch Log (b)
Transcript of Recorded Dispatch Tape (c)
Patrick Morgan's Field Notes (d)
Leslie Uhr's Field Notes (e)
Nate Inouye's Field Notes (f)
Interagency Report of Incident and Dispatch Action (g)

Saturday, October 2, 2004

8:00 a.m.	SEKI Fire Dispatch, Arrowhead IHC, Engine 51, Crew 91, Ted Young, Patrol 51, and helibase in service. (b)
9:00 a.m.	IAP briefing conducted at the Grant Grove fire station. (e)
9:24 a.m.	Park Ridge Fire Lookout in service. (b)
10:42 a.m.	Prescribed fire burn boss begins ignition on test burn. (b)
11:35 a.m.	Traffic control starts on Division B-Highway 180. (e)
12:45 p.m.	Test burn complete. (e)
12:46 p.m.	Tree section strikes Dan Holmes (time estimate by Patrick Morgan). (d)
12:46 p.m.	On-scene EMTs begin emergency medical treatment. (d)
12:48 p.m.	Arrowhead IHC crewmember sent to crew truck to obtain additional EMS equipment. Park ambulance ordered and confirmed. (d)
12:49 p.m.	On-scene EMTs complete initial patient assessment. (d)
12:51 p.m.	Helicopter ambulance ordered from the accident scene. (d)

INCIDENT TIMELINE

12:51 p.m.	Park ambulance in service and responding. (c)
12:53 p.m.	Park Ranger/EMT Nate Inouye assumes role as medical incident commander. (c)
12:56 p.m.	Park ambulance on scene. (c)
1:00 p.m.	Burning stops due to serious injury to a firefighter. (e)
1:03 p.m.	Inouye arrives at accident scene and begins patient packaging. (d)
1:07 p.m.	Patient moved from initial accident scene to safe area 100 feet away. (f)
1:13 p.m.	Patient carried to the park ambulance on Hwy. 180. (d)
1:16 p.m.	Final decision made for the helicopter ambulance to land at McGee Overlook (Cherry Gap). (c)
1:17 p.m.	Patient loaded into the park ambulance. (d)
1:17 p.m.	Park ambulance departs scene en route to McGee Overlook. (c)
1:19 p.m.	Cardio-pulmonary resuscitation starts. (f)
1:21 p.m.	Park ambulance arrives at McGee Overlook. (c)
1:32 p.m.	Helicopter ambulance lands at McGee Overlook. (d)
1:33 p.m.	Helicopter ambulance medical crew rendezvous with park ambulance. (d)
1:58 p.m.	Daniel Holmes pronounced dead by helicopter ambulance medical crew. (f)

INVESTIGATION

As soon as it was known that a firefighter had died on the Grant West burn, an interagency SAIT was designated by the NPS National Fire Management Office. The team leader was contacted at approximately 2:30 p.m., on October 2. When assembled, the primary team consisted of 14 members:

Jim Loach, Team Leader, NPS
Dan Horner, Chief Investigator, NPS
Vern Hurt, Accident Investigation Advisor/Safety Manager, NPS
Kevin Chambers, Agency Representative/Investigator, BLM
Dave McCandliss, Agency Representative/Investigator, USFS
Rich Browne, Investigator, NPS
Todd Bruno, Investigator, NPS
James Gould, Investigator, NPS
Marty O'Toole, Information Officer, NPS
Dave Walton, Sequoia and Kings Canyon NPs Liaison, NPS
John Kraushaar, Agency Representative, NPS
Mark Harvey, Documentation, NPS
Victoria Mates, Writer/Editor, NPS
Robin Wills, Agency Representative, NPS
Gerry Carder, Logistics, NPS

Additional support provided by:

John Wenz, Subject Matter Expert-Entomologist, USFS
John Pronos, Subject Matter Expert-Plant Pathologist, USFS
Tom Warner, Subject Matter Expert-Park Forester, NPS
John Workman, Subject Matter Expert-Tree Worker, NPS
Karen Folger, Subject Matter Expert-GIS, NPS
Chris Edison, Transcriber, NPS
Kim Bollens, Transcriber, NPS
Katy Despain, Transcriber, NPS
Irene Burlingame, Transcriber, USFS
Cindy Mattiuzzi, Transcriber, NPS
Isabel Alvarado, Transcriber, NPS
Kelly Maples, Transcriber, NPS

The team was directed to:

1. Objectively gather facts and evidence, including causal and contributing factors related to the fatality
2. Develop the following reports: Preliminary Brief (24 hours), Expanded Brief (72 hours), Final Report (45 days)

The team investigated the accident site, reviewed the Grant West burn plan, conducted interviews of involved personnel, and researched causal factors. The team met regularly to discuss progress, clarify assignments, plan the report, and review findings.

NARRATIVE OF TEAM ACTIONS

Saturday, October 2

The fatal accident was reported to the National Park Service's Fire and Aviation Management Office at the National Interagency Fire Center. Paul Broyles, fire operations program leader, assembled an investigation team. Jim Loach, Midwest Region associate regional director for operations, was recruited as the team leader. Vern Hurt, chief of public health and safety for the Midwest Region, was selected to be the accident investigation advisor/safety manager. Dan Horner, special agent at Yosemite National Park, was appointed as the chief investigator. Horner drove to SEKI late that evening, arriving in Grant Grove shortly after midnight.

Sunday, October 3

At 8:00 a.m., Horner met with the park's death investigation team, led by Park Ranger Debbie Brenchley. In the late morning, Horner took photographs of the accident scene. Also driving from Yosemite, park rangers Rich Browne and Todd Bruno arrived at Grant Grove at about noon. Horner, Browne, and Bruno started a list of people they would need to interview. No interviews were started until Loach arrived later that afternoon and was briefed by Horner.

Dave McCandliss, district fire management officer for the High Sierra Ranger District on the Sierra National Forest, arrived in Grant Grove midmorning to serve as the US Forest Service (USFS) agency representative. After he oriented himself to the scene and took photographs, he was assigned to assist with interviews. Horner, Browne, Bruno, and McCandliss held a planning meeting in the early afternoon. At approximately 1:30 p.m., Horner drove to Ash Mountain for the in-briefing.

Loach and Hurt arrived at SEKI headquarters at Ash Mountain at about 3:00 p.m. Horner briefed Loach on current plans. After the briefing, Browne, Bruno, and McCandliss sat in on interviews of the Arrowhead Hotshots and BLM engine crew members being conducted by park investigators.

Shortly after 3:00 p.m., Loach, Hurt, and Horner attended the in-briefing with SEKI Superintendent Richard Martin and other key park staff members. John Kraushaar, Pacific West Regional deputy fire management officer for aviation and operations, arrived as the NPS agency representative on the SAIT and as a policy expert for fuels management, prescribed fire, fire qualifications, and national and regional standard operating procedures.

INVESTIGATION

Monday, October 4

In the morning, the team members present (minus Horner, who had already viewed the scene) visited the accident scene. Loach, Hurt, and Kraushaar also briefly visited the Arrowhead crew at the Swale Work Center. Rosso gave Loach a CD containing digital photos taken by Arrowhead crew members at the accident scene.

Interviews were conducted as follows: Browne, Bruno, and McCandliss interviewed crew members not stationed at SEKI so they could return to their home bases. McCandliss interviewed Grant Grove Ranger Nate Inouye, the ranger who served as medical incident commander. Browne, Bruno, and McCandliss continued to interview Arrowhead crew members at the Swale Work Center. Because of the Arrowhead's previously scheduled Critical Incident Stress Debriefing, the hotshots were not available for interviews that afternoon. The Firestorm contract crew was interviewed in the afternoon at Azalea Campground. Members of the Grant Grove Engine 51 crew were interviewed in the area of their station. Kings Canyon District Fire Management Officer Dave Bartlett was interviewed by Bruno and Horner at the Grant Grove fire station.

Kevin Chambers, fire management officer for the Bakersfield Field Office of the Bureau of Land Management (BLM) arrived to serve as agency representative. Kraushaar began reviews of the Grant West burn plan, IAP, and red card qualifications of all personnel on the burn.

Tuesday, October 5

In the morning, interviews of the Arrowhead Hotshots were completed. James Gould, park ranger from SEKI, assisted the SAIT with these interviews. Horner collected Holmes' helmet and line gear from Rosso. Horner also received a copy of a video tape taken by the Arrowhead crew immediately after the accident. McCandliss returned to the scene and took more photographs. Later in the afternoon the interview team moved from Grant Grove to Ash Mountain where the remaining persons to be interviewed were located. Browne began preparing an incident time line and Bruno began a roster of all persons involved in the Grant West burn and their red card qualifications.

John Wenz, entomologist, and John Pronos, plant pathologist, both with the USFS stationed in Sonora, California, were requested to survey the involved snag and prepare a report on their findings.

Tuesday, October 5 (continued)
Chambers worked with Brenchley and others on the park's death investigation team to collect information and arrange to share information. He then began documenting the location of all personnel at the time of the accident. He approached SEKI Geographic Information Systems (GIS) personnel to request assistance with maps and diagrams, and examined national policy and standard operating procedures on chainsaw operations and tree falling.

Wednesday, October 6
The members of the Ash Mountain Fuels Crew 91 and Sequoia District Fire Management Officer (FMO) Dave Allen, who was the Grant West burn Division B holding boss, were interviewed. Work continued on the time line and roster. McCandliss contacted the USFS Missoula Technology and Development Center regarding potential analysis of Holmes' helmet. The center felt that no useful information would be gained by submitting the helmet for analysis.

Thursday, October 7
Grant West Fire Information Officer Jody Lyle was interviewed. Follow-up interviews were done with some members of Crew 91. Horner flew in the park's contract helicopter to take aerial photographs of the top of the snag.

Friday, October 8
Browne and Bruno interviewed Uhr. They also accomplished three follow-up interviews with members of Crew 91.

Saturday, October 9 through Tuesday, October 12
Interview transcription continued during the Columbus Day holiday weekend.

Wednesday, October 13
A team planning meeting was held. Browne interviewed Ben Jacobs as the last interview of the Grant West burn overhead team. Chambers worked on refining maps and diagrams with the SEKI GIS office, and joined McCandliss in further examining chainsaw and falling policy and procedure and reviewing interview transcripts. Kraushaar continued to review policy, procedures, and interview transcripts. The investigative team planned for a group interview with SEKI FMO Bill Kaage.

INVESTIGATION

Thursday, October 14
The morning began with a team discussion of what needed to be done to further the drafting of the report. At 10:00 a.m., the full team was invited to participate in a Critical Incident Stress Debriefing at the Ash Mountain Community Center. From 11:30 a.m. to approximately 2:00 p.m., a group interview with Kaage was held in the Ash Mountain fire station. About 3:00 p.m., a team meeting was held to discuss findings and causal factors for the report. Because Kraushaar was departing the following morning, Robin Wills, Pacific West regional fire ecologist, arrived to replace him. Interview transcription continued.

Friday, October 15
Browne edited the incident timeline, refined the Grant West burn roster, and conducted follow-up interviews at Ash Mountain and Grant Grove. While at Grant Grove, he returned to the accident scene and confirmed measurements. Horner drafted parts of the report. The team reviewed and commented on the first report draft. Interview transcription continued.

Saturday, October 16
A team meeting was held; it was decided that the team would reconvene on November 8 to finalize the report and close out with the park superintendent. Browne completed the incident timeline and the burn roster. The team continued review of the report draft and discussed what would be included in the appendices. In the afternoon, most team members departed to travel home. Interview transcription continued.

Monday, November 8 through Friday, November 12
The team reconvened to review coroner report findings, conduct follow-up interviews, discuss findings and recommendations, and finalize the report.

FINDINGS

This section presents the Holmes Investigation Team's findings. These are supported by interviews, physical evidence, photographs, standard operating procedures (SOPs), technical and subject matter experts, and other information held electronically in the investigation file at the Washington D.C. NPS Risk Management Office. All original investigation documents are on file at Sequoia and Kings Canyon National Parks.

DIRECT CAUSE

In the course of the Grant West burn, the top of a snag caught fire. The fire weakened the snag and caused the burning top portion to fall. Holmes was walking underneath the snag; he was hit on the head by this top portion and mortally wounded.

INDIRECT CAUSES

HUMAN ERROR

Standards Failures

- Current wildfire standards and policies are not sufficient to mitigate the danger associated with working near burning trees and snags.
- Existing snag safety standards (i.e. in the Fireline Handbook and brief mention in the SEKI Job Hazard Analysis (JHA) on prescribed fire) are not adequate to provide for firefighter safety.
- The standard of posting a lookout failed in the case of watching a snag for falling material because there was not ample time to react. Posting a lookout is described as ineffective in the S-212 Wildland Fire Chain Saws Instructor Guide.
- The tree-falling section of the Fireline Handbook and unit three (pg. 3.34) of the S-212 Wildland Fire Chain Saws Instructor Guide provide conflicting information on the posting of lookouts.
- The hazard tree section of the Incident Response Pocket Guide states, "Trees [that] have been burning for an extended period" are hazardous. This language implies that a tree burning for a short period of time is less dangerous. Such an ambiguous statement also requires speculation on what is "an extended period." It is misleading to state that the level of danger is a function of time.
- There was a failure to fully implement the proposals set forth by the 1993 National Snag Hazard Report.

FINDINGS

Individual Failure

- A JHA was not completed for working near a snag, whether burning or not. The NPS Occupational Safety and Health Program Reference Manual #50B, section 13, requires that a JHA be completed for any hazardous situation in the workplace.
- The firefighters failed to recognize the increased hazard of the snag, once it caught fire.
- LCES (Lookouts, Communications, Escape Routes, Safety Zones) was not established for the hose relocation task. As tasks and conditions change, LCES must be established to fit the situation. Changing the travel route along the fireline underneath the burning tree was not considered.
- While transitioning to a hose relocation task, Akerberg and Holmes momentarily lost "situational awareness" of the burning snag hazard.

MATERIAL FAILURES

- The investigation team considered whether or not the failure of the helmet was a causal factor; they determined that the helmet was not designed to protect from an impact of that magnitude (figure 9).

Figure 9: Holmes' helmet

ENVIRONMENTAL CONDITIONS

The condition of the snag:

- A USFS plant pathologist and a USFS entomologist found that multiple factors contributed to the death of the white fir involved in the accident. The factors included tree age, probable decay, periodic moisture stress, true fir mistletoe, attack by fir engraver beetles, and possible defoliation by Douglas fir tussock moths. The snag had probably been dead for one to two years at the time of the accident, with the top 20% having likely been dead a few years prior to that. Dead branches were scattered throughout the crown, and older ones had already broken loose from the bole. Such dead tops and branches eventually become structurally unsound.

FINDINGS

Fire Behavior

- The test fire was burning within prescription.
- Three igniters, spaced eight to ten feet apart using a spot firing method, dropped fire every ten to fifteen feet. This procedure continued until the test fire was completed. The fire carried well, creating 12 – 18 inch flame lengths in the surface litter. Higher flame lengths were observed in pockets of heavier fuels. Some torching occurred in small conifer stands creating some high scorch heights.
- Given the tree's condition and burning conditions of the day, probability of ignition of the snag top was high.
- Approximately 50 feet downhill from the accident snag at the top of a small drainage, a small group of low brush mixed with conifer regeneration caught fire (figure 10). The combined effects of the drainage, wind direction, and torching conifers lifted burning embers into the top of the accident snag. A large mature sugar pine 47 feet southeast of the accident shows scorch height of 60 feet. The accident snag has no scorch marks.

Site Conditions *(taken from burn plan)*

FUEL MODELS

36% Fuel Model 8 (closed canopy stands of short-needle conifers, including white fir, incense-cedar, and giant sequoia with some scattered heavy fuel concentrations) Understory species include dogwood, manzanita, and white thorn.

64% Mixture of Fuel Model 10 (heavy timber litter) and Custom Fuel Model 14 (includes larger limb wood that creates heavy loads of dead material on the forest floor, as well as low elevation short needle conifers including white fir and giant sequoia). Understory species include bear clover, ribes, manzanita, and white thorn.

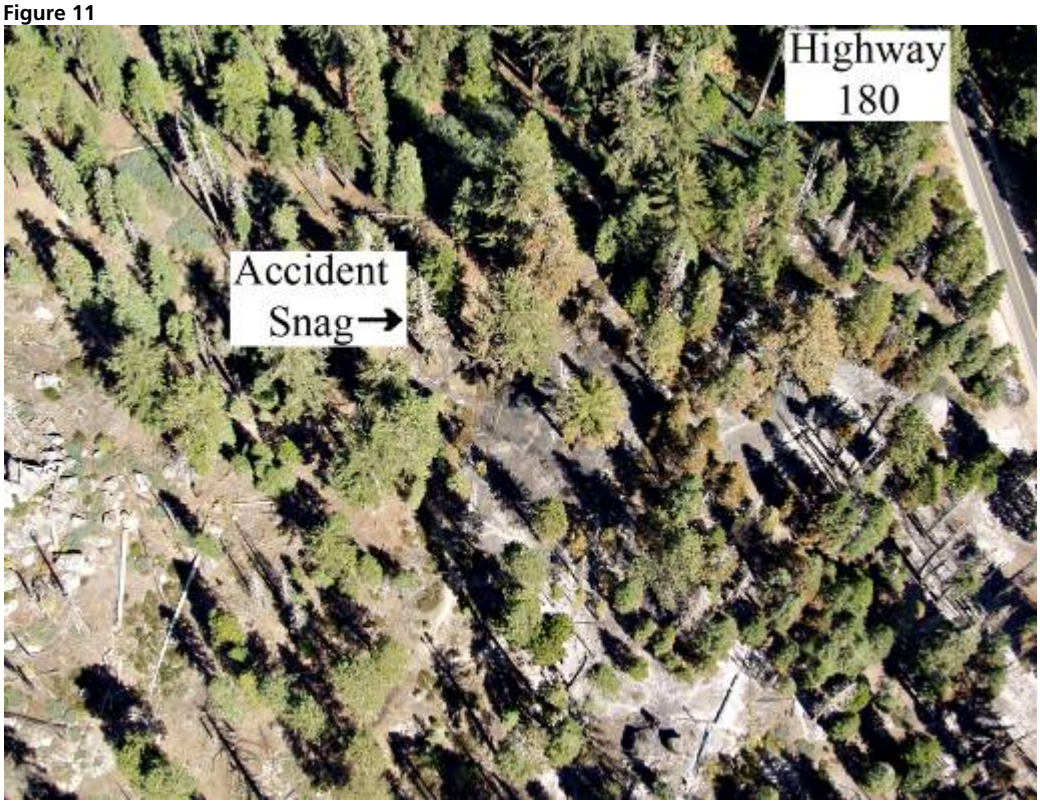
Figure 10: The accident snag is the tallest tree in the center of this image. The scorched sugar pine is on the far right.

Site Conditions (continued)

TOPOGRAPHY (figures 11 and 12)

Grant Grove is variably sloped with small meadows occurring in the flatter portions. Creeks and streams are common. Two giant sequoia groves are located within the area. Elevation ranges of the burn unit are from 5900 to 6691 feet. The slope of the unit ranges from 0-45%, with 25% being the average; the aspect is west and southwest. It is a mixed conifer forest comprised of white fir, Ponderosa pine and incense-cedar with pockets of manzanita and chinquapin.

Figure 11



ACCIDENT SCENE

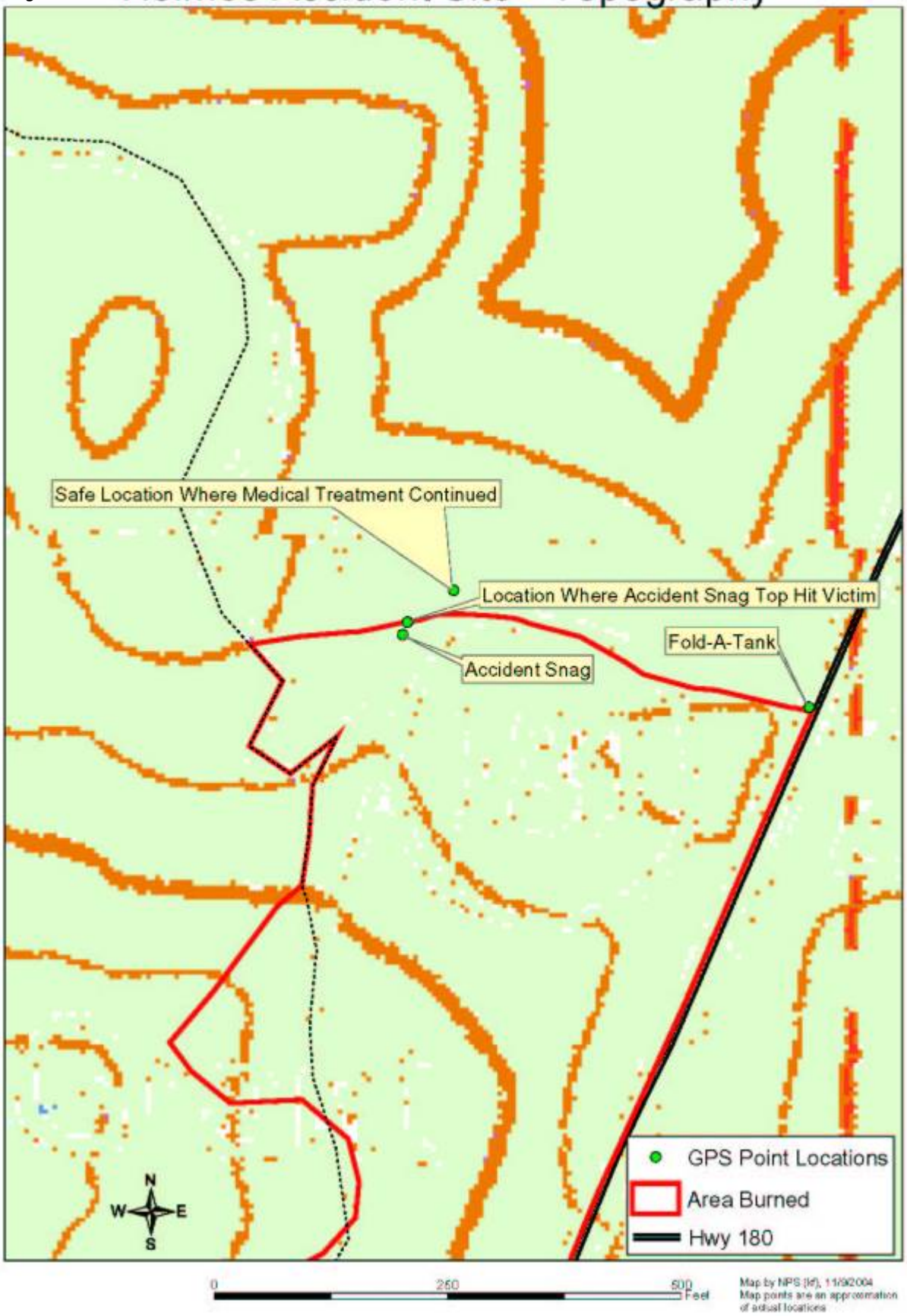
The control line in this area runs along a low ridge in a gentle saddle in an east-west direction. The accident snag is located in a broad level saddle, 12 feet south of the fireline.

WEATHER

No critical fire weather patterns occurred at the time of ignition. Temperature was 66-68 F; relative humidity was 25-30 %; winds were light and variable, mostly upslope 3-6 mph SW.

Figure 12

Holmes Accident Site - Topography



FINDINGS

OTHER FINDINGS

- All positions on this burn were filled with personnel who were red-card qualified for their positions.
- The burn plan met the standards of NPS Wildland Fire Management Reference Manual 18, chapter 10B.
- The burn unit was segmented to reduce burn unit acreage in order to meet San Joaquin Valley Unified Air Pollution Control District smoke management considerations. This reduction required the construction of the fireline section where the firefighter was killed.
- The Medical Plan was not attached to the IAP.
- The Burn Plan Execution Go/No-Go Checklist was signed, but the individual elements were not checked off.
- No advanced life support medic was on duty in Grant Grove at the time of the accident.
- The Medical Plan was not coordinated with rangers who staff the local ambulance and were on duty at the time of the accident.
- The autopsy report, completed on October 13, 2004, identified the cause of death to be a basilar skull fracture. A hemothorax was identified as a significant condition contributing to death. The toxicology test indicated a blood alcohol content (BAC) of .06%. The drug screen showed no positive findings.*

*On November 2, SEKI Law Enforcement Specialist Robert Wilson received the Tulare County autopsy report. For the first time, Holmes' BAC level was reported. On November 3, Wilson informed SAIT Chief Investigator Horner of the BAC level. Horner asked Wilson to communicate with the pathologist and clarify this finding's significance. Wilson reported that autopsy BACs of .02 -.03% are not uncommon due to post mortem decomposition, especially when refrigeration of the body is delayed; however, a .06% BAC was higher than would be expected from this process. Wilson further reported that a yeast or bacteria infection of the blood sample could have potentially caused this BAC. To determine if yeast or bacteria was present, the coroner's office ordered gram stain laboratory tests on a saved sample of Holmes' blood. The BAC test was also ordered to be redone.

Based on the information of the BAC level, investigator Browne re-interviewed Rosso, Morgan, Ressler, Akerberg, and Gerwe during the week of November 8. These men supervised or worked closely with Holmes on the day of his death. The interviews focused specifically on determining if Holmes took any medications or consumed

* (continued)

alcoholic beverages at a time that could have resulted in the reported BAC level. All persons interviewed said that they had not seen Holmes take any medications or consume alcoholic beverages at a time that would have resulted in a measurable BAC. All were asked if they had smelled alcohol on Holmes or had observed any objective signs of physical impairment while working closely with him. They had not.

On November 9, Wilson reported that the BAC re-test result was .05% (within the testing equipment's coefficient of variation with respect to the .06% first result), and that the gram stain test showed no yeast or bacteria present in the sample. The pathologist submitted the blood sample to the lab for a yeast culture. On November 16, the pathologist informed Wilson that the result of the yeast culture confirmed that yeast was not present. On December 1, the pathologist wrote a letter to Wilson about the blood alcohol analysis process which summarized the laboratory tests and stated his opinion that Holmes' autopsy BAC results were accurate. He did offer that a possible mitigating factor could be that the rib fractures might conceivably be a source of contamination of the blood sample, and that the BAC levels could be residual from alcohol intake the night before the accident. The pathologist stated in the letter that the liver will metabolize .015 to .02% BAC per hour. Based on the re-interviewed firefighter's statements about Holmes' potential previous night's alcohol intake, Holmes did not consume an alcohol amount to result in the BAC levels from the autopsy blood sample.

On November 12, investigator Browne returned to the Arrowhead Hotshot's base to recover two full water bottles that were stored with Holmes' fire-line gear (of the four carried the day of the accident; two had been cleaned and put back in service). One bottle appeared to contain water; the other held red liquid. The bottles were tested for alcohol presence. The lab results showed none present in the bottle of clear liquid, and less than .1% ethyl alcohol in the bottle containing red liquid. This amount is not enough to explain the BAC at autopsy.

RECOMMENDATIONS

This section presents the SAIT's recommendations for follow-up actions which are based on the findings. These corrective actions should be implemented on an interagency basis as appropriate to reduce future accidents of this nature.

- The National Safety and Health Working Team (SHWT) should reevaluate the findings and proposals of the 1993 National Snag Hazard Report and move forward to implement all proposals. The SHWT should also develop revised policy and standards for working near and underneath burning snags and trees.
  The 1980s saw a large increase in falling snag and tree related fatalities. In spring 1993, the SHWT formed a task group to review and analyze snag accidents and fatalities and make recommendations. This group was called the National Snag Hazard Review Task Group and generated the National Snag Hazard Report. The group interviewed 100 fire suppression personnel about the safety standards, guidelines, training, and tactics that were in use. The group drew conclusions and proposed actions to be taken to improve firefighter safety relative to snag hazards. Many proposals were never implemented.

- LCES hazard mitigation protocol needs to be emphasized at entry and mid-level fire training. The practice of modifying LCES as job tasks and situations change must be improved.

- The hazard tree sections of the Incident Response Pocket Guide and the Fireline Handbook must be revised by the Incident Operations Standards Working Team. This revision should include language stating that all burning snags are dangerous, regardless of the length of time they have been burning.

- The tree felling section of the Fireline Handbook and unit 3 (page 3.34) of the S-212 Wildland Fire Chain Saws Instructor Guide must be made consistent regarding the posting of lookouts to warn personnel of objects falling from trees and snags.

- A template for a JHA addressing safety near and underneath burning snags and burning trees should be developed at the national level so fire supervisors will have a model to help them write their own JHA locally.

RECOMMENDATIONS

- A national education program focusing on firefighter safety while working near and underneath snags and trees should be implemented.

- Federal, state, and local officials must work together as a team to develop strategies for prescribed fire and wildland fire use, reducing risks to firefighters as well as achieving air quality and National Fire Plan objectives. *The National Fire Plan requires treatment of increasing amounts of acreage to reduce the threat of wildfire to communities. This conflicts with local air quality districts that mandate limited smoke duration. To meet these mandates, federal land managers have been required to reduce the size of burn units by segmenting them into smaller units. Much more fireline must be constructed in order to treat the same total acreage, resulting in additional days of exposure of firefighters to hazardous conditions.*

GLOSSARY

Burn Plan Execution Go/No-Go Checklist-A checklist verifying completion of required factors which must happen before a prescribed fire is lit or continue once a test burn has been successfully accomplished; the checklist must have at least three signatures to be complete.

CPR-Cardio-pulmonary resuscitation.

Cat face-A wound near the base of a tree where the bark has been removed and the tree is more vulnerable to fire.

Faller -A chainsaw operator who manages the falling of trees; Class C fallers have significant experience and skill; also called sawyer or cutter.

Forest structure & composition-the quantity, distribution, and species of trees in a particular area of forest.

Fuels-Anything that burns, including leaves, needles, and standing live trees.

Helispot– A predetermined, safe landing location for a helicopter.

Holding line-A temporary control line used to limit the spread of a fire.

Hose lay-Arrangement of connected lengths of fire hose and accessories on the ground. Begins at the first pumping unit and ends at the point of water delivery.

ICS-Incident Command System

IHC-Interagency Hotshot Crew

Litter-The top layer of forest floor, composed of loose debris of dead sticks, branches, twigs, and recently fallen leaves or needles; structure of material has been minimally altered by decomposition.

Lookouts, Communications, Escape Routes & Safety Zones (LCES)-Elements of a safety system used by fire fighters to routinely assess their current situation with respect to wildland firefighting hazards.

Prescribed fire-A management-ignited wildland fire that burns under specified conditions. The fire is confined to a predetermined area and produces behavior and characteristics required to attain resource management objectives.

RM-Reference Manual (NPS guidelines).

Scratch line-An unfinished preliminary control line hastily established or constructed as an emergency measure to stop the spread of a fire.

Size-up-The evaluation of fire or snag to determine a course of action.

Snag-A standing dead tree or part of a dead tree.

Spot fire-Fire unintentionally ignited outside the perimeter of the main fire.

APPENDICES

1. Grant West Omnibus Prescribed Burn Plan
2. Grant West Omnibus Prescribed Burn Incident Action Plan for October 2, 2004
3. Burn Plan Execution Go/No-Go Checklist
4. Grant West Omnibus Prescribed Burn Briefing Guide
5. Firefighters Assigned to the Grant Burn & Qualifications
6. Weather
   - A. Field Notes
   - B. Spot Weather
   - C. Planned Ignition Forecast Advisory
7. Grant Burn Log
8. NPS Radio Transcripts/Logs
   - A. Radio Call Numbers
   - B. SEKI Fire Dispatch Radio Log
   - C. SEKI Park Dispatch Radio Log
   - D. Transcript of Park Dispatch Tape
9. Coroner and Autopsy Reports
   Daniel Holmes' family requested that the coroner's and autopsy report not be distributed publicly and the National Park Service is respecting the family's request.
10. Interview Transcripts
    Department of the Interior, Departmental Manual Part 485, Chapter 7, Appendix 1 provides that all interview and witness statements are to be treated as confidential. After consultation with Office of the Solicitor, it was determined that the identity of those interviewed and their interview transcripts, are to be protected from disclosure under 5 U.S.C. 552(b)(6), of the Freedom of Information Act.
11. Tree Failure Reports
    - A. USFS Tree Failure Report
    - B. SEKI Tree Failure Report
12. Safety and Prescribed Fire Policies, SOPs, and Reports
    - A. SEKI JHAs and JHGs
    - B. Hardhat Information
    - C. Class C Faller Taskbook Implementation Standards and Memo
    - D. FY2002 Safety Plan, Division of Fire and Visitor Management
    - E. 1993 National Snag Hazard Report
13. SEKI Death Investigation
14. SAIT
    - A. Delegation of Authority
    - B. Organizational Chart
    - C. SAIT Biographies

HOLMES ACCIDENT INVESTIGATION

APPENDIX 1

Grant West Omnibus Prescribed Burn Plan

USDI National Park Service
SEQUOIA & KINGS CANYON NATIONAL PARKS

PRESCRIBED FIRE BURN PLAN

UNIT NAME: GRANT WEST OMNIBUS

Prepared By: _____ Date: _____
Assistant Fuels Management Specialist
Corky Conover

Reviewed By: Corky Conover Date: July 27, 2004
Technical Specialist Reviewer

Reviewed By: _____ Date: _____
USFS Hume Lake District FMO

Recommended By: _____ Date: _____
Kings District Fire Management Officer

_____ Date: _____
Park Fire Management Officer

_____ Date: _____
Kings District Ranger

_____ Date: _____
Chief Ranger

_____ Date: _____
Natural Resource Management Specialist

_____ Date: _____
Chief, Science and Resources Management

_____ Date: _____
Chief, Cultural Resources and Interpretation

The approved prescribed fire plan constitutes a delegation of authority to burn. No one has the authority to burn without an approved plan or in a manner not in compliance with the approved plan. Actions taken in compliance with the approved prescribed fire plan will be fully supported. Personnel will be held accountable for actions taken that are not in compliance with elements of the approved plan regarding execution in a safe and cost-effective manner.

Approved By: _____ Date: _____
Superintendent

For information about this burn unit, contact:
Fire Management Office (559) 565-3164/3165
FAX: (559) 565-3797, 24 Hour Dispatch (559) 565-3341

USDI National Park Service
SEQUOIA & KINGS CANYON NATIONAL PARKS

PRESCRIBED FIRE BURN PLAN

UNIT NAME: GRANT WEST OMNIBUS

Prepared By: Leslie [illegible] Date: 7/11/04
Assistant Fuels Management Specialist

Reviewed By: _____ Date: _____
Technical Specialist Reviewer

Reviewed By: _____ Date: _____
USFS Hume Lake District FMO

Recommended By: [illegible] Date: 8/17/04
Kings District ~~Fire Management Officer~~ Ranger

for [illegible] Date: 7/19/04
Park Fire Management Officer

[illegible] Date: 8/6/04
Kings District ~~Ranger~~ FMO

[illegible] Date: 9/14/04
Chief Ranger

adg

[illegible] Date: 9/14/04
Natural Resource Management Specialist

[illegible] Date: 9/15/04
Chief, Science and Resources Management

[illegible] Date: 9/15/04 SEE COMMENTS
Chief, Cultural Resources and Interpretation

The approved prescribed fire plan constitutes a delegation of authority to burn. No one has the authority to burn without an approved plan or in a manner not in compliance with the approved plan. Actions taken in compliance with the approved prescribed fire plan will be fully supported. Personnel will be held accountable for actions taken that are not in compliance with elements of the approved plan regarding execution in a safe and cost-effective manner.

Approved By: [illegible] Date: 9/17/04
Superintendent

For information about this burn unit, contact:
Fire Management Office (559) 565-3164/3165
FAX: (559) 565-3797, 24 Hour Dispatch (559) 565-3341

TABLE OF CONTENTS

B. EXECUTIVE SUMMARY

The purpose of the Grant West Omnibus Prescribed Burn is to continue to maintain health and productivity to an ecosystem that has evolved with recurring fire for thousands of years and to maintain fuel loads within a range that will prevent a stand-replacing wildfire. The three segments that make up this unit will be used as part of the long term fuels management program to maintain the natural fire cycle in the ecosystems of the Grant Grove area. Fire is a vital process in the Sierra Nevada that has been excluded by the intervention of human fire suppression activities. Prescribed fire will continue to provide the reduction of high fuel loadings under controlled conditions whereas a wildfire burning through this area may occur during extreme conditions and could cause damage to the ecosystems and threaten visitor safety and property. As a result, this proposed burn will aid in continuing to build a reduced fuels buffer around the Grant Grove developed area, the General Grant Tree, the Big Stump Entrance and the community of Wilsonia.

C. DESCRIPTION OF PRESCRIBED FIRE AREA

Area Description: The Grant West Omnibus Burn Unit is 436 acres in size, ranging in elevation from 5,900 feet to over 6,691 feet. It is comprised of White Fir, Ponderosa Pine and Giant Sequoia with pockets of manzanita and chinquapin. The unit is generally west facing and is west of Highway 180, and is divided into three segments. Segment 1, known as **Grant West I**, the largest segment, is 271 acres. The second segment, known as **Grant West II**, is approximately 106 acres, and segment 3, known as **Grant West III**, is approximately 59 acres. The purpose of this management ignited prescribed fire project is to reduce the dead and down fuels west of Highway 180, north of Azalea Campground, east and south of the Sequoia National Forest Boundary. The segments in this burn unit are within the Grant Grove Sub-District and bounded on the north and west by Sequoia National Forest. These segments were last burned between 1990 and 1995 as 3 separate burn units.

1) Location: Northwest corner of the Grant Grove peninsula.
   County - Fresno
   Township 14 S, Range 28 E, north half of section 31.
   Latitude 36° 45' 07.22"
   Longitude 118° 58' 31.42"

2)

Size:	436 acres
Elevation Range:	5,900 ft. to 6,691 ft.
Slope(s):	0% to 45%, average: 25%
Aspect(s):	west and southwest

3) Description of Project Boundaries: From Highway 180, at the northern boundary of the park, just north of Grant Grove, approximately 1.5 miles due west along the boundary of the park and Sequoia NF, is the northern boundary of the unit. The western boundary of the unit extends along the western boundary of the park, wrapping around back to tie in with the North Grove Loop Trail. Then continuing along this trail until it reaches the Fire Road Trail. The southern boundary of the unit would start at the junction of the Fire Road Trail and the Swale Cutoff Trail. From this point, heading east until intersecting Swale Road. The unit boundary continues along the Swale Road until it reaches the parking lot for the General Grant Tree. There is a 10 acre exclusion area surrounding the General Grant Tree, which is included in this southern boundary of the unit. The unit boundary then continues from the exclusion area in a northeastern direction until it intersects Highway 180 again. This line would go just north of the service road and corrals, intersecting with the Highway. The eastern boundary of the unit is Highway 180 to the northern boundary of the park. (see ATTACHMENT 13)

4) Vegetation Types and NFFL Fuel Model including Fuel Loading and Dead Fuels:

<u>Vegetation Includes</u>: Manzanita (*Arctostaphylus spp.*) and chinquapin (*Chrysolepis sempervirens*) (NFFL 5) in very small concentrations are scattered around the upper north east part of the unit. White fir (*Abies concolor*) and Incense cedar (*Calocedrus decurrens*) litter (NFFL 8) in large jackpots and heavy ground litter concentrations are scattered throughout the unit. There are also heavy loadings of dead

and down fuels in the 3" diameter and larger material (NFFL 10) throughout the segment. Custom Fuel Model 14 is also represented in the unit which includes a giant sequoia component.

Fuel loading description: The burn unit is variably sloped throughout, with small meadow areas occurring in flatter portions. Very few areas of dense closed canopy occur on the interior portions, as well as jackpots scattered throughout.

36% - Fuel Model 8; Closed canopy stands of short-needle conifers, including white fir, incense cedar and some giant sequoia. Scattered jackpot's or heavy fuel concentrations exist within the unit. Understory species include dogwood, manzanita and white thorn.

64% - Mixture of Fuel Model 10 Heavy timber litter, and Custom Fuel Model 14; including larger limb wood that create large loads of dead material on the forest floor, also known as jackpots, and low elevation short needle conifer including white fir and giant sequoia. Understory species include bear clover, ribes, manzanita, and white thorn. Fuel loading is similar for this

Grant West Omnibus	SEGMENT 1				smoke emissions	
Vegetation Type/ Fuel Model	*Acres per F M*	*% of Unit*	*Tons per Acre*	*Tons of Fuel*	*PM10 (tons)*	*CO (tons)*
Closed Timber, short needle, FM 8	60	22%	18.3	1,098	27.7	264.2
Mixed Conifer, Sequoia, FM10 & FM14	211	78%	27.4	5,781.4	90.6	847.7
TOTALS:	**271** acres			**6,879** Tons of Fuel	**118.3**	**1,111.9**

Grant West Omnibus	SEGMENT 2				smoke emissions	
Vegetation Type/ Fuel Model	*Acres per F M*	*% of Unit*	*Tons per Acre*	*Tons of Fuel*	*PM10 (tons)*	*CO (tons)*
Closed Timber, short needle, FM 8	96	91%	18.3	1,756.8	44.3	422.7
Mixed Conifer, Sequoia, FM10 & FM14	10	9%	27.4	274	2.6	23.8
TOTALS:	**106** acres			**2,031** Tons of Fuel	**46.9**	**446.5**

Grant West Omnibus	SEGMENT 3				smoke emissions	
Vegetation Type/ Fuel Model	*Acres per F M*	*% of Unit*	*Tons per Acre*	*Tons of Fuel*	*PM10 (tons)*	*CO (tons)*
Closed Timber, short needle, FM 8	0	0%	18.3	0	0	0
Mixed Conifer, Sequoia, FM10 & FM14	59	100%	27.4	1,616.6	25.5	238.4
TOTALS:	**59** acres			**1,617** Tons of Fuel	**25.5**	**238.4**

Grant West Omnibus	TOTALS FOR UNIT				smoke emissions	
Vegetation Type/ Fuel Model	Acres per F M	% of Unit	Tons per Acre	Tons of Fuel	PM10 (tons)	CO (tons)
Closed Timber, short needle, FM 8	156	36%	18.3	2854.8	72	686.9
Mixed Conifer, Sequoia, FM10 & FM14	280	64%	27.4	7672	118.7	1109.9
TOTALS:	**436** acres			**10,527** Tons of Fuel	**190.7**	**1,796.8**

Note: Estimated tons-per-acre for fuel models come from Photo Series for Quantifying Fuels and Assessing Fire Risk in Giant Sequoia Groves, 1997; and Photo Series for Quantifying Natural Forest Residues in Sierra Nevada, 1981.

D. GOALS AND OBJECTIVES

GOAL #1: Provide for Safety First.

OBJECTIVE: Conduct prescribed burn operations safely so that firefighters, park staff and the public are not adversely affected by project implementation.

OBJECTIVE: Base all strategy and tactical decisions on proven safety practices.

OBJECTIVE: Conduct prescribed burn operations so that the impacts to smoke sensitive areas are minimized and human health is protected from unhealthful smoke concentrations.

OBJECTIVE: Ensure all fire personnel are provided a safety briefing at the beginning of daily operations.

OBJECTIVE: Ensure public safety by posting warning signs and/or restricting access to the fire area.

GOAL #2: Restore Natural Processes: Restore and maintain this fire-adapted ecosystem through ecologically appropriate use of fire. This prescribed fire will serve as a maintenance burn by returning the area to a more appropriate fire occurrence cycle.

OBJECTIVE:
Fuels Maintenance and Reduction- Reduce dead and down fuels by 60% to 80% in burned areas. A low to moderate intensity understory burn will help to maintain and reduce dead and down forest fuels, fire prune lower tree branches, and cause some mortality of mainly shade tolerant tree species. The burn will reduce the risk of catastrophic wildfire.

GOAL #3: Provide opportunities for educating employees and the public about the role of fire in ecosystem management and protection of values at risk.

OBJECTIVE: Develop outreach strategies that explain the prescribed fire project and how it reduces the treat of wildfire damaging or destroying property, harming people and possibly damaging park ecosystems.

E. PROJECT COMPLEXITY

See attached Prescribed Fire Complexity Rating Worksheet (ATTACHMENT 1)

F. ORGANIZATION

1. Full Operation
   Overhead Personnel:
   1 Burn Boss (RXB2)

1 Ignition Specialist (RXI2)
1 Holding Group Supervisors (Single Resource qualified)
2 Prescribed Fire Monitors (FEMO)
1 Fire Information Officer (FIO)

Minimum Holding Resources Required:
1 Type II Handcrews (20 personnel)
1 Type 3 Engines with crew

G. ESTIMATED PROJECT COSTS (non-base)

Item: Phase: →	Planning	Preparation	Execution	Rehab	Evaluation
Personnel	$0	$4,500	$25,000	$1,500	$0
Equipment	$500	$500	$2,000	$0	$500
Supplies	$0	$2,000	$8,000	$500	$0
Aircraft	$0	$0	$0	$0	$0
Phase Costs	$500	$7,000	$35,000	$2,000	$500

ESTIMATED TOTAL COST FOR PROJECT: **$50,000**
ESTMATED TOTAL COST PER ACRE: (436 acres) **$115/acre**

H. SCHEDULING

Proposed Ignition Date: late August thru December, 2004.

Projected Burn Duration: Ignition: 4 to 7 days. Burn Down: an additional 1-3 days. Smoldering is possible for up to 30 days.

Dates when burn will NOT be conducted:
1. No-burn day as determined by SJVUAPCD.
2. National or Regional Preparedness Levels preclude new prescribed fires unless approval given by regional and national offices.
3. Burn area not in prescription.

I. PRE-BURN CONSIDERATIONS

PREPARATION NEEDS ON SITE:
1. AT LEAST ONE MONTH BEFORE BURN:
   a. Line or fall snags along the perimeter, up to 1 chain (66 feet) within the perimeter, which could cause excessive spot fires or safety problems. If snags are felled, stumps will be flush cut and disguised.
   b. Cut out logs across all fire lines.
   c. Remove all 1000-hour fuels from the fireline to 20 feet inside the burn unit. Scatter inside the burn unit.
   d. Prepare and rake fire lines/trails/fences surrounding the burn unit.
   e. Identify all staging areas, helispots, safety zones and lookout points.
   f. Set up weather monitoring module (Micro-RAWS, HOBO-weather data collection instrument, or equivalent) inside burn unit, if available.
   g. Collect Dead Fuel Moisture samples (Duff, Litter, 1 hour, 10 hour, 100 hour, and 1000 hour fuels) on a weekly basis until ignition of burn unit to determine prescription indicators.
   h. Notify SJVAPCD of burn plan; send copy of plan along with Smoke Management Plan.
   i. Insure archaeological clearance from park archaeologist.

2. ONE WEEK BEFORE BURN:
    a. Stage all bladder bags and burn mix along unit boundary.
    b. Notify District Ranger of affected trailheads, trail junctions, parking areas and roads that may need to be closed.

3. ONE DAY BEFORE BURN:
    a. Take hourly on-site weather observations around burn unit.
    b. Orient fire personnel to burn unit.
    c. Request spot weather forecast for burn area.
    d. Insure signs are posted.

4. DAY OF BURN and EACH DAY OF BURN:
    a. Obtain spot weather forecast through Fire Dispatch.
    b. Close affected trails and roads.
    c. Keep Fire Information Staff informed of events in burn area.

PREPARATION NEEDS OFF SITE:

1. AT LEAST ONE WEEK BEFORE BURN:
    a. Complete necessary pre-work as listed on the Prescribed Fire Checklist.
    b. Initiate Incident Action Plan (IAP) and associated maps.
    c. Notify public via press releases and phone calls to major media.
    d. Update Sequoia National Forest, SJVUAPCD and Fire Dispatch.

2. ONE DAY BEFORE BURN:
    a. Complete Incident Action Plan (IAP) and associated maps.
    b. Post burn notice signs at Visitor's Center and key public gathering areas.
    c. Notify private adjacent lands of prescribed burning.
    d. Request burn authorization from SJVUAPCD smoke coordinator.
    e. Coordinate with Fire Information Officer.

3. DAY OF BURN and EACH DAY OF BURN:
    a. Contact Fire Dispatch.

J. PRESCRIBED FIRE PRESCRIPTION

NFFL (NFDRS) Fuel Models used: & Percentage of burn area	8, 10, 14	H, G	100%

PRESCRIPTION:

Weather	Fuel Model 8	Fuel Model 10/14
Temperature (degrees F°)	40 - 85°	40 - 85°
Relative Humidity (%)	20 - 60%	20 - 60%
Mid-Flame Wind Speed (mph)	0 - 10	0 - 8
1-hour Fuel Moisture (%)	3-10	3-12
10-hour Fuel Moisture (%)	4-11	4-13
100-hour Fuel Moisture (%)	5-12	5-14
1000-hour Fuel Moisture (%)	10-20	10-20
Live Woody Fuel Moisture (%)	n/a	70-150

FIRE CHARACTERISTICS

Characteristics	Fuel Model 8	Fuel Model 10/14
Rate of Spread (chains/hour)	0 - 8	1 - 18
Flame Length (feet)	0 - 2.5	0.5 - 4
Scorch Height (feet)	0 - 30	0 - 30
Fireline Intensity (btu/ft/sec)*	1 - 35	4 - 120
Heat per Unit Area (btu/sq.ft./sec)*	165 - 225	320 - 416
Probability of Ignition (%)	10 - 80	10 - 80

*NOTE: Firing methods and patterns will be carefully controlled along burn unit boundaries to allow for lower intensities along the fireline.

K. IGNITION AND HOLDING ACTIONS

Burn unit boundaries and the unit interior will be hand ignited with drip torches or fusees.
The Ignition Specialist (RXI2) will thoroughly describe the firing plan and safety considerations to all burn personnel at the pre-burn briefing. Firing operations for the entire unit should be completed in 3 to 7 days. Unit may be broken down into segments to facilitate meeting air quality requirements and due to resource availability.

Test Fire:
A test ignition at the burn site will be conducted each day to observe fire behavior, smoke column dispersal and to assess probability of attainment of objectives. The test fire will be conducted in a location determined appropriate by the Burn Boss, Ignition Specialist and Holding Group Supervisor, and will be conducted in an area in the burn unit where environmental and weather parameters can be contained and controlled easily.

Firing and Ignition:
Once the test fire has been determined to be acceptable, firing and ignition of the unit will commence. Blacklining operations near the unit boundaries will be completed with drip torches. Combinations of strip head, flanking, spot, and backing ignition patterns will be used to ignite the unit. Firing patterns and directions could change depending on wind direction and other parameters.

The Ignition Specialist and ignition team(s) will be briefed before ignition begins and use good care and communication to ensure safety of all personnel around the burn unit. Strip and spot firing patterns utilizing the contour and prevailing winds will create an even backing and /or short strip head fire through the unit. Firing pattern distances may range from 5-80' apart depending on winds, topography and observed fire behavior.

The ignition pattern will be determined on the day of the burn by the Burn Boss, Ignition Specialist and Holding Group Supervisor. If prescription parameters are exceeded during project execution, ignition operations will be terminated by the Burn Boss at safe and appropriate locations based on fire behavior, fuels, and topography and weather conditions. If the project area comes back into prescription based on current and forecasted weather, ignition operations may continue. If not, the project area will be put into a mop-up and patrol status. Holding actions shall maintain control of the fire until a decision to continue, postpone or extinguish the prescribed fire is made and the Agency Administrator or their designee is notified. The Burn Boss will document this decision process on a unit log.

Holding Actions:
Minimum impact hand lines, existing trails and the Highway 180 surrounding the burn unit will be used as boundaries for holding operations. Handcrews will provide holding on the hand lines and trails on the north and west sides of the unit. Engine and patrol vehicles will provide for holding and patrol along the highway. Spot fires across containment lines, or an escaped fire, will be considered an emergency situation and immediate suppression action will be initiated. Holding actions will consist of

any or all of the following: use of bladder bags, patrolling the line for spot fires and slop-overs, griding areas outside of the burn unit to look for spot fires as situations warrant, mopping up, and removing any burning snags or trees that are threatening the line.

a) Critical holding areas: The perimeter the north and west boundaries of the unit, which are also the boundary lines with Forest Service land. Within the unit, the Gamlin Cabin, the General Grant Tree, and all fences surrounding the Grant Tree. Additionally, there are structures located to the south and south east of the unit which will be protected should they become threatened. The structures are the compound of Swale Work Center, the buildings associates with the Grant Grove Corrals and the miscellaneous buildings found at the Azalea Campground. The Grant Sewage Treatment Plant located on Swale Rd. is also a concern as it is adjacent the burn unit. See ATTACHMENT 13.

b) See project map (ATTACHMENT 13) for divisions, drop points, helispots, etc. (Drop points will be areas where fuel/burn mix, drinking water, full bladder bags will be staged).

c) See ATTACHMENT 8 for Adequate Holding Resources Worksheet for slopover containment resource needs.

Mop-Up Operations:
Mop-up of part or the entire unit may occur by park personnel if the Burn Boss or Fire Management Officer determines that there is a high potential risk of fire escape outside of the burn unit.

L. WILDLAND FIRE TRANSITION PLAN

1. If a spot fire or slopover occurs, the Holding Specialist will lead suppression actions and oversee operational aspects under the direction of the Burn Boss who will function as the Incident Commander.
2. Fire Dispatch will be notified immediately of significant fire spotting, slop-over or escape. Burn personnel will go through the Park Communications Center to notify Fire Dispatch after hours.
3. The burn will be declared a wildfire if off-Park resources (above those identified in the Adequate Holding Resources Worksheet) are requested, and/or available on-Park resources are unable to contain the escape within one burning period. A Wildland Fire Situation Analysis (WFSA) will be completed. All suppression actions will be done using minimum impact suppression techniques whenever feasible in accordance with the FAMOG.
4. If the fire is declared a wildfire, ignition will cease and all fire personnel will become holding and/or suppression forces. Ignition, holding, and monitoring bosses will account for their personnel and be assigned to a division of fire with their crews by the Burn Boss. A tactical chain of command will be pre-identified by the Burn Boss at the initial briefing.
5. The Burn Boss will make the declaration of escape and assume the role of Incident Commander. Additional resources will be ordered as necessary from local fire agencies or from out of the area through Fire Dispatch. The escape will be managed under the Incident Command System. The Burn Boss will immediately notify the Fire Management Officer of the change in status from prescribed burn to a wildland fire. The Park Superintendent will be immediately notified by Fire Dispatch of the change in the burn's status.
6. WFSA completion will involve at the minimum fire management staff, ranger staff from the affected district, and resource management staff. Should an external management team be ordered to manage the suppression action, the Superintendent will issue a Delegation of Authority. The suppression Incident Commander will report directly to the Fire Management Officer unless otherwise directed in the delegation.

M. PROTECTION OF SENSITIVE FEATURES

1. An archaeological/cultural clearance has been completed for the proposed project area. Burn operations will be closely monitored by the Burn Boss for compliance with any stated mitigation requirements in the clearance. Currently there are no known archaeological sites within the burn unit.
2. The General Grant Tree is located in proximity of the burn unit. The burn unit has been designed so that the General Grant Tree will be excluded from any direct fire impacts.

3. All other "named" Giant Sequoia trees will be identified and proper precautions taken to protect them from igniting if they are within the burn unit boundary. Other named trees include: the Dead Giant, the Centennial Stump, the California Tree, the Fallen Monarch and the Lee Tree.

N. PUBLIC AND PERSONNEL SAFETY

Public Safety Procedure:
All burn personnel will give special attention to visitor safety since the unit is easily accessible via Highway 180. Prescribed fire warning signs will be posted along the Highway advising motorists of the potential for smoke on the road. The roads may be closed if visibility becomes poor, but will be kept open as much as possible. Grant Grove Rangers, holding crews and engine personnel will assist with traffic control as needed.

Several trails within the burn unit will be affected by the burn and will be closed while burning operations are underway, as well as after burning operations have concluded. The Grant Grove District Ranger will be notified of the need for trail closures when that time occurs. The affected trails include: the North Grove Loop, Swale Cutoff Trail, the North Boundary Trail, the Grant View Trail and portions of the Grant Tree Trail. Access to the Grant Tree will be granted to visitors as long as safety permits.

Fire Personnel Safety Procedure:

- Fire Hazards:

Falling burning snags and unhealthy smoke are the major threat to fire personnel.

All fire line personnel will wear standard fire fighting PPE, including leather boots, Nomex pants and shirts, leather gloves and a class B hard hat. They will carry a fire shelter and fire tool at all times. Standard wildland fire fighting safety rules will be strictly enforced (see Fire Line Handbook). All fire line personnel will be NWCG "red carded" as at least FFT2. Communications will be maintained with all personnel. A safety briefing will be given at the start of each operational period.

- Unhealthy Smoke:

Fire line personnel will be rotated out of smoke at regular intervals to limit CO exposure.

All personnel will be advised of Lookouts, Communications, Escape Routes, and Safety Zones. Any other potential safety hazards will be pointed out and mitigated as soon as possible.

First Aid and MEDIVAC Procedure:

EMT's will be identified to fire personnel at briefings. Ground transport would most likely be the means for evacuating sick or injured. The Pan Point helispot should be available as needed. EMT's and Park Medics should be available in the Grant Grove area. MEDIVAC will be coordinated through the park Communications Center.

Emergency medical procedures will be identified in the daily Incident Action Plan and reviewed at the daily briefing prior to initiating action.

O. SMOKE MANAGEMENT AND AIR QUALITY

Smoke Emissions

Estimated Smoke Emissions Period:
Localized emissions of significant quantities of smoke will be produced during firing and burn down. Initial firing operations will require 1-3 days with an additional 2-3 days of burn down. The unit will continue to produce minor amounts of smoke for up to 30 to 60 days after initial ignition.

Estimated Smoke Emissions:
Estimated emissions based on FOFEM calculations using park fuel loadings and average prescription conditions—fuel moisture and consumption (2001). Fuel Model 10 fuel load estimated at 27.4 tons/acre, Fuel Model 8 fuel load at 18.3 tons/acre, and Fuel Model 14 at 27.7 tons/acre.

See Page 4 and 5 for Smoke Emissions Outputs for each segment and the total unit.

Smoke Sensitive Areas:
(See ATTACHMENT 14 for map of predicted plume direction).

Smoke Sensitive Areas within 15 Miles of Burn Unit:

Smoke Sensitive Area	Distance From Burn Unit	Compass Direction From Burn Unit	Population	Critical Receptors
Wilsonia	2 miles	NW S/E	328	Summer Homes
Cedar Springs Trailer Park	2 miles	NW	30	Employee Housing
Grant Grove Hotel	2 miles	NW	~~30~~ Auto=200	Lodging/Overnight Guests
Grant Grove Village	2 miles	NW	50	Park Visitors
NPS Housing	2 miles	NW	54	Employee Housing
Crystal Springs Campground	1.25 miles	NW	67	Campground/Park Visitors
Azalea Campground	1.25 miles	NW	113	Campground/Park Visitors
Grant Grove Pack Station	1.25 miles	NW	4	Concession Employees/Park Visitors
Swale Work Station	0.25 miles	NW	22	Park Employees
Montecito Sequoia Lodge	8 miles	SE	40	Guests/Park Visitors
Hume Lake	5 miles	N E	200-400	Summer Camps/Summer Homes
Sequoia Lake Camps	5.25 miles	WNW W SW	100-200	Summer Camps
Pinehurst	7 miles	W	200	Year Round Community
Badger	7 miles	SSW	100	Year Round Community

Estimated Smoke Impact to Smoke Sensitive Areas:

There is a potential for moderate smoke impact during daytime and early evening hours to employees and visitors to the Grant Grove area. Smoke concentrations will be regularly monitored in the Grant Grove area during ignition and burn-down phases of the project. Depending upon overall wind patterns, potential also exists for light to moderate impacts in the Sequoia Lake area. As with the Grant Grove area, smoke concentrations will be regularly monitored throughout the duration of the project. The greatest potential for hazardous smoke accumulations will be along the length of Highway 180, along the north and east flanks. Here, concentrations of smoke could result in decreased motorist visibility and cause potential traffic hazards. Traffic control will be implemented as monitoring indicates is necessary.

Nighttime concentration of smoke could accumulate in the Sequoia Lake area. Sequoia Lake YMCA Camp personnel will be notified of the project and smoke concentrations will be regularly monitored throughout ignition and burn down. Night time smoke dispersion should be down Redwood Canyon to the south and southwest with light to moderate impacts to the communities of Badger, Pinehurst, and Eshom Valley.

Desirable Smoke Dispersal Transport Winds Direction and Speed:

Strong westerly winds with an unstable atmosphere would provide the best dispersal to the east during the day and would minimize smoke accumulations in low-lying areas at night.

Undesirable Smoke Dispersal Transport Winds Direction and Speed:

Easterly winds and especially light winds under very stable conditions from any direction.

Estimated Daytime Smoke Plume Direction and Potential Impact:

Local diurnal wind flow should carry the smoke column towards the east during late morning through afternoon. Impact will be along Highway 180 which is the north and east boundary. Smoke may obscure the roadway as that portion of the unit is burned.

Estimated Night Time Smoke Plume Direction and Potential Impact:

The column should flow down into Sequoia Lake to the south and west with some smoke drifting southwest. However, concentrations of smoke would be expected to be light in these areas and no significant impacts would be expected.

Smoke Monitoring

Type and Interval of Monitoring:
Smoke observations will be periodically monitored and documented on a smoke observation form along with weather conditions and fire behavior observations on an hourly basis during daylight hours. Any significant change in smoke emissions or column/plume behavior will be reported to the Burn Boss.

Smoke Sensitive Area Health Impacts Monitoring:
The SEKI smoke and weather-monitoring module (TEOM) is permanently located in the Middle Fork drainage near park headquarters and will be used to assess impacts on the Three Rivers community. It is not anticipated that the Grant West Omnibus unit will affect the Three Rivers Community. A second module (E-BAM) is located at Pinehurst, which will be actively monitored while the burn is being implemented. An additional monitoring unit ~~may be set~~ will be set up in the Grant Grove Housing/Maintenance /Visitor Center area or Sequoia Lake area while the burn is ignited to monitor smoke during initial burn-down.

Burn Day Regulation

Burn Day Notice Procedure: Fire Dispatch will monitor compliance with "Burn Day" regulations and request a 24 hour decision through the San Joaquin Valley Unified Air Pollution Control District Meteorological Section. If a No Burn Day is declared, then no new ignition will occur unless needed for safety and holding purposes, or after approval is obtained from Air District enforcement personnel.

SEKI fire staff will discuss the fire situation with Air District enforcement staff on a regular basis or when there are significant changes with the burning operation and conditions.

Roadway Safety

Daytime smoke on Highway 180 will be monitored by the Fire Personnel. Minimum acceptable visibility and speed limits, or traffic control, for all public roadways will be enforced by speed limit signs or traffic controllers. Drivers will be advised of the potential for night time smoke via signing. Rangers and/or fire staff may be assigned to nighttime road patrol if conditions warrant.

Any compromised roadway conditions should be relayed to the Burn Boss immediately, day or night, on shift or off shift.

Road Control Guideline for Two Lane, Two Way Road- **Day Light** Hours:

Posted Speed Limit	Minimum Acceptable Visibility
10 mph	56 feet - if less than 56 feet begin one-way traffic control
15 mph	100 feet
25 mph	216 feet
35 mph	370 feet
45 mph	566 feet

Road Control Guideline for Two Lane, Two Way Road- **Night Time** Hours:

Posted Speed Limit	Minimum Acceptable Visibility
10 mph	112 feet - if less than 112 feet begin one-way traffic control
15 mph	200 feet
25 mph	432 feet
35 mph	740 feet
45 mph	1132 feet

Public Information and Coordination

Notification and Coordination with Air District:
Air quality enforcement staff will be consulted about the execution of the burn before ignitions take place, including new ignitions that would occur after breaks in firing of a day or more.

Logging of Information Requests and Smoke Complaints:
All contacts will be recorded at park visitor centers and dispatch centers. Receiving parties will determine whether the contact is for the purpose of information or to lodge a formal complaint against the park.

The Burn Boss will be notified of all contacts and consult with the Duty Officer regarding Air District notification in case of formal complaint. The Burn Boss will review complaints and coordinate with the Fire Information Officer in contacting complaining parties to discuss the nature of the complaints.

Complaints will be investigated by fire staff to determine the severity of the situation causing the complaint and will determine mitigation steps needed to solve the problem.

This information will be FAXed to the enforcement staff at the Air District as soon as possible.

Smoke Impact Reduction Procedure:

This Unit has been divided into 3 segments to help mitigate smoke impacts, should if become a problem. If smoke impacts become a major issue affecting management of the fire, ignition will cease until conditions that are more favorable for smoke dispersion develop. Topography and firefighter safety will limit or prevent the use of mid-slope containment lines or check lines to halt burning operations. Consequently, the fire may be allowed to back downslope at a slow rate of spread. There are many trails that bisect the unit which will help facilitate mitigation measures employed to reduce smoke impacts. If appropriate, the ignition pattern will be regulated to reduce smoke production.

The need for aggressive mop-up will be evaluated and implemented as needed in order to mitigate an established smoke impact problem. The impacts to natural resources will need to be weighed against the benefits of aggressive mop-up.

P. INTERAGENCY COORDINATION AND PUBLIC NOTIFICATION

Employee and Public Information Outreach Procedure:
The Fire Information Officer will coordinate public information and interpretive programs with the Grant Grove interpreters and the Grant Grove Visitor's Center.

Fire Dispatch Situation Update Procedure:
King Canyon district staff will be kept up to date about progress made concerning burn preparation, execution, and rehabilitation. All resource orders will be placed though Fire Dispatch. Fire dispatch will monitor compliance with Zone Preparedness Plan for Wildland Fire Agencies in California and "Burn Day" regulations.

Fire dispatch will be continually kept informed about staffing, fire size, activity, smoke dispersal and any problems relevant to the burn on a daily basis

Interagency Cooperation and Coordination:
Sequoia National Forest and San Joaquin Valley Unified Air Pollution Control District will be kept informed during ignition and holding operations.

Q. MONITORING AND EVALUATION PROCEDURES

Weather:

- Weather monitoring will be coordinated by the Lead Fire Monitor.
- No firing will be conducted if Red Flag conditions or winds are forecasted to be out of prescription by Hanford NOAA Weather.
- Spot weather forecasts will be requested daily before ignition and reviewed by the Burn Boss, Ignition Specialist and Holding Supervisors to assure the burn is expected to be within prescription and to identify potential problem areas.
- The Park Ridge NFDRS/WIMS Station will be used to determine related fire danger indices. These indices will be used to assist in making the Go/No Go decision.
- Weather observations will be taken every hour beginning at least one hour before ignition and continuing throughout the ignition phase.

Fire Behavior and Smoke: During the burn, on site monitoring will be conducted by the lead Fire Monitor (FEMO) and/or other assigned Fire Monitors. These people will be responsible for the collection and documentation of weather, smoke, and fire behavior observations according to National Park Service monitoring protocols. They will maintain constant communication with the Burn Boss, Ignition, and Holding Group Supervisors to ensure safe operations when working within the burn.

Fire Effects: There are 5 fire effects plots located in the unit. They are FSEGI1T08072, 73, 74 & 75 and FPIPO1T09063. The Fire Effects Monitoring staff will be responsible for monitoring these plots. They will follow all policies and procedures endorsed in this plan. (SEE ATTACHMENT 13 for fire effects plot locations)

Other Considerations:
1. At no time will Fire Monitor safety be compromised for data collection. It will be at the discretion of the Burn Boss whether or not Fire Monitors will be allowed within the burn unit. Monitors will coordinate all activities with the Burn Boss prior to beginning.

2. Ten-hour fuels sticks and/or a mini weather data collection device (HOBO or Micro-RAWS) may be set up to measure on site temperature and relative humidity at least one month prior to and throughout the burn.

3. Dead and live fuel samples will be collected and oven dried to validate the fuel moisture prescription within one month prior to the proposed ignition date.

R. POST FIRE REHABILITATION

1. Any necessary rehabilitation of temporary firelines and trails will be completed once the Burn Boss has declared the prescribed fire out.
2. All firelines and roadways will be surveyed post burn for hazards caused by the burn operation.
3. Any saw cuts will be flush-cut and cuts will be buried or disguised.
4. Line construction and minimum impact suppression techniques will be utilized to rehabilitate the impacts per the FAMOG.

S. POST FIRE REPORTS

Documentation will include:

1. Fire Dispatch will maintain a fire file with dispatch log, resource orders, spot weather forecasts, OF-288 and CTR forms, burn unit plan, burn notification form (CB-3), Incident Action Plans, unit Logs and all original fire observation data. Fire Effects monitoring staff will maintain the fire effects data.

2. The Burn Boss will maintain an ICS-214 Unit Log.

3. The Lead Fire Monitor will prepare and submit an individual report that summarizes weather, fire behavior, and smoke observation data within two-weeks after the fire.

4. The Burn Boss will prepare an Individual Fire Report, DI-1202, within 10 days after declaring the fire out. All fire records will be stored according to standard procedure.

5. The Fuels Management Specialist will prepare a project accomplishment report in the National Fire Plan Operational Reporting System (NFPORS) within 5 days of declaring the fire out.

T. ATTACHMENTS

1. Prescribed Fire Complexity Rating Worksheet
2. Hazard Rating Guide
3. Prescribed Fire Risk Analysis Worksheet
4. Risk Mitigation Table
5. Park Superintendent GO/NO GO Pre-ignition Approval
6. Briefing Guide
7. Burn Plan Execution GO/NO GO Checklist
8. Slopover Containment Resource Needs Worksheet
9. BEHAVE Runs
10. Burn Plan Technical Review
11. Park Review Comments
12. Vicinity Map
13. Project Map
14. Project Fuels Map
15. Smoke Plume Direction Map

Attachment #1: PRESCRIBED FIRE COMPLEXITY RATING WORKSHEET

GRANT WEST OMNIBUS UNIT

	Complexity Element	Complexity Value L	M	H
Primary	1. Life and Safety	X		
	2. Threats to Boundaries		X	
	3. Management Organization		X	
	4. Political Concerns		X	
	SUBTOTAL OF PRIMARY FACTORS	1	3	0
Secondary	5. Objectives		X	
	6. Fuels and Fire Behavior		X	
	7. Air Quality Values		X	
	8. Improvements	X		
	9. Logistics	X		
	10. Natural, Cultural and Social Values		X	
	11. Tactical Operations	X		
	12. Interagency Coordination		X	
	SUBTOTAL OF SECONDARY FACTORS	3	5	0
	TOTAL COUNT OF COMPLEXITY VALUES	4	8	0

QUALIFICATIONS DETERMINATION TABLE:

	Prescribed Fire Burn Boss Type 2 (RXB2)	Prescribed Fire Burn Boss Type 1 (RXB1)
Primary Factors rated "H"	Less than 2	2 or more
	AND	OR
Total Count rated "H"	Less than 4	4 or more
		OR
	Minimum required on all prescribed fires.	When deemed appropriate by the agency administrator or unit Fire Management Officer.

Prescribed Fire Burn Boss Level Indicated (check one):	RXB1		RXB2	XXX

PREPARED BY: Leslie A. Uhr DATE: 7/11/04
Assistant Fuels Specialist

APPROVAL BY: _____ DATE: 9/17/04
Superintendent - Sequoia & Kings Canyon National Parks

Attachment #2: HAZARD RATING GUIDE, page 1 of 4

Hazard Element	Hazard Probability			Potential Consequences		
	L	M	H	L	M	H
1. Environmental Data						
a. Seasonal severity	Energy Release Component (ERC) below 10 year average levels.	Energy Release Component (ERC) is at or above the 90th percentile levels	Energy Release Component (ERC) is at or above the 97th percentile levels. Live fuel moistures in the brush are > 25% drier than the average values.	Low probability for problematic fire behavior or difficulty with holding activities.	Some potential for problematic fire behavior or difficulty with holding activities.	High probability for problematic fire behavior and difficulty with fire control activities.
b. Fire Behavior	Flame lengths confined to the target fuels (surface litter, dead & down) and well within the prescribed range for the burn project.	Flame lengths within the prescribed range but approaching the hot end of the prescribed range for the burn project. Single trees to small groups of trees occasionally torching leading to few spots that are easily handled.	Flame lengths consistently exceeding the hot end of the prescribed range for the burn project. Frequent torching of small groups of trees and occasional short dependent crown fire run through the trees presenting significant control problems.	Low probability of difficulty in holding the fire.	Some potential for fire behavior to approach the upper prescription limits and cause holding problems.	High potential for fire behavior to create holding problems and exceed the prescription.
c. Fuels	Surface fuel light with no ladder fuels present to encourage torching. Little brush in the understory and the dead component of the brush is less than 25%.	Surface fuels are moderate with occasional ladder fuels present to cause possible torching of the overstory. Moderate amount of brush in the understory and the dead component of the brush is less than 50%.	Surface fuels are dense with many ladder fuels present to cause possible torching of the overstory. Large amount of brush in the understory and the dead component of the brush is greater than 50%.	Fuels present no specific execution problems for the project.	Fuels will have a direct affect on the amount of holding resources needed to implement the project.	Fuels will have a direct affect on the management organization and type of holding resources needed to implement the project.
d. Weather	Weather stable, winds light and predictable.	Weather slightly variable, winds light with occasional gusts.	Weather highly variable, winds near prescription limits and gusty, frontal activity possible.	Little impact on execution.	Weather variation will require mitigation actions involving additional resources.	Weather will have a major influence on management organization and qualifications for project execution.

e. Topography	Low variability in slope and aspect.	Some variability in the slope and aspect, will have an affect on fuel moisture and fire behavior.	High variability in the slope and aspect, will have a direct affect on fire behavior and control activities.	Little influence on project implementation.	Consideration of topography is necessary during project planning.	Topography will have a direct affect on the firing patterns, and ignition timing and methods.
2. Agency Values	**L**	**M**	**H**	**L**	**M**	**H**
a. Ecological and Environmental Considerations	Fire poses little threat of adverse effects on natural resources. No Threatened or Endangered Species or critical habitat.	Fire poses a moderate threat for short-term adverse effects on natural resources or air quality. T & E species may be present and or critical habitat.	Fire poses a high potential for adverse effects to natural resources or cause long-term degradations to air quality. T & E species or critical habitat is present.	Low probability for adverse impacts and little need for mitigation actions.	Mitigation actions may need to be developed to ensure desirable outcomes. Some short-term adverse effects may have to be accepted.	Prescribed Fire Plan must address mitigation actions to prevent undesirable outcomes.
b. Social and Cultural Values	No known social or cultural features in or adjacent to the project.	Features of social or cultural value have been identified in or adjacent to the project area. Mitigation measures can be accomplished.	High value social or cultural features have been identified in or adjacent to the project area. Mitigation actions are difficult to accomplish.	No values have been identified.	High intensity fire outside of the unit posses a potential for moderate damage to identified values. Concerned parties are aware and are supportive of the project.	High intensity fire outside of the unit will have and adverse impact on identified values. Acceptance of concerned parties is low.
c. Project Duration and Logistics	Project of short duration, logistical needs easily met.	Moderate duration project, multiple days of logistical support required.	Long duration project, dedicated logistical support needed.	Limited impact.	Duration may impact firefighters and the public, logistical needs must be specifically addressed.	Long duration fire necessitates greater information dissemination, mitigation for impacts to public and firefighters, logistical needs must be met or the project postponed.
d. Smoke and Air Quality Management	Few smoke sensitive areas near the project, limited potential for scheduling conflicts with cooperators.	Multiple smoke sensitive areas near the project; mitigation actions minimize impacts, low potential for scheduling conflicts.	Multiple smoke sensitive areas near the project, mitigation actions are unable to remove all impacts. High potential for scheduling conflicts	No adverse smoke events.	Mitigation actions must address smoke impacts; coordination is required to confirm scheduling.	Mitigation actions must be developed, regulatory agencies must concur, and scheduling conflicts may restrict accomplishment.

3. Public Values	L	M	H	L	M	H
a. Land use values	No commercial or agricultural activities near the project area.	No commercial or agricultural activities near the project area. Some managed wildlands (recreation, timber, range values) exist.	Project is located in close proximity to urban, commercial and or agricultural areas.	No impacts.	Project planning must consider actions to prevent fire movement on to adjacent lands.	Mitigation actions must reflect additional resources needed to protect adjacent lands. If mitigation cannot be accomplished the project must be postponed.
b. Dwellings	No permanent or part-time residences in the project area.	Some part-time residences or outbuildings near the project area.	Project is located in a wildland urban interface zone; permanent residences are located in close proximity to the project.	No impacts.	Plan must address actions to ensure adequate protection of residences.	Notification of all concerned homeowners, residents and visitors required. Coordination with local fire protection agency is needed. Mitigation actions must adequately address potential fire escapes.
c. Non-dwellings	No non-dwellings present.	Some outbuildings and non-residences near the project.	Commercial structures in close proximity to project area.	No impacts.	Planning must consider these non-dwellings.	Planning and implementation must adequately address all measures to prevent any adverse impacts.

4. Human Factors	L	M	H	L	M	H
a. Firefighter	Limited firefighter exposure.	Some firefighter due to fire duration and smoke.	Potential for high firefighter exposure to smoke during the burn and to fire during holding actions.	No specific problems, implement standard safety precautions.	Mitigation measures to limit exposure to smoke.	Mitigation measures must address smoke exposure, use of mechanized equipment to reduce exposure to fire.
b. Public	No public exposure.	Some public exposure, mitigation action can minimize exposure.	Public may be exposed to high smoke concentrations for moderately long periods, especially during nighttime and early morning hours.	No adverse consequences anticipated.	Mitigation actions necessary to provide for maximum public safety.	Mitigation actions must be developed, coordinated with other emergency organizations and fully understood prior to ignition.
c. Fire Management	No problems with commitment and acceptance by park staff.	No problems with commitment but some unwillingness to support and prioritize the project over other activities.	Park staff not committed to using prescribed fire as a tool and not willing to support and prioritize the project over other activities.	No adverse consequences.	Park staff must be briefed on the need and importance of the project.	Park management team must be informed of project objectives support needs and priority.

Attachment #3: PRESCRIBED FIRE RISK ANALYSIS WORKSHEET

GRANT WEST OMNIBUS UNIT

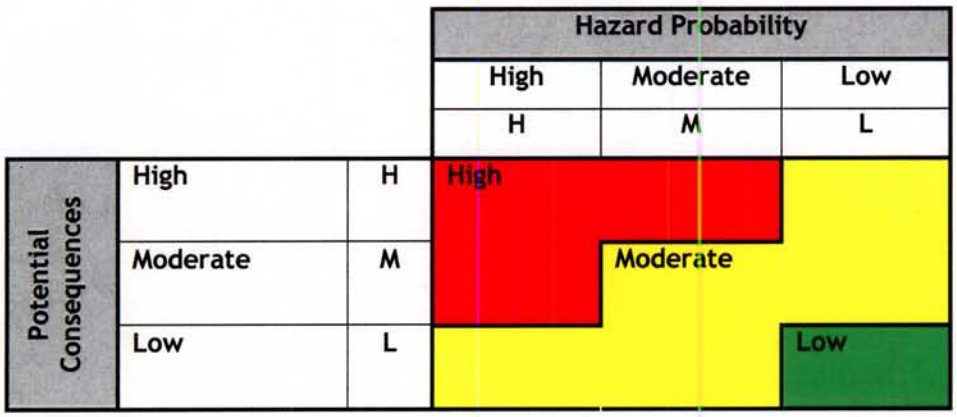
Hazard Element	Hazard Probability			Potential Consequences			*Risk (Attach-ment #4)
	L	M	H	L	M	H	
1. Environmental Data							
a. Seasonal severity		X		X			M
b. Fire Behavior		X		X			M
c. Fuels		X		X			M
d. Weather	X			X			L
e. Topography	X			X			L
2. Agency Values							
a. Ecological and Environmental Considerations	X			X			L
b. Social and Cultural Values		X			X		M
c. Project Duration and Logistics	X			X			L
d. Smoke and Air Quality Management		X			X		M
3. Public Values							
a. Land use values	X			X			L
b. Dwellings	X			X			L
c. Non-dwellings	X			X			L
4. Human Factors							
a. Firefighter	X			X			L
b. Public		X			X		M
c. Fire Management	X			X			L

RATIONALE & MITIGATIONS:

***NOTE:** Risk is determined using the Risk - Assessment Matrix by finding the intersection between the hazard probability and the potential consequence and entering the value as the "Risk" for that element.

Mitigations and controls to be taken will be identified and documented for each element defined above the Low Risk Level in the Prescribed Fire Risk Mitigation Table (Attachment #4) and in the various applicable elements in the Prescribed Fire Plan. The highest risk value will be carried forward to the Prescribed Fire Complexity Rating Guide (Exhibit 6) as a reminder of those hazard elements requiring mitigation.

Risk - Assessment Matrix



Hazard Probability

(H) High ..... May occur frequently or requires continuous peak performance of resources implementing the project.

(M) Moderate..... May occur sometimes or requires sporadic peak performance of resources implementing the project.

(L) Low ..... is possible but improbable to occur or requires no increased performance of resources implementing the project.

Potential Consequences

(H) High ..... Major resource loss, significant property damage, permanent or partial disability to personnel or loss of life.

(M) Moderate..... Minor resource loss, minor property damage, lost time injury or illness to personnel.

(L) Low ..... Negligible resource loss or property damage, possible first aid treatment to project personnel.

Risk Levels

High ..... Impact or loss to park or public resources is unacceptable. Likely to have programmatic level impact and includes the loss of ability to accomplish prescribed fire at the unit level and potentially at the national level.

Moderate..... Impact or loss to park or public resources is controversial but tolerated. May have suspension of prescribed fire program at the unit level. This will require review prior to reinstatement.

Low..... Impact or loss to park or public resources is negligible. Little or no impact on the park prescribed fire program.

Attachment #4: PRESCRIBED FIRE RISK MITIGATION TABLE, page 1 of 2

Hazard Element	Risk	Mitigations / Controls Briefly explain what actions will be taken relative to each hazard element that will reduce the risk.	Residual Risk	Reference: In Prescribed Fire Plan
1. Environmental Data				
a. Seasonal Severity	M	The unit will be ignited under prescribed conditions. If fuel moistures and humidity values are approaching the bottom or hot end of the prescription, ignition will be adjusted to occur in the evening and early in the mornings, or when the RH's are higher and the probability of ignition is lower.	L	H. Schedule J. Burn Prescription
b. Fire Behavior	M	The unit will only be ignited under prescribed conditions, and after all pre-burn preparation is complete to secure the control lines. A test fire will be ignited each day of ignition to verify that fire behavior is controllable. The fire will be staffed according to slop over containment needs worksheet.	L	J. Burn Prescription K. Holding and Firing
c. Fuels	M	Ignitions will be done only when within the burn prescription. Holding resources will be available on site to control spot fires during the peak burning period.	L	J. Burn Prescription K. Holding and Firing
d. Weather	L	N/A	N/A	N/A
e. Topography	L	N/A	N/A	N/A
2. Agency Values				
a. Ecological and environmental considerations	M	Sensitive areas have been identified. Pre-burn treatment and adjustments in ignition patterns will protect identified values. Black lining around these areas will occur as necessary.	L	K. Holding and Firing M. Protection of Sensitive Features
b. Social and Cultural values	M	Pre-burn treatment and adjustments in ignition patterns will protect identified values, along with resources committed during the burn to protect sensitive features.	L	K. Holding and Firing
2. Agency Values				
c. Project duration and logistics	L	N/A	N/A	N/A
d. Smoke and Air Quality Management	M	The unit will be ignited under prescribed conditions. Burn day conditions will be met. Mitigations to take effect as necessary and as smoke dispersion patterns dictate.	L	O. Smoke Mngmt & Air Quality

3. Public Values				
a. Land use values	**L**	**N/A**	**N/A**	**N/A**
b. Dwellings	**L**	**N/A**	**N/A**	**N/A**
c. Non-dwellings	**L**	**N/A**	**N/A**	**N/A**
4. Human Factors				
a. Firefighter	**L**	**N/A**	**L**	**N/A**
b. Public	**M**	Visitor exposure to the burn will be minimal. Portions of the unit will be visible from Highway 180; this road will be properly signed and staffed. Roadway visibility will be monitored for minimum acceptable standards and appropriate speeds posted. If one lane of traffic is required, proper staff will be in place for traffic control. The trails within the burn unit will be closed for the entire duration of the burn and burn down times. The trails will not be reopened until declared safe by the Burn Boss or District Fire Management Officer.	**L**	I. Pre-burn considerations on site K. Holding procedures, mop-up and patrol. O. Smoke Management and Air Quality.
c. Fire Management	**L**	**N/A**	**N/A**	**N/A**

Attachment #5: PARK SUPERINTENDENT GO/NO-GO CHECKLIST

AGENCY ADMINISTRATOR
GO/NO-GO PRE-IGNITION APPROVAL

Prescribed Fire Name: GRANT WEST OMNIBUS Date: 9/27/04

Instructions

The Agency Administrator's Go/No-Go Pre-Ignition Approval is the first of two GO/NO-GO decisions that must be completed before a prescribed fire can be implemented. The Agency Administrator's Go/No-Go Pre-Ignition Approval is the final management approval prior to execution of the prescribed fire and evaluates whether compliance requirements, prescribed fire plan elements, and internal and external notifications have been completed. The Agency Administrator's Go/No-Go Pre-Ignition Approval is valid for 30 days. If ignition of the prescribed fire is not initiated prior to expiration date determined by the Agency Administrator, a new approval will be required.

Key Elements

1. Is the prescribed fire plan up to date?
   Hints: changes, amendments, seasonality.

2. Have all compliance requirements been completed?
   Hints: cultural, threatened and endangered species, smoke management.

3. Is risk management in place and the residual risk acceptable?
   Hints: Prescribed Fire Mitigation Table and Prescribed Fire Complexity Rating Guide completed with rationale and mitigations identified.

4. Will all elements of the prescribed fire plan be met?
   Hint: preparation work, mitigation, weather, organization, prescription.

5. Have all internal and external notifications and media releases been completed?

6. Are key park staff fully briefed, and understand the implementation of the prescribed fire?

7. Other?

Recommended by:	B. Kaage District Fire Management Officer	9/27/04 Date
Recommended by:	B. Kaage Park Fire Management Officer	9/27/04 Date
Approved by:	 Chief Ranger	9/27/04 Date
Approved by:	 Park Superintendent	9/27/04 Date

Approval expires: 10/11/04 (May not be more than 30 days after approved date.)
Date

Attachment #6: BRIEFING GUIDE

BRIEFING GUIDE

A. Operational Objectives

B. Organizational Assignments

C. Incident Safety
- fire personnel safety procedure
  - fire hazards
  - unhealthy smoke
  - environmental hazards
  - LCES
- public safety procedure
  - fire hazards
  - unhealthy smoke
- first aid and MEDIVAC procedure, identify EMT's

D. Incident Operations Strategy and Tactics
- prescription parameters
- test fire procedure
- firing procedure
- expected fire behavior
- holding procedure
- slop over containment procedure
- sensitive features
- weather forecast

E. Incident Communications
- radio frequencies
- radio use protocol
- available telephones and FAX
- fire dispatch situation update procedure

F. Incident Logistics
- equipment support procedure
- supplies support procedure
- food and water procedure
- sanitation facilities
- sleeping areas

G. Incident Finance/Administration
- personnel time keeping procedure
- compensation for injuries procedure
- damage to, or loss of equipment and supplies reporting procedure
- disposable supplies replacement procedure

H. Feedback

Attachment #7: BURN PLAN EXECUTION GO/NO-GO CHECKLIST

Grant West Omnibus Burn Plan Execution Go/No Go Checklist

The answer to each of the following must be yes.

____ Burn plan is approved by park superintendent and distributed to key field supervisors.
____ Burn plan is approved by the local air district.
____ Park Superintendent Go/No Go Pre-ignition Approval is complete and current.
____ All personnel required in the IAP plan are on site.
____ All equipment and supplies required in the IAP are in position and working properly.
____ Employee and public information outreach is complete.
____ Fire monitoring is ready:
- fire weather observations
- fire behavior observations
- smoke observations
- fire effects plots/transects observations

____ IAP is distributed to overhead personnel.
____ All fire personnel have received a briefing.
____ All prescription parameters have been met:
- pre-burn preparation is complete
- smoke management is favorable
- burning prescription is favorable
- current and forecasted weather is favorable
- sensitive species review is complete
- cultural clearance is complete

____ Fire dispatch has made required notifications.
____ Contingency resources described in the plan have been committed and are available within the specified time frames.
____ A significant test fire designed to establish fire control and smoke dispersal is ready to go.
____ Incident personnel are ready to enforce roadway speed limits or control traffic due to reduced visibility per Smoke Management and Air Quality.
____ There are no extenuating circumstances that preclude successful completion of this project.

All above elements must be yes in order to proceed with the test fire.

____ Test fire demonstrates that holding resources are able to safely implement holding tactics.
____ Fire behavior is within prescription and is expected to stay in prescription into the foreseeable future.
____ Test fire results indicate burn objectives will be met.

Ignition Specialist Printed Name	Signature	Date	Time
Holding Supervisor Printed Name	Signature	Date	Time
Burn Boss Printed Name	Signature	Date	Time

Attachment # 8: SLOP-OVER CONTAINMENT NEEDS

SLOPOVER CONTAINMENT NEEDS WORKSHEET

Slopover containment resource needs are determined by analyzing the worst case slop over scenario, based on the location along the burn perimeter that poses the most threat of a slopover. Potential spread and fire intensity was calculated for this location using environmental inputs from the hot end of the burning prescription using BEHAVE (version 4.4). The output information provided by the BEHAVE run is then used along with the standard fire line production rates found in the Fireline Handbook (pages A20-A22) to determine the resources that would be needed to contain the slop over at established time intervals.

Fire Behavior Fuel Model	Specific Conditions	Construction Rate in Chains per Person per Hour**	Chains of Hose lay per Crew Hour					Type 1 Hand Crew Scrape*	Type2 Hand Crew Scrape*
			# persons in engine crew						
			1	2	3	4	5+		
1 Short Grass	grass	4	6	12	24	35	40	30	18
	tundra	1	2	8	15	24	30	9	5
2 Open Timber	all	3	3	7	15	21	25	24	16
3 Tall Grass	all	0.7	2	5	10	14	16	5	3
4 Chapparal	Chap.	0.4	2	3	8	15	20	5	3
	Pocosin	0.7	2	4	10	15	18	4	2
5 Brush (2 ft.)	all	0.7	3	6	12	16	20	6	4
6 Dormant Brush/Hardwood Slash	black spruce	0.7	3	6	10	16	20	7	5
	others	1	3	6	12	16	20	6	4
7 Southern Rough	all	0.7	2	5	12	16	20	4	2
8 Closed Timber Litter	conifers	2	3	8	15	20	24	7	5
	hardwoods	10	10	30	40	50	60	40	24
9 Hardwood Litter	conifers	2	3	7	12	18	22	28	16
	hardwoods	8	8	25	40	50	60	40	24
10 Timber Litter	all	1	3	8	12	16	20	6	4
11 Light Logging Slash	all	1	3	8	12	16	20	15	9
12 Medium Logging Slash	all	1	3	5	10	16	20	7	4
13 Heavy Logging Slash	all	0.4	2	4	8	15	20	5	3

*Sustained line production rates of 20-person crews for Construction, Burnout, and Holding in chains per hour. Allowances have been made in production rates for rest periods and cumulative fatigue.

28

** These rates are to be used for estimating initial action productivity only. DO NOT use these rates to estimate sustained line construction, burnout, and holding productivity. Initial action may consist of scratch line construction and hot spotting.

Discussion and Assumptions

The most likely scenario for escape of the Grant West Omnibus burn would be a spot fire across the northern boundary of the unit, onto the Sequoia National Forest. This is an area of mixed NFFL Fuel Models 8, 10, 12, and 14. Fuel Model 8 is most dominant on the Forest.

In order to provide the most conservative approach to the contingency resources worksheet, the following analysis was only run on a worst case scenario. That would be at the hot end of the prescription and a head fire. In reality, any escape from the burn unit would most likely result in a backing fire due to favorable topography around the unit. It is also most likely that the burn will not be ignited at the extreme hot end of the prescription. Even so, the outputs for the cool end were not analyzed because they would not be worst case scenario.

The greatest risk of escape would occur during ignition and initial burn down as the fire is brought down the northern line of the unit. As fuels near the line are consumed, risk of escape drops significantly. The results of this analysis therefore would apply only to those periods where this perimeter would be exposed to risk, i.e. ignition and initial burn down within 200 feet of the line. Once that area is black and substantially cold, contingency needs could be reduced to staff on-hand as specified in the burn organization portion of the plan.

Assumptions used for the analysis:

- The fuels in the potential area of escape are predominately fuel model 8. This was confirmed by a site visit. Calculations for containment used FM 8, 10 and 14 as these are the predominant fuels.
- For BEHAVE runs, it was assumed that the fire would spot across the northern line onto USFS land and move with the wind across the slope. This would be the most politically sensitive escape that could occur outside the burn unit.
- For containment analysis, it was assumed that contingency resources were on site and could be reasonably able to begin initial attack within ½ hour (again this is very conservative). It was also assumed that all ignition and most holding forces on the burn would become available for suppression should escape occur.
- The "contain" module of BEHAVE was run with the following constraints; the suppression action needed to be completed within a 12-hour shift, and the area of escape would be held to 10 acres or less (to minimize the political impact).

Recommendations

- At the hot end of the prescription, it is recommended that all contingency resources be actually assigned to the burn.
- It is the responsibility of the Burn Boss to determine necessary staffing needs in response to the identified prescription parameters.

Prepared By: Leslie Uhr Date 7/27/04
Assistant Fuels Management Specialist

ADEQUATE HOLDING RESOURCES WORKSHEET
FOR PRESCRIBED FIRE

Project Name: GRANT WEST OMNIBUS Fuel Models Inside Project Area: 8, 10, 14 Acres: 436
Prepared By/Date: L.UHR 6/11/04 Fuel Models Outside Project Area: mostly 8, some 10, and 12

Characteristics	Output type	Modeling Predictions COOL END RX	Modeling Predictions HOT END RX	Unit of Measure
CRITICAL FIRE INPUTS	1 Hr Fuel Moisture	10	3	%
	Wind Speed	5	10	MPH
	Slope	35	35	%
KEY FIRE BEHAVIOR OUTPUTS	Rate of Spread (ROS)		8	ch/hr
	Fireline Intensity		31	BTU/ft/sec
	Flame Length		202	Feet
	Probability of Ignition		80	%
	Spotting Distance		0.2	Miles
	Scorch Height		2.2	Feet
FIRE SIZE	Projection Time		1.0	Hours
	Forward Spread		22.0	Chains
	Backward Spread		0.7	Chains
FIRE CONTAINMENT	Method Of Attack		REAR	Head/Rear
	Max Escape Target		10	Acres
	Max Containment Time		4.2	Hours
	Total Line Building Rate		17	Ch/hr
1. Choose greater total line building rate from inside and outside the project area		17		Ch/hr
2. Estimate potential number spot fires or slopovers at one time:			1	
3. TOTAL LINE BUILDING RATE NEEDED (multiply line 1 times line 2)			17	Ch/hr

Production Rates: Ease of Access: (circle) POOR-FAIR-GOOD-EXCELLENT

(refer to fireline handbook other sources and local knowledge)

On Site Organization	Total # Planned On Burn	Total # Dedicated to Prescribed Fire	Total # Available for Spot Fire or Slopover Control		Line Building Production Rates		Spot Fire or Slopover Line Building Capacity
Overhead	5	5	0	X	2.0	ch/hr	0
Firing Crew	6	0	6	X	2.0	ch/hr	12
Holding	20	5	15	X	2.0	ch/hr	30
Other Personnel				X		ch/hr	
Engine (Crew of 4)	2	1	1	X	20	ch/hr	20
Dozer (Size)				X		ch/hr	
Other				X		ch/hr	
Other				X		ch/hr	
Other				X		ch/hr	
4. TOTAL CAPACITY	102	40	62				62
3. TOTAL LINE BUILDING RATE NEEDED (from table above)							17
5. DETERMINATION OF ADEQUATE HOLDING RESOURCES (Line 4 minus Line 3)						ch/hr	62-17 = +45

If number on line 5 is positive then adequate holding forces will be available. If number is negative, more holding resources are needed.

Attachment #9: BEHAVE RUNS, page 1 of 4

```
WELCOME TO THE BEHAVE SYSTEM
   BURN SUBSYSTEM
     FIRE1 PROGRAM: VERSION 4.4 -- FEBRUARY 1997
```

HOT END - HEAD FIRE:

```
 DIRECT
  1--FUEL MODEL -------------      8 -- CLOSED TIMBER LITTER
  2--1-HR FUEL MOISTURE, % --     3.0
  3--10-HR FUEL MOISTURE, % -     4.0
  4--100-HR FUEL MOISTURE, %      5.0
  7--MIDFLAME WINDSPEED, MI/H     2.0    4.0    6.0    8.0   10.0
  8--TERRAIN SLOPE, % -------    35.0
  9--DIRECTION OF WIND VECTOR      .0
      DEGREES CLOCKWISE
       FROM UPHILL
 10--DIRECTION OF SPREAD ----      .0   (DIRECTION OF MAX SPREAD)
     CALCULATIONS
      DEGREES CLOCKWISE
       FROM UPHILL
```

MIDFLAME WIND (MI/H)	RATE OF SPREAD (CH/H)	HEAT PER UNIT AREA (BTU/SQFT)	FIRELINE INTENSITY (BTU/FT/S)	FLAME LENGTH (FT)	REACTION INTENSITY (BTU/SQFT/M)	EFFECT. WIND (MI/H)
2.0	1.	225.	6.	1.0	1109.	3.1
4.0	3.	225.	11.	1.3	1109.	4.8
6.0	4.	225.	17.	1.6	1109.	6.7
8.0	6.	225.	23.	1.9	1109.	8.6
10.0	8.	225.	31.	2.2	1109.	10.6

HOT END - BACKING FIRE:

```
 DIRECT
  1--FUEL MODEL -------------      8 -- CLOSED TIMBER LITTER
  2--1-HR FUEL MOISTURE, % --     3.0
  3--10-HR FUEL MOISTURE, % -     4.0
  4--100-HR FUEL MOISTURE, %      5.0
  7--MIDFLAME WINDSPEED, MI/H     2.0    4.0    6.0    8.0   10.0
  8--TERRAIN SLOPE, % -------    35.0
  9--DIRECTION OF WIND VECTOR      .0
      DEGREES CLOCKWISE
       FROM UPHILL
 10--DIRECTION OF SPREAD ----   180.0
     CALCULATIONS
      DEGREES CLOCKWISE
       FROM UPHILL
```

MIDFLAME WIND (MI/H)	RATE OF SPREAD (CH/H)	HEAT PER UNIT AREA (BTU/SQFT)	FIRELINE INTENSITY (BTU/FT/S)	FLAME LENGTH (FT)	REACTION INTENSITY (BTU/SQFT/M)	EFFECT. WIND (MI/H)
2.0	0.	225.	1.	.4	1109.	.0
4.0	0.	225.	1.	.4	1109.	.0
6.0	0.	225.	1.	.4	1109.	.0
8.0	0.	225.	1.	.4	1109.	.0
10.0	0.	225.	1.	.4	1109.	.0

COOL END - HEAD FIRE:

DIRECT
1--FUEL MODEL ---------- 8 -- CLOSED TIMBER LITTER
2--1-HR FUEL MOISTURE, % -- 10.0
3--10-HR FUEL MOISTURE, % - 11.0
4--100-HR FUEL MOISTURE, % 12.0
7--MIDFLAME WINDSPEED, MI/H 2.0 4.0 6.0 8.0 10.0
8--TERRAIN SLOPE, % ------- 35.0
9--DIRECTION OF WIND VECTOR .0
DEGREES CLOCKWISE
FROM UPHILL
10--DIRECTION OF SPREAD ---- .0 (DIRECTION OF MAX SPREAD)
CALCULATIONS
DEGREES CLOCKWISE
FROM UPHILL

MIDFLAME WIND (MI/H)	RATE OF SPREAD (CH/H)	HEAT PER UNIT AREA (BTU/SQFT)	FIRELINE INTENSITY (BTU/FT/S)	FLAME LENGTH (FT)	REACTION INTENSITY (BTU/SQFT/M)	EFFECT. WIND (MI/H)
2.0	1.	165.	3.	.7	810.	3.1
4.0	1.	165.	4.	.9	810.	4.8
6.0	2.	165.	7.	1.1	810.	6.7
8.0	3.	165.	9.	1.3	810.	8.3*
10.0	3.	165.	9.	1.3	810.	8.3*

* MEANS YOU HIT THE WIND LIMIT.

COOL END - BACKING FIRE:

DIRECT
1--FUEL MODEL ---------- 8 -- CLOSED TIMBER LITTER
2--1-HR FUEL MOISTURE, % -- 10.0
3--10-HR FUEL MOISTURE, % - 11.0
4--100-HR FUEL MOISTURE, % 12.0

```
 7--MIDFLAME WINDSPEED, MI/H     2.0    4.0    6.0    8.0   10.0
 8--TERRAIN SLOPE, % -------    35.0
 9--DIRECTION OF WIND VECTOR      .0
     DEGREES CLOCKWISE
      FROM UPHILL
10--DIRECTION OF SPREAD ----   180.0
    CALCULATIONS
     DEGREES CLOCKWISE
      FROM UPHILL
```

MIDFLAME WIND (MI/H)	RATE OF SPREAD (CH/H)	HEAT PER UNIT AREA (BTU/SQFT)	FIRELINE INTENSITY (BTU/FT/S)	FLAME LENGTH (FT)	REACTION INTENSITY (BTU/SQFT/M)	EFFECT. WIND (MI/H)
2.0	0.	165.	0.	.2	810.	.0
4.0	0.	165.	0.	.2	810.	.0
6.0	0.	165.	0.	.2	810.	.0
8.0	0.	165.	0.	.2	810.	.0
10.0	0.	165.	0.	.2	810.	.0

HOT END - HEAD FIRE - CONTINGENCY RESOURCES DETERMINATION:

```
DIRECT
 1--FUEL MODEL -------------      8 -- CLOSED TIMBER LITTER
 2--1-HR FUEL MOISTURE, % --     3.0
 3--10-HR FUEL MOISTURE, % -     4.0
 4--100-HR FUEL MOISTURE, %      5.0
 7--MIDFLAME WINDSPEED, MI/H    10.0
 8--TERRAIN SLOPE, % -------    35.0
 9--DIRECTION OF WIND VECTOR      .0
     DEGREES CLOCKWISE
      FROM UPHILL
10--DIRECTION OF SPREAD ----      .0
    CALCULATIONS
     DEGREES CLOCKWISE
      FROM UPHILL

     RATE OF SPREAD, CH/H ----------      8.
     HEAT PER UNIT AREA, BTU/SQFT --    225.
     FIRELINE INTENSITY, BTU/FT/S---     31.
     FLAME LENGTH, FT---------------      2.2
     REACTION INTENSITY, BTU/SQFT/M    1109.
     EFFECTIVE WINDSPEED, MI/H------     10.6

SIZE-LINKED-TO-DIRECT
 1--RATE OF SPREAD, CH/H ---   OUTPUT FROM DIRECT =     8.
 2--EFFECTIVE WIND, CH/H ---   OUTPUT FROM DIRECT =    10.6
 3--ELAPSED TIME, HR -------      .5

     AREA, ACRES   -----------------       .3
     PERIMETER, CHAINS--------------      8.
```

```
     LENGTH-TO-WIDTH RATIO----------      3.6
     FORWARD SPREAD DISTANCE, CH----     3.8
     BACKING SPREAD DISTANCE, CH----      .1
     MAXIMUM WIDTH OF FIRE, CH------     1.1

CONTAIN-LINKED-TO-DIRECT-AND-SIZE
 1--RUN OPTION -------------    1.=COMPUTE LINE BUILDING RATE
 2--MODE OF ATTACK ---------    2.=REAR
 3--RATE OF SPREAD, CH/H ---    OUTPUT FROM DIRECT =     8.
 4--INITIAL FIRE SIZE, AC --    OUTPUT FROM SIZE   =     0.
 5--LENGTH-TO-WIDTH RATIO --    OUTPUT FROM SIZE   =     3.6
 6--BURNED AREA TARGET, AC -   10.0

    TOTAL LENGTH OF LINE              71.  CHAINS
    CONTAINMENT TIME                   4.2 HOURS
    TOTAL LINE BUILDING RATE          17.  CH/H


SPOT:
 1--FIREBRAND SOURCE--------    1--TORCHING TREE
 2--MEAN COVER HEIGHT, FT --  100.0
 3--20-FOOT WINDSPEED, MI/H    10.0
 4--RIDGE/VALLEY ELEVATION
          DIFFERENCE, FT --   200.0
 5--RIDGE/VALLEY HORIZONTAL
          DISTANCE, MI ----     .2
 6--SPOTTING SOURCE LOCATION    2.-- MIDSLOPE, LEEWARD SIDE
 7--TORCHING TREE SPECIES---    4. PONDEROSA PINE, LODGEPOLE PINE
 8--TORCHING TREE DBH, IN --   20.0
 9--TORCHING TREE HEIGHT, FT  100.0
10--NUMBER OF TREES
          TORCHING TOGETHER     5.0

    MAXIMUM SPOTTING DISTANCE =     .2 MI


SCORCH:
 1--AMBIENT AIR TEMP, F ----    85.0
 2--FLAME LENGTH, FT -------     2.2
 3--MIDFLAME WINDSPEED, MI/H    10.0

    CROWN SCORCH HEIGHT, FT        2.


IGNITE:
 1--DRY BULB TEMPERATURE, F     85.0
 2--1-HR FUEL MOISTURE, % --     3.0
 3--FUEL SHADING, % --------    75.0

    PROBABILITY OF IGNITION =   80. %
```

Attachment #10: BURN PLAN TECHNICAL REVIEW

Burn Plan Technical Review

Burn Plan Name: **Grant West Omnibus**

Burn Plan Section	Review Status	Date	Initials
Signature Page	+	07/27/04	CC
Executive Summary	+	07/27/04	CC
Goals and Objectives	+	07/27/04	CC
Burn Unit Description	+	07/27/04	CC
Project Complexity	+	07/27/04	CC
Burn Organization	+	07/27/04	CC
Estimated Costs	+	07/27/04	CC
Scheduling	+	07/27/04	CC
Pre-Burn Planning and Preparation Considerations	+	07/27/04	CC
Burning Prescription	+	07/27/04	CC
Firing and Holding Plan	+	07/27/04	CC
Smoke Management and Air Quality	+	07/27/04	CC
Escaped Fire and Smoke Contingency Transition Planning	+	07/27/04	CC
Protection of Sensitive Features	+	07/27/04	CC
Public and Personnel Safety	+	07/27/04	CC
Interagency/Intra-agency Coordination and Public Involvement	+	07/27/04	CC
Monitoring and Evaluation	+	07/27/04	CC
Rehabilitation	+	07/27/04	CC
Documentation	0	07/27/04	CC
Attachments: ➢ Cultural Resources Clearance ➢ Prescribed Fire Complexity Rating Guide ➢ Slopover Containment Resource Needs Worksheet ➢ Technical Review ➢ Park Staff Comments ➢ Park Superintendent Go/No Go Pre-ignition Approval ➢ Briefing Guide ➢ Burn Plan Execution Go/No Go Checklist ➢ Vicinity Map ➢ 7.5 minute project topographic map ➢ 7.5 minute project vegetation map ➢ 7.5 minute project fuels map	0	07/27/04	CC

Status: + Adequate - meets NPS standards NC Unable to evaluate
0 Adequate with modification - see comments
- Deficient

Comments: An excellent and thorough job on the burn plan overall. Good job! Under the documentation section in Post fire Reports, it should state that NFPORS will be updated within 5 days of ignition/project completion and not within 5 days of calling the fire out (which could be weeks). In the slop over containment section you talk about the fuels being predominately NFFL models 8 and 12, but you use the cooler model for your calculations. Latter you state that the fuels on the USFS lands are mostly 8, I believe that you should also state this on page 9 to justify your use of the cooler of the 2 models.

Corky Conover

Reviewed by: Corky Conover Date: July 27, 2004
Job Title: NPS-PWR-Fuels Specialist, RXB1 559-565-3129

Attachment #11 - PARK REVIEW COMMENTS

Burn Plan Name: **GRANT WEST OMNIBUS**

Please note comments you have concerning this prescribed burn plan.

Fire Management Officer:

See comments on page.

Division of Visitor and Fire Management:

- provide thorough protection of named Sequoias + monarch sugar pines
- communicate effectively w/ other park divisions + neighbors
- set up the additional E-BAM during burn - in appropriate location
- do any needed trail repair in post-fire rehab

Division of Science and resources Management:

No additional comments

Division of Cultural Resources and Interpretation:

AREA POPULATION FIGURES ON PAGE 11 ARE WAY TOO LOW. HUME LAKE HAS SEVERAL THOUSAND PEOPLE @ PEAK USE. M-S LODGE EASILY 200-300.

ON PAGES 9-10, THERE NO MENTION OF GAMLIN CABIN, A NATIONAL REGISTER FEATURE ON ~~BOR~~ UNIT BOUNDARY. } page 9

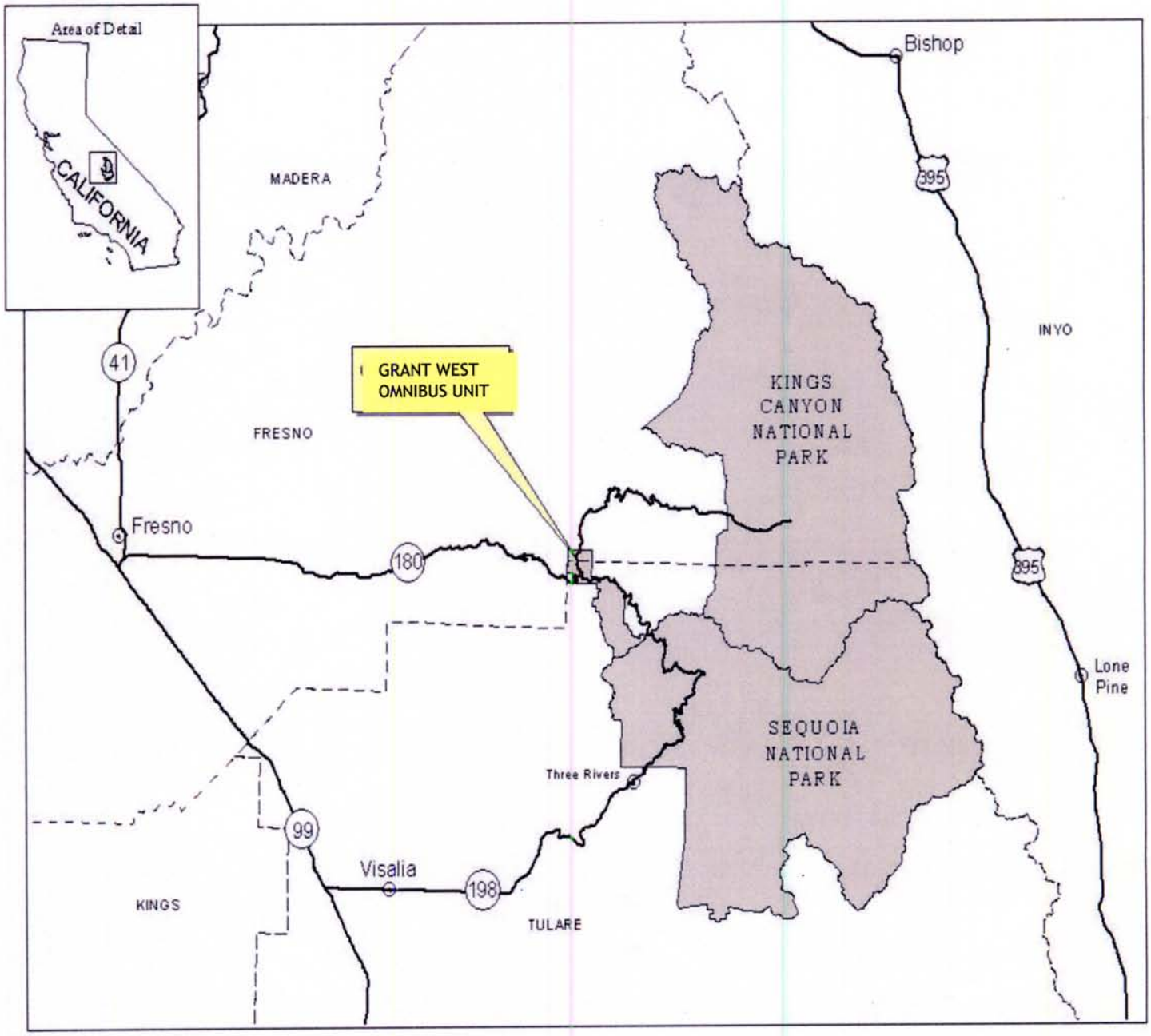
FIRE SHOULD NOT BE STILL SMOLDERING ON DEC 12, WHEN NATION'S CHRISTMAS TREE EVENT OCCURS ON UNIT BOUNDARY.

Superintendent:

Other:

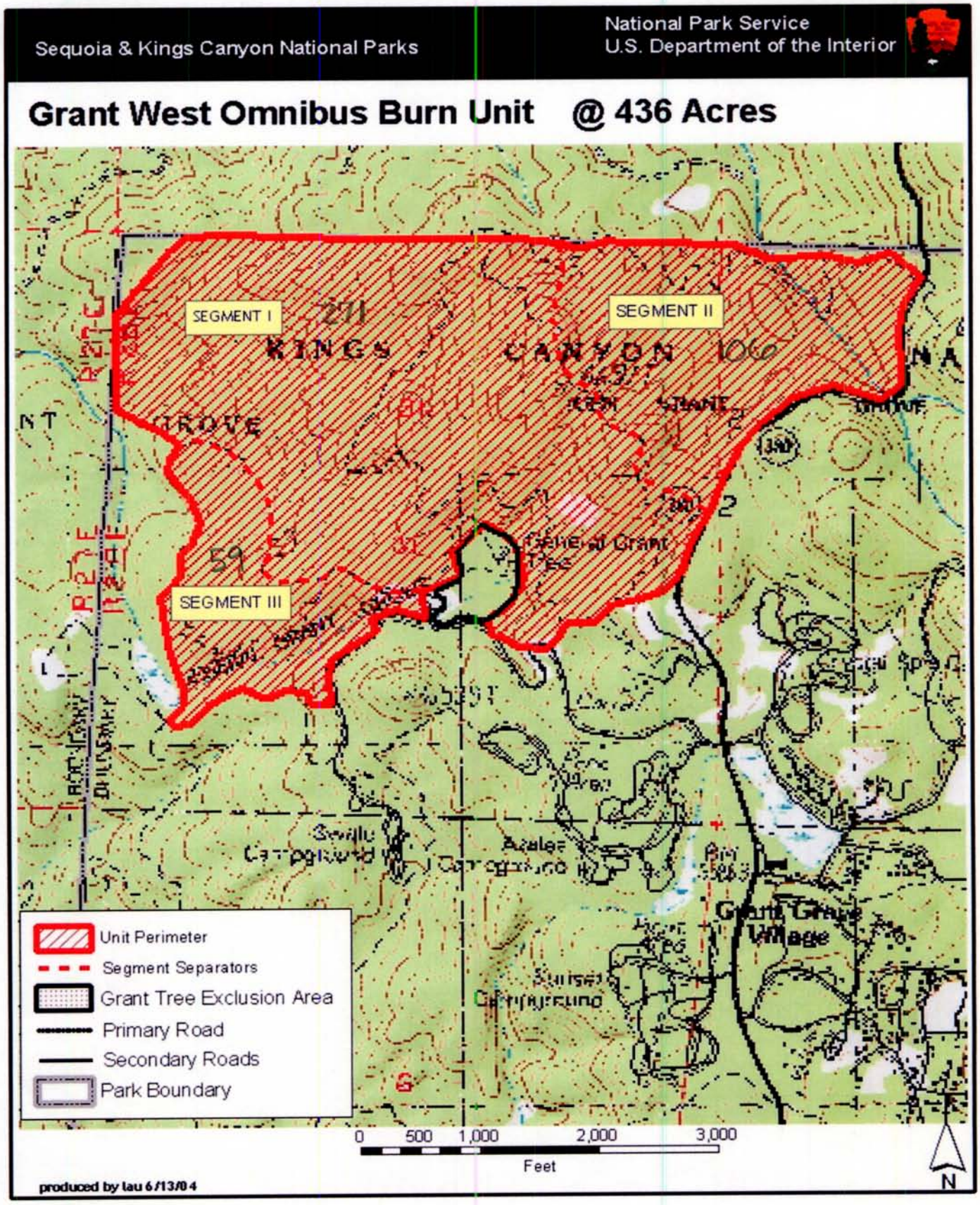
36

Attachment #12: VICINITY MAP

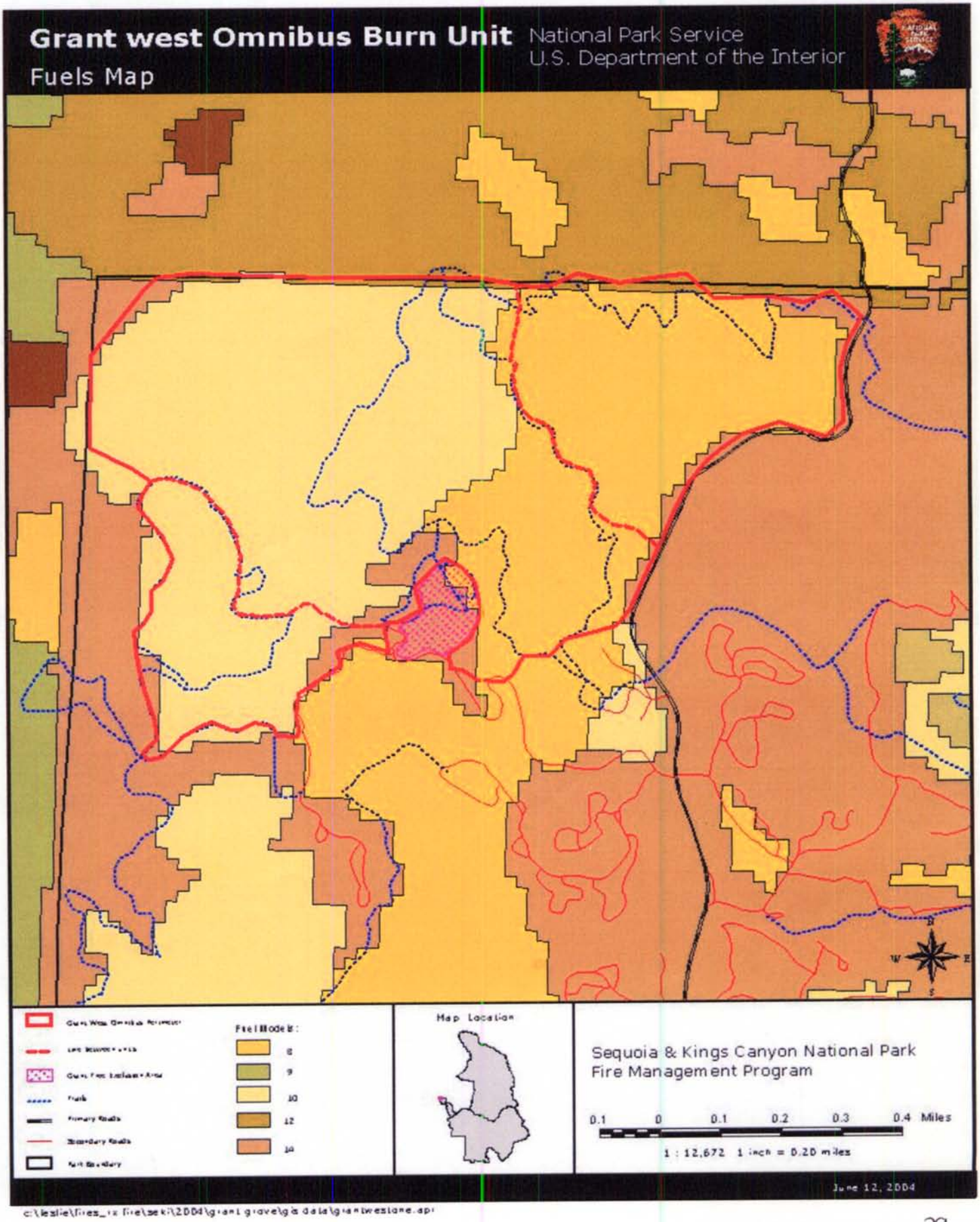


37

Attachment #13: PROJECT MAP

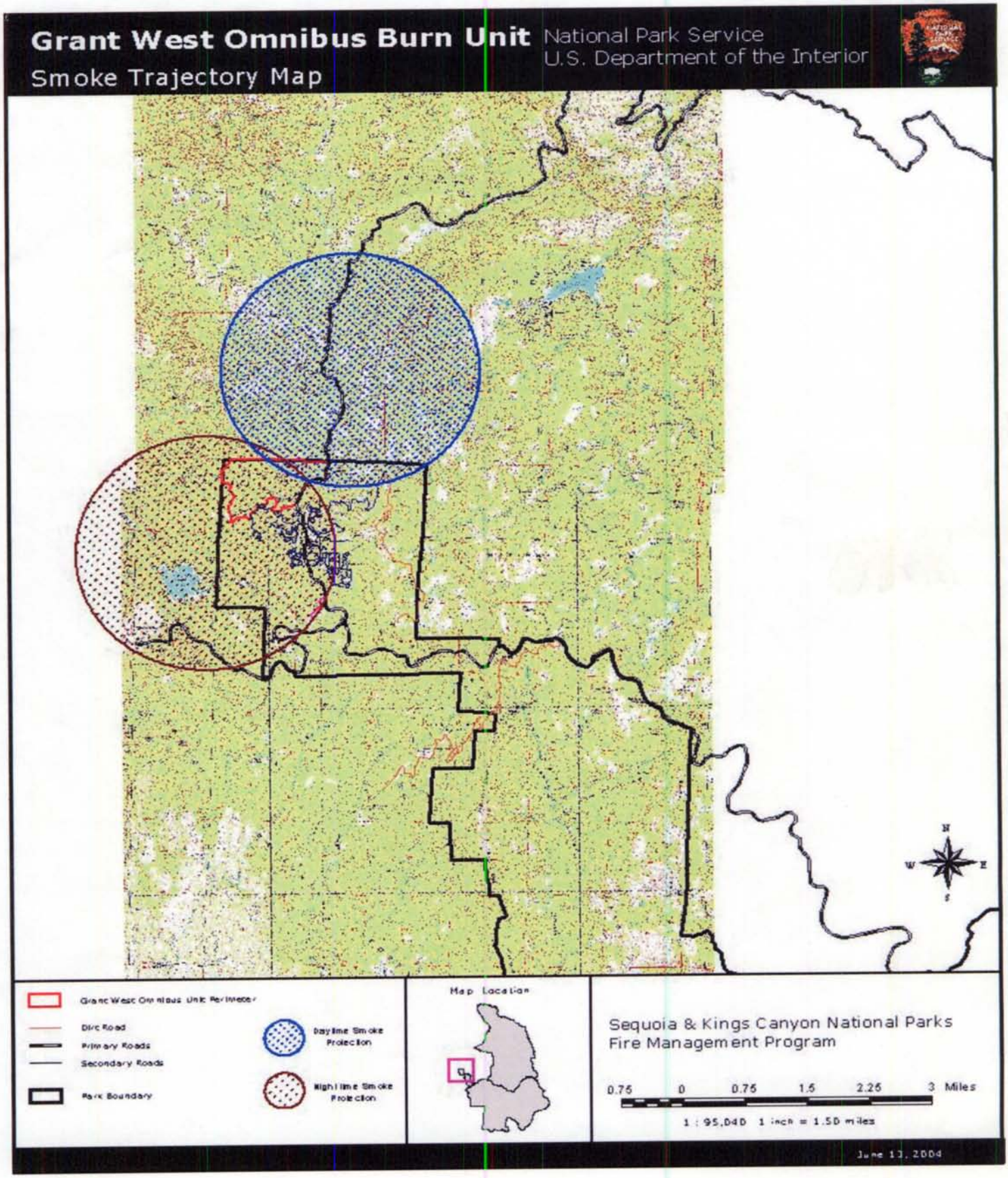


Attachment #14: PROJECT FUELS MAP



c:\leslie\fires_rx fire\seki\2004\grant grove\gis data\grantwestone.apr

Attachment #15: SMOKE PLUME DIRECTION MAP



APPENDIX 2

Grant West Omnibus Prescribed Burn Incident Action Plan for October 2, 2004

INCIDENT OBJECTIVES	1. Incident Name Grant West RX Burn	2. Date 10/02/04	3. Time 0800

4. Operational Period

10/02 -10/05

5. General Control Objectives for the Incident (include alternatives)

1: SAFETY FIRST. Conduct all burn operations with strict attention to the safety of all burn personnel, other park personnel, and the public.

2: Reduce dead and down fuels by 60% - 80% within the burn area.

3: Conduct all operations in a cost effective and efficient manner.

4: Provide opportunities for education of employees and the public about the role of fire in ecosystem management and protection of values at risk.

Burn Prescriiption

Temperature: 40 - 85 degrees

Relative Humidity: 20 - 60%

Wind: 0 -10 mph

1 hour: 3 -12%

10 hour: 4 -13%

1000 hour:10 - 20%

Expected Fire Behavior Outputs

Rate of Spread: 0 -18 chains per hour

Flame Length: 0 - 4 feet

SEE ATTACHED SAFETY MESSAGE.

8. Attachments (mark if attached)

☐ Organization List - ICS 203	☒ Medical Plan - ICS 206	☐ (0ther)
☒ Div. Assignment Lists - ICS 204	☒ Incident Map	☐
☐ Communications Plan - ICS 205	☐ Traffic Plan	☐

9. Prepared by (Burn Boss- t)	10. Approved by (Incident Commander)
Leslie A. Uhr	

DIVISION ASSIGNMENT LIST	1. Branch	2. Division/Group A
3. Incident Name: Grant West Rx Burn	4. Operational Period: Date: 10/2-10/5	

5. Operations Personnel

Burn Boss	Ben Jacobs/Leslie Uhr(t)	Division Holding Boss	Brit Rosso
Ignition Specialist	Patrick Morgan/T. Young(t)	Fire Information Officer	Jody Lyle

6. Resources Assigned this Period

Strike Team/Task Force/ Resource Designator	Leader	Number Persons	Trans. Needed	Drop Off PT./Time	Pick Up PT./Time
Arrowhead Hotshots	Corn-Dog	17			
WHIS Fire Use Module	Johanna Darcy	4			
Firestorm	Duane Fields	10			
Smoke Technician	Joel Metcalfe	1			
Fire Monitors	Rich Ragusin	2			

7. Control Operations

Ignite unit using ignition patterns to meet burn objectives. Ensure all personnel are aware of ignition operations.

Keep burn within the unit boundaries, patrol for and suppress spot fires using minimum impact suppression tactics.

Monitor smoke column and impact to Grant Grove area.

Maintain good communications with Burn Boss, Ignition, Holding and all crew personnel.

8. Special Instructions

Stage firing equipment and backpack pumps along Division as determined by Holding and Ignition Boss.

Fire Monitors to provide weather observations every hour or as requested, and broadcast over tactical frequency.

Monitors will remain on flanks of fire and not wander in the interior of unit unless cleared by Burn Boss.

Smoke Technician to observe, document, and record with digital photos, smoke column direction and dispersion every hour or as significant changes occur.

Fire Monitors and Smoke Technician will work directly for Burn Boss.

9. Division/Group Communication Summary

Function	Frequency	System	Channel	Function	Frequency	System	Channel
Command	173.7875 TX 173.7875 RX Tone 123.0	King NIFC	SEKI Tac 2	Logistics		King NIFC	
Tactical Div/Group	168.200 TX 168.200 RX	King NIFC	NIFC Tac 2	Air to Ground	168.650 TX 168.650 RX	King NIFC	

Prepared by (Burn Boss -t)	Approved by (Planning Sect. Ch.)	Date	Time
Leslie A. Uhr		10/02/04	0800

DIVISION ASSIGNMENT LIST	1. Branch	2. Division/Group B
3. Incident Name: Grant West Rx Burn	4. Operational Period: Date: 10/2 – 10/05	

5. Operations Personnel

Burn Boss	Ben Jacobs/Leslie Uhr(t)	Division Holding Boss	Dave Allen
Ignition Specialist	Patrick Morgan/T. Young(t)	Fire Information Officer	Jody Lyle

6. Resources Assigned this Period

Strike Team/Task Force/ Resource Designator	Leader	Number Persons	Trans. Needed	Drop Off PT./Time	Pick Up PT./Time
Crew 91	Mike Brown	7			
SAMO Engine 73	Ryan O'Neil	5			
SEKI Engine 51	Larry Smith	5			
BLM Engine	Abel Mata	5			
Smoke Technician	Joel Metcalfe	1			
Fire Monitors	Rich Ragusin	2			
Patrol 51	Clint Coonfield	1			
Arrowhead Mule	TBA				

7. Control Operations

Ignite unit using ignition patterns to meet burn objectives. Ensure all personnel are aware of ignition operations

Keep burn within the unit boundaries, patrol for and suppress spot fires using minimum impact suppression tactics.

Monitor smoke column and impact to Grant Grove area.

Maintain good communications with Burn Boss, Ignition, Holding and all crew personnel.

Patrol Generals Highway for spot fires across road.

Monitor Generals Highway for smoke impacts to traffic.

8. Special Instructions

Stage firing equipment and backpack pumps along Division as determined by Holding and Ignition Boss.

Implement traffic control plan as determined by Holding Boss or Burn Boss.

SEKI Engine 51 is pre-identified to lay hose on Division B if requested by the Division B Holding Boss.

Fire Monitors to provide weather observations every hour or as requested, and broadcast over tactical frequency.

Monitors will remain on flanks of fire and not wander in the interior of unit unless cleared by Burn Boss.

Smoke Technician to observe, document and record with digital photos, smoke column direction and dispersion every hour or as significant changes occur.

Fire Monitors and Smoke Technician will work directly for Burn Boss.

Division will provide personnel for evening patrol as determined by the Holding or Burn Boss.

9. Division/Group Communication Summary

Function	Frequency	System	Channel	Function	Frequency	System	Channel
Command	173.7875 TX 173.7875 RX Tone 123.0	King NIFC	SEKI Tac 2	Logistics		King NIFC	
Tactical Div/Group	168.200 TX 168.200 RX	King NIFC	NIFC Tac 2	Air to Ground	168.650 TX 168.650 RX	King NIFC	

Prepared by (Burn Boss-t)	Approved by (Planning Sect. Ch.)	Date	Time
Leslie A. Uhr		10/02/04	0800

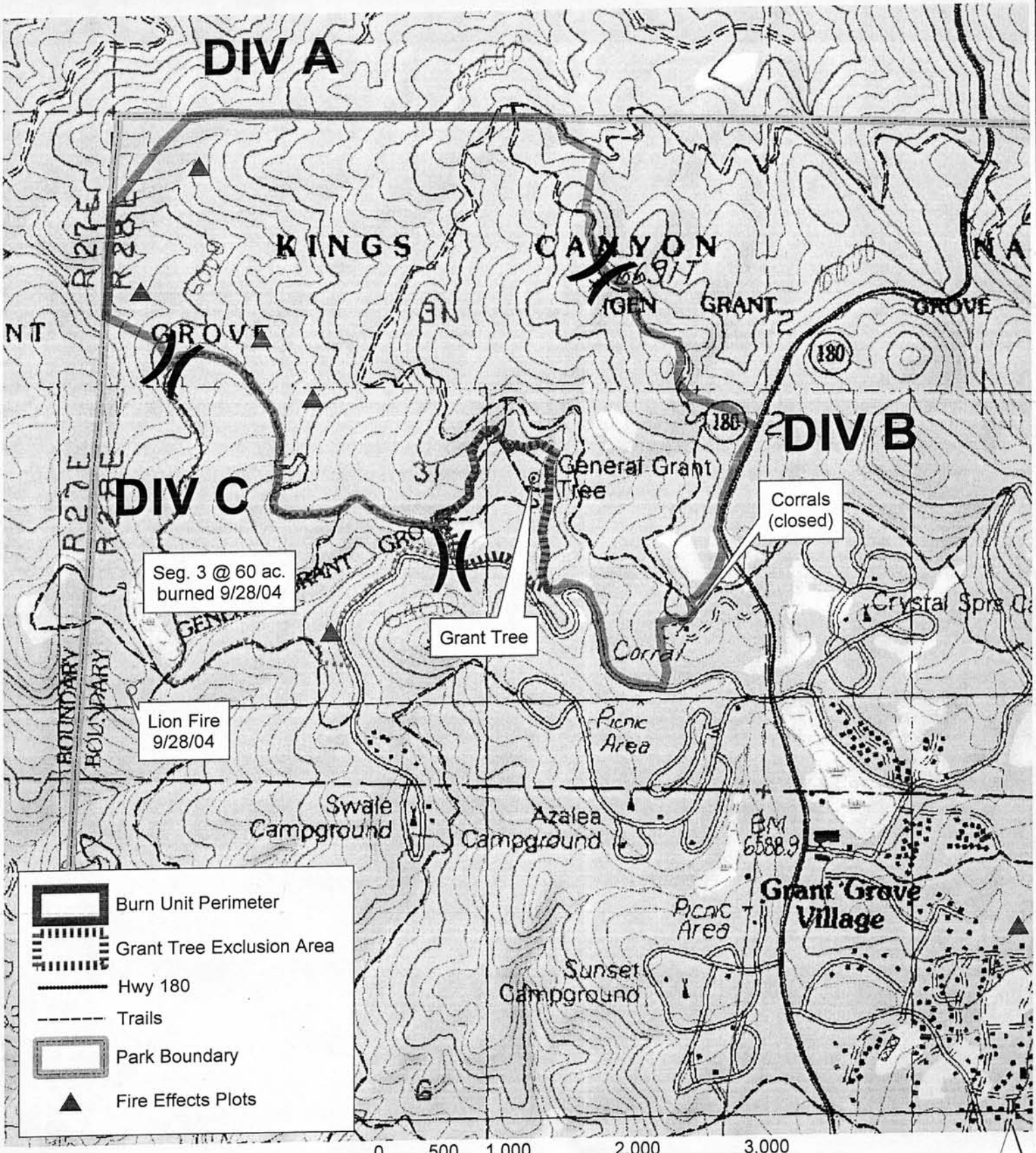
GRANT WEST SAFETY MESSAGE

1. Pay attention to traffic along the Generals Highway.
2. Watch out for snags throughout the unit. There are several Tussock Moth snags in the area.
3. Rotate personnel out of the smoke whenever possible.
4. Burners need to pay special attention access in the brush during ignition operations.
5. Burners need to watch out for cut banks when burning near the Generals Highway, and the Grant Tree access road.
6. Watch out for bees, snakes, and other critters.
7. The unit is steep in places with numerous rocky drop offs. Watch footing at all times.
8. LCES is everyone's responsibility. All personnel must know their safety zone and escape route at all times.

Sequoia & Kings Canyon National Parks

National Park Service
U.S. Department of the Interior

Grant West Burn Unit - Segment 1 @ 270 Acres



Map by NPS (lau) 9/30/04

APPENDIX 3

Burn Plan Execution Go/No-Go Checklist

Attachment #7: BURN PLAN EXECUTION GO/NO-GO CHECKLIST

Grant West Omnibus Burn Plan Execution Go/No Go Checklist

The answer to each of the following must be yes.

____ Burn plan is approved by park superintendent and distributed to key field supervisors.
____ Burn plan is approved by the local air district.
____ Park Superintendent Go/No Go Pre-ignition Approval is complete and current.
____ All personnel required in the IAP plan are on site.
____ All equipment and supplies required in the IAP are in position and working properly.
____ Employee and public information outreach is complete.
____ Fire monitoring is ready:
- fire weather observations
- fire behavior observations
- smoke observations
- fire effects plots/transects observations

____ IAP is distributed to overhead personnel.
____ All fire personnel have received a briefing.
____ All prescription parameters have been met:
- pre-burn preparation is complete
- smoke management is favorable
- burning prescription is favorable
- current and forecasted weather is favorable
- sensitive species review is complete
- cultural clearance is complete

____ Fire dispatch has made required notifications.
____ Contingency resources described in the plan have been committed and are available within the specified time frames.
____ A significant test fire designed to establish fire control and smoke dispersal is ready to go.
____ Incident personnel are ready to enforce roadway speed limits or control traffic due to reduced visibility per Smoke Management and Air Quality.
____ There are no extenuating circumstances that preclude successful completion of this project.

All above elements must be yes in order to proceed with the test fire.

____ Test fire demonstrates that holding resources are able to safely implement holding tactics.
____ Fire behavior is within prescription and is expected to stay in prescription into the foreseeable future.
____ Test fire results indicate burn objectives will be met.

PAT Morgan	DMM	10/2/04	12:44
Ted Young (+)			
Ignition Specialist Printed Name	Signature	Date	Time
		10/2/04	12:42
David Allen		10/2/04	1223
Brit Rosso			
Holding Supervisor Printed Name	Signature	Date	Time
Ben Jacobs		10/2/04	1224
Leslie Uhr (+)			
Burn Boss Printed Name	Signature	Date	Time

APPENDIX 4

Grant West Omnibus Prescribed Burn Briefing Guide

chment #6: BRIEFING GUIDE

BRIEFING GUIDE

A. Operational Objectives

B. Organizational Assignments — unassigned resources

C. Incident Safety
- fire personnel safety procedure
  - fire hazards
  - unhealthy smoke
  - environmental hazards
  - LCES
- public safety procedure
  - fire hazards
  - unhealthy smoke
- first aid and MEDIVAC procedure, identify EMT's

Maura - needs help - Sat Mon

Road affected by smoke

D. Incident Operations Strategy and Tactics
- prescription parameters
- test fire procedure
- firing procedure
- expected fire behavior
- holding procedure
- slop over containment procedure
- sensitive features
- weather forecast

Think about what you're doing
Jackpoting
No fire in Sequoia Cat faces
Don't waste fuel on rocks/dirt

B4 13 - W12 OT
B5 13 - W12 staff

E. Incident Communications
- radio frequencies
- radio use protocol
- available telephones and FAX
- fire dispatch situation update procedure

F. Incident Logistics
- equipment support procedure
- supplies support procedure
- food and water procedure
- sanitation facilities
- sleeping areas

Time from Out of Park resources
need CTR's & Reddogs
WHIS
SAMO
BLM Eng.

G. Incident Finance/Administration
- personnel time keeping procedure
- compensation for injuries procedure
- damage to, or loss of equipment and supplies reporting procedure
- disposable supplies replacement procedure

H. Feedback

APPENDIX 5

Firefighters Assigned to the Grant Burn & Qualifications

	Personnel/Position List for Grant West Rx Fire		
		2-Oct-04	
Crew Name	**Name**	**Crew position**	**Red Card Qualifications**
RX Fire			
Overhead			
Mgmnt.	Dave Bartlett	Kings District FMO	DIVS, ENGB, FOBS, ICT3, SITL, STCR, STEN, RXB2, RXI2, SCKN-T
	Ben Jacobs	Rx Fire Specialist	DIVS, DOZB, FOBS, ICT3, ICT4, TFLD, RXB1, RXB2, RXI2, FALC, HECM-T, RXI1-T,FUMA-T
	Leslie Uhr	Fuels Mgmt. Specialist	CRWB, DPRO, FFT1, FOBS, HECM, ICT4, RXI2, FEMC, RXB2-T, HCWN
	David Allen	Sequoia Dist. FMO	DIVS, DPRO, ENGB, FOBS, HECM, ICT3, SITL, STCR, RXI2, TFLD, RXB1-T, HCWN-T
	Patrick Morgan	Arrowhead H.S. Capt.	STCR, ICT4, DOZB, FALB, RXI2, HECM, CRWB, EMTB, FALC-T
	Ted Young	Forestry Tech.	CRWB, FFT1, FFT2, ICT5, RAWS, FALA, FALB, FEMO
	Jody Lyle	Fire Information Officer	IOF2, IOF3, IOF1-T
	Marty O'Toole	Fire Information Officer	FFT2, IOF3, IOF2-T
Arrowhead			
Hotshots	Brit Rosso	Arrowhead H.S. Supt.	ICT3, DIVS, TFLD, STDZ, STLC, FELB, FALC, FOBS, RXI2, RXB2
	Jake Akerberg	Crew Member	FFT1, FALB, ICT5, EMTB, HECM-T, CRWB-T
	Will Basye	Squad Leader	ICT4, CRWB, FALB, HECM, FALC-T, RXI2-T
	Daniel Holmes	Crew Member	FFT2, FALA, HECM
	David Cabrido	Crew Member	FFT1, FALB
	Derek Casbon	Crew Member	FALB, CRWB, ICT4, HECM, ENGB, WTOP, RXI2-T, DOZB-T
	Mark Gevue	Squad Leader	CRWB, HECM, ICT4, FALC, DOZB-T, STCR-T
	Pedro Guiterrez	Crew Member	FFT1, FALA, HECM, EMTB
	Nicholas Hruby	Crew Member	FFT2, FALA, EMTB
	Evan Karp	Crew Member	FFT1, FALB, ICT5, HECM, EMTB, CRWB-T
	Jacob Matilsky	Crew Member	FFT2, FALA
	Patrick Owens	Crew Member	FFT1, FALB
	Robert Palmer	Crew Member	FFT1, FALB, ICT5, HECM, EMTB, CRWB-T, ENGB-T
	Mike Ressler	Squad Leader	ICT4, CRWB, FALB, EMTB, RXI2, HECM, DOZB-T, FALC-T, STCR-T
	Don Shannon	Crew Member	FFT1, FALB, ICT5, HECM, ABRO, TOLC
	Amy Skraba	Crew Member	FFT2, FALA
	Chris Warren	Crew Member	FFT2, FALA
	Reed Wendel	Crew Member	FFT1, FALB, FEMO
Crew 91	Mike Brown	Squad Leader	ICT5, FALB-T, EMTB-T
	Ryan Dunehew	Crew Member	FFT2
	Scott Scherzinger	Crew Member	FFT2
	Anthony Saylor	Crew Member	FFT2
	J. Scherzinger	Crewmember	FFT1, ICT5, ENGB-T
	Jennie Smith	Crewmember	FFT1, FALB, ENOP, FALA, CRWB-T, ENGB-T, HECM-T
SAMO			
Engine 73	Ryan O'Neill	Engine Capt.	ENGB, FFT1, EMTB, FALA, CRWB-T, FOBS-T, HECM-T
	Mike Wilson	Squad Leader	ENGB, FFT1, EMTB, FALA, CRWB-T, FOBS-T, HECM-T
	Robert Wilkinson	Crew Member	FFT2, FALA
	Paul Bartiromo	Crew Member	FFT2
	Dustin Fenzke	Crew Member	FFT2
SEKI			

Engine 51	Larry Smith	Engine Capt.	ICT4, ICT5, FALA, ENGB, FFT1, SECM, FFT2, ENOP, WTOP, RXI2
	Ben Sundal	Crew Member	FFT1, HECM, FALB, SMKJ, ICT5
	Bret Buxton	Crew Member	FALA, FALB, FFT2, FFT1
	Paul Clement	Crew Member	HECM, FFT2, FFT1, HETM
	Chris Patterson	Crew Member	FFT2, EMTB
BLM			
Engine 31-30	Abel Mata	Engine Capt.	CRWB, ENGB, FFT1, HECM, ICT5, HESM, ICT4, STEN-T, RXI2-T
	Jennifer Mata	Crew Member	FFT2, INCM, SCKN, RADO, COMT-T, RESL-T
	John Carpenter	Crew Member	FFT1, ENOP, FALA
	John Stubblefield	Crew Member	FFT2
	Rodney Bruce	Crew Member	FFT2
Patrol 51	Clint Coonfield	Asst. Engine Capt.	FALB, HCWN, CRWB, ENGB, FFT1, HECM, FFT2, ENOP, HESM, ICT5, FOBS, HETM
	Josh Miller	Crew Member	FFT2
Fire Monitors	Rich Ragusin	Fire Monitor	FFT2, FEMO
	Todd Erdody	Fire Monitor	FFT2, FEMO
Smoke Tech.	Joel Metcalf	Smoke Monitor	FFT1, FFT2, FALA, FEMO, HECM-T
WHIS Fire			
Use Module	Jason Cully	Firefighter	ICT5, FFT1, FEMO, RAWS, FALB, ENGB-T, HECM-T
	Anna Hunt	Firefighter	EMTI, FALA, FEMO-T, FFT1-T
	Johanna Darcy	Firefighter	FALA, FEMO, HECM, PLDO, FFT1-T
	Jennifer Bentrim	Firefighter	FFT2
Fire Storm	Duane Fields	Crew Boss	CRWB, RXB3, FR, FFT1, FALB
	Bruce Wilson	Squad Leader	FFT2, FR, FFT1, FALA
	Kane Zink	Crew Member	FFT2
	Ann Vance	Crew Member	FR, FFT2, FALA
	Jason Carver	Crew Member	FF2
	Jake Dahl	Crew Member	FFT2
	Marcos Garcia	Crew Member	FFT2
	Danny Manning	Crew Member	FFT2
	Shane Kelly	Crew Member	FFT2
	Roy Bayless	Crew Member	FFT2

APPENDIX 6

Weather

COPY FIELD NOTES OF RICH RAGUSIN FIRE MONITOR

GRANT WEST

DAY 1 10-2

1020H 60° RH 26% 1-2 Light S

1042H START TEST BURN
NE CORNER BY PORTA TANK

1050H SPOTS ACROSS LINE
TREES TORCHING ON LINE
HOLD IGNITION AT HORSE TRAIL

1100H 61° RH 23% 1-3 S

1105H SMOKE THIN WHITE DISPELLING 200' ABOVE TREES TO NORTH-NORTH EAST

1130H 66° RH 21% 1-3 S TO W

1140H ESCORT 4 PEOPLE OUT OF FIRE TRAIL HEAD CLOSER BEING CHECKED

1200H 65° RH 31% 1-3 SW

1206H BEHAVE FM8
30% SLOPE SW WINDS 1-3 SW
1-10 FL FDZ 200'+ HEAVY DOWN Δ.
HEAD 10 CHAINS HOUR. TORCHING

1215H SMOKE
FROM WEATHER SPOT. T BEHAVE
LIGHT BROWN MOVING NE

1230H 65° RH 31% 1-5 SW

1231H IGNITION TIED OFF SACRE
TEST BURN - MEETING OF THE MINDS

APX 1245H ARROW HEAD FALLER HIT BY SNAG. DAN HOLMS

1300H 66° RH 22% 1-3 SW

1300-1345 WORKED ON DAN AT LZ

1400H 67° RH 27% 1-3 G5 W

1357H COMMAND TO DAVE ALLEN
DIV. B CAP 73
DIV B TIED

1430H 65° RH 24% 1-3 W

1500H 64° RH 26%

Appendix 6A-1

FIRE WEATHER OBSERVATIONS

INTERAGENCY FIRE USE MODULE HANDBOOK

FIRE NAME: Grant West - Seg. 1 | DATE: 10/2/04 | OBSERVERS: Eddody, Ragusin, Mata

TIME	LOCATION	ELEVATION	ASPECT	SLOPE	DRY BULB	WET BULB	RELATIVE HUMIDITY	DEW POINT	WIND SPEED (GUSTS)	WIND DIRECTION	% CLOUD COVER	% SHADING	FINE DEAD FUEL MOISTURE	PROB. OF IGNITION	COMMENTS (PRECIP, FIRE BEHAVIOR, SMOKE, ETC)
0840	engine bay	6500	E	5%	48	39	48	29	calm	-	0	80	11/12	20/20	
1020	test fire	6700	NE	15%	60	43	26	25	light	S	0	60	7/10	50/30	
1100	W side test fire	6700	E	5%	61	43	23	25	1-3	S	0	50	6/10	50/30	
1128	W side " "	6700	E	5%	65	45	21	24	1-3	S-W	0	50	6/8	50/40	
1200	"	6700	E	5%	65	48	31	34	1-3	SW	0	50	6/9	60/30	
1230	"	6700	E	5%	65	47	27	31	1-4	SW TO SW	5	50	6/9	60/30	
1300	"				66	46	22	26	1-3	SW	5	50	5/8	60/40	
1330	"				65	48	31	34	1-3 G6	SW	5	50	6/9	50/30	
1400	"				65	47	27	31	1-3 G5	W	5	50	6/9	50/30	
1430	"				65	46	24	28	2-4(9)	SW	5	50	5/8	60/40	
1500	"				64	46	26	29	1-3(6)	SW	5	50	6/9	50/30	

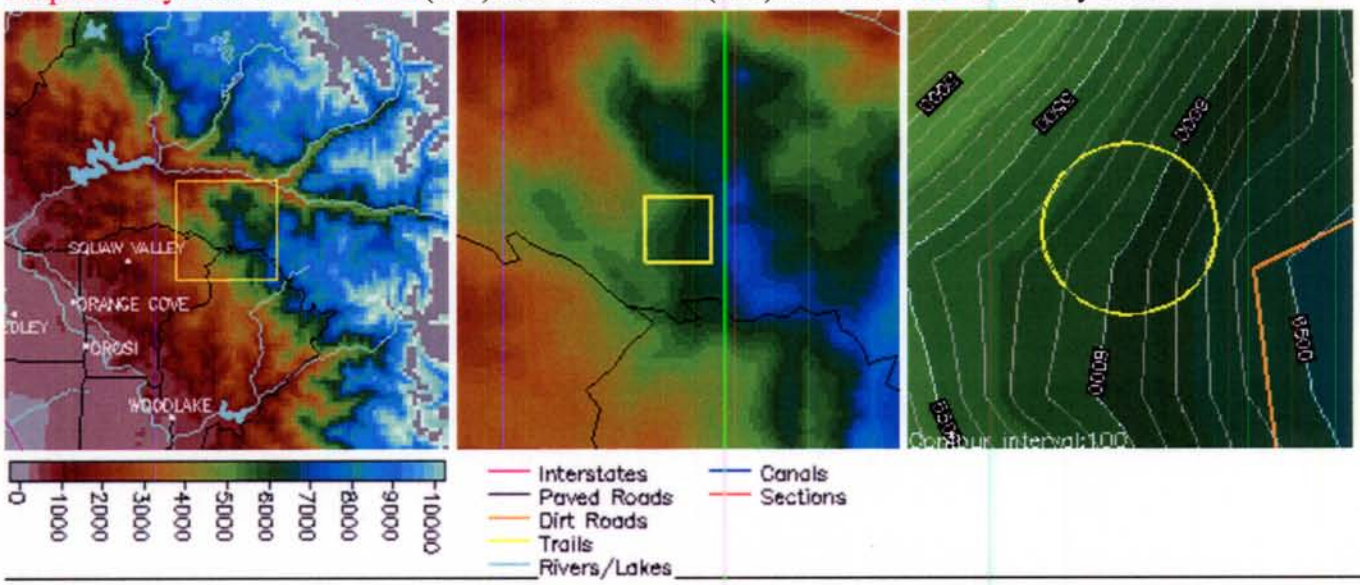
MAX TEMP: _____ MIN TEMP: _____ MAX RH: _____ MIN RH: _____

TIME OF MAX TEMP: _____ TIME OF MIN TEMP: _____ TIME OF MAX RH: _____ TIME OF MIN RH: _____

Grant West (Proposed ignition time: 1000 PDT 10/2/04) (Requested: 1701 PDT 10/1/04)

Forecast complete at 054 PDT 10/2/04

Requested by: CA-KNP Phone:(559) 565-3165 FAX:(559) 565-3797 Contact:Rudy Romo



Location: Legal: Lat/Lon:36 45.120/118 58.52 Quad:General Grant Grove
Calculated: (36.752°N 118.97533°W) (HUME CA)

Elevation:5900-6691 Drainage:Sequoia Creek Aspect:SW Size:270

Fuel Type:Model 8&10 (Partially Sheltered)

Observations:

Place	Elev	Time	Wind	Temp	Wetbulb	RH	Dewpt	Remarks
North Aspect	6850	1300	0-2 NE	64	49	37		Scattered clouds
				Calculated:		38	38	
Northwest Aspect	6850	1400	0-2 NE	62	49	43		80% Clouds
				Calculated:		44	40	
Northwest Aspect	6850	1500	0-2 SW	58	49	56		80% Clouds
				Calculated:		57	43	

Requested Parameters

XXX Clouds / Weather
XXX Temperature
XXX Relative Humidity
XXX Eye Level Wind
XXX Surrounding Ridge Wind
XXX Smoke Dispersion

Remarks

Could we please have this spot forecast for tomorrow by 0800.

Thank you,
Rudy

FORECAST:

IF CONDITIONS BECOME UNREPRESENTATIVE, CONTACT THE NATIONAL WEATHER SERVICE.

...SLIGHT CHANCE OF SHOWERS AND THUNDERSTORMS THIS AFTERNOON AND THIS EVENING...

DISCUSSION...AN UPPER LOW PRESSURE CENTER WILL REMAIN OFF THE CENTRAL CALIFORNIA COAST THROUGH TONIGHT. THIS FEATURE WILL CONTINUE TO DRAW MOISTURE TO THE BURN SITE UNTIL IT MOVES INLAND ON SUNDAY. THE MOISTURE WILL PROVIDE THE AREA WITH A SLIGHT CHANCE OF SHOWERS AND

```
THUNDERSTORMS THIS AFTERNOON AND EVENING. HIGH PRESSURE IS THEN
EXPECTED TO BUILD IN FROM OFFSHORE ON SUNDAY NIGHT AND
MONDAY...BRINGING CLEARING SKIES AND LOWER HUMIDITIES.

FOR TODAY
   WEATHER.....MOSTLY SUNNY IN THE MORNING...BECOMING PARTLY
               CLOUDY IN THE AFTERNOON WITH A SLIGHT CHANCE
               OF SHOWERS AND THUNDERSTORMS AFTER 1200 PDT.
   TEMPERATURE.....MAX 66-68
   HUMIDITY.....MIN 25-30%
   WIND...EYE LEVEL...LIGHT AND VARIABLE IN THE MORNING. BECOMING
               UPSLOPE 3-6 MPH AFTER 1200 PDT. WINDS GUSTY
               AND ERRATIC NEAR ANY THUNDERSTORM.
   WIND...SURROUNDING RIDGES...SOUTHEAST 3-7 MPH.
   MIXING HEIGHT.....RISING TO 13000 FEET AGL.
   MIXING WINDS.....SOUTHEAST 6 MPH.

FOR TONIGHT
   WEATHER.....PARTLY CLOUDY WITH A SLIGHT CHANCE OF SHOWERS
               AND THUNDERSTORMS IN THE EVENING. BECOMING
               MOSTLY CLEAR BY 2300 PDT.
   TEMPERATURE.....MIN 45-47
   HUMIDITY.....MAX 45-50%
   WIND...EYE LEVEL...DOWNSLOPE 1-3 MPH. WINDS GUSTY AND ERRATIC
               NEAR ANY THUNDERSTORM.
   WIND...SURROUNDING RIDGES...SOUTHEAST 5-10 MPH.
   MIXING HEIGHT.....LOWERING TO LESS THAN 1000 FEET.
   MIXING WINDS.....EAST 3 MPH.

FOR SUNDAY
   WEATHER.....MOSTLY SUNNY.
   TEMPERATURE.....MAX 69-71
   HUMIDITY.....MIN 22-27%
   WIND...EYE LEVEL...LIGHT AND VARIABLE IN THE MORNING. BECOMING
               UPSLOPE 2-5 MPH AFTER 1200 PDT.
WIND...SURROUNDING RIDGES...LIGHT AND VARIABLE.
   MIXING HEIGHT.....RISING TO 12000 FEET AGL.
   MIXING WINDS.....VARIABLE 3 MPH.

FORECASTER...DS
```

Please provide feedback:

Send Feedback CANCEL

Printer Friendly Version of Forecast

Back to Oct 2 Spot List Back to Todays Spot List Copy Info to New Spot Request

Appendix 6B-2

National Weather Service, NOAA
Page last updated at 9:23 am PDT 4/14/04

Planned Ignition Forecast Advisory

(TO BE COMPLETED BY THE BURNER)

Name of Burn: Grant West 1 **Organization doing burn:** Sequoia and Kings Canyon N.P.

Send PIFA Form Via (choose one) **e-mail address:** SEKI_Fire@nps.gov **fax number:** (559) 565-3797

Burn Window- Start: 25-Sep **End:** 9/28/04 **Target Date:** 25-Sep

County: Fresno **Mean Elevation (ft.):** 6296 **Total Acres:** 330

Latitude: N36* 45' 07.22" **Min. Elevation (ft.):** 5900 **Fuels Tons/Acre:** 22

Longitude: W118* 58' 31.41" **Max. Elevation (ft.):** 6691 **Acres/Day:** 80

and / or:

Township: **Burn Aspect:** West/ SouthWest **Planned % Fuel Consumption:** 70%

Range: **Section:** **Fuel Type:** Mixed Conifer / Sequoia

Special Circumstances: **Multi-day (Overnight):** Yes [no. of days? 4]

Restoration / Re-entry: Re-entry **Large (>250 acres):** yes

Location of nearest sensitive area(s):

Grant Grove / Wilsonia	is	2	/	SE	(miles/direction) from the burn.
Hume Lake	is	5	/	NE	(miles/direction) from the burn.
Sequoia Lakes Camps	is	5.25	/	SW	(miles/direction) from the burn.
Pinehurst / Badger	is	7	/	SW	(miles/direction) from the burn.

Nearest RAWS ID & Site Information (Elevation, Aspect, Distance From Burn): Park Ridge // 44713 // 7540' // Top of Ridge // 2.5

Burner's Telephone Number: (559) 565-3165 **Weekend Number:** (559) 565-3165

(TO BE COMPLETED BY SJVAPCD)

SJVAPCD - Air Quality Analysis Section
1990 E. Gettysburg Avenue
Fresno, CA 93726

Assigned Burn Zone:

Date SJVAPCD Compliance Approval: 9/14/2004

Request received from District staff on (date/time): 09/21 AT 4:48 pm **by** Shawn Ferreria

This is NOT an Ignition Authorization - For Ignition Authorization, Contact Compliance Division (559) 230-5950

	Time		24-hr Forecast		48-hr Forecast			72-hr Outlook		96-hr Trend		
Date	Issued PST	By	Valid Date	F/U*	Valid Date	F/U*	(L,M,H)**	Valid Date	F/U*	Valid Date	F/U*	Comments
9/27	15:30	SF	9/28	F***	9/29	U	M	9/30	U	10/1	U	1 Please see comments below.
9/28	15:45	SF	9/29	U	9/30	U	L	10/1	U	10/2	F	2
9/29	15:45	SF	9/30	U	10/1	U	L	10/2	F	10/3	F	3
9/30	15:55	SF	10/1	F*****	10/2	F	L	10/3	F	10/4	F	4
10/1	14:49	SF	10/2	F*****	10/3	F	L	10/4	F	10/5	U	5
10/2	13:15	SF	10/3	F*****	10/4	F	L	10/5	U	10/6	U	6

*F - favorable, U - unfavorable ** L - low, M - medium, H - high level of confidence in the 48-hr forecast

Comments Continued:

6- A favorable forecast, ***with extreme caution,*** will be declared for the Grant West Segment I Prescribed Burn, tomorrow, Sunday, October 3, 2004. Due to extremely marginal vertical and horizontal dispersion conditions, special caution needs to be observed while conducting this burn. Transport flow will remain the problem with the forecast models projecting some sort of easterly component through the period. During the overnight hours, down slope flow will transport smoke into the favored drainage basins and during the afternoon hours any smoke plumes will follow upslope flow to the top of the drainage and then carry in the regional transport wind direction. The thermally driven upslope flow may be hindered tomorrow afternoon when clouds over the higher elevations drift westward impeding solar heating. Confidence has lowered today, due to the models not agreeing with the dispersion pattern and flow pattern for Monday.

APPENDIX 7

Grant West Burn Log

INTERAGENCY REPORT OF INCIDENT AND DISPATCH ACTION
CONTINUATION SHEET
USDI - NATIONAL PARK SERVICE

INCIDENT NAME: GRANT WEST SEG. 3
INCIDENT NO:
ECCO / DISPATCHER:
FIRE NO:
DATE: 9/28/04
PAGE ____ OF ____

DISPATCH ACTION

UNIT	COMMITTED	STANDBY	AT SCENE	AVAILABLE	IN QUARTERS

MOVE-UP / STAGING ACTION

UNIT	TO STATION	COMMITTED	QUARTERS	RETURNING	QUARTERS

MESSAGE RECORD

TIME	TO	FROM	MESSAGE
1114	ASH	9-6-8	STARTED IGNITION ON TEST BURN
1120	ASH	9-6-8	9-68 LEAVING FIRE, 9-6-1 IS BURN BOSS
1133	ASH	9-6-1	TEST BURN IS OK, WILL PROCEED WITH BURN
1519		9-6-1	35-40 ACRES COMPLETED, GOOD FIRE BEHAVIOR 50% - 60% CONSUMPTION SMOKE COLUMN N - NE 2500 Ft. 60 acres completed today
1871	ASH	96-1	COMPLETED IGNITION - ON BURN - 9-6-8 IS BURN BOSS for 9/29/04
0630		968	Grant West Burn Boss & Burn Boss trainee patrol burn unit and check spot fire. All is well.
0900		968	C91 & Arrowhead deploy onto unit. E51 & E72 Are assigned to Lyon spot fire
1800		968	All resources released from Grant west Burn Unit
1830		968	All resources released from Lion fire
1042	10/02	968	-Burn Boss began Ignition on Test Burn.
1438	10/02	760	- Will be Burn Boss from this point and time. Arrowhead, E-51, and P-51 are released. Estimated acres Completed 10 Acres. There is line around the rest of the Burn. No more ignition Rest of Resources are holding

MESSAGE RECORD

TIME	TO	FROM	MESSAGE
1438	10/02	760	968, 961, 936 have been released from the Burn.
1525	10/02	760	Pulling off All the PARK Resources. Switching Command to ICT4 Capt. 73 Crews still on the Burn: Firestorm, Whiskey Town, and E-73.
	10/02	760	Four Modules are still on the Burn: BLM 3130, E-73, Whiskey town, and Firestorm
1750	10/02	961	Rx will be Turned over to Supt. 3 → crew 3
0808	10/03	Supt. 3	+ Sq. E-31 + horseshoe hotshots on Scene. At Rx. Supt. 3 will resume Command on Grant west.
0832	10/03	Supt. 3	- Firestorm night shift has been released.
1528	10/04	760	Firestorm has been released
1633	10/04	E-31	will be leaving the unit for today and will be back tomorrow.

APPENDIX 8

NPS Radio Transcripts/Logs

SUMMER RADIO CALL NUMBERS

SIERRA SUB-DISTRICT

•⊕	1-1-1	BRENCHLEY
•+	1-1-2	MALENGO **MCCLURE**
•+	1-1-3	GORDON **LECONTE**
+	1-1-4	EVERETT **BENCH/MONARCH**
•+	1-1-5	DURKEE **RAE LAKES**
•+	1-1-6	WEISENBERGER **CHARLETTE**
	1-1-7	CLUM (VIP)
	1-1-8	ROBBINS (VIP)
	1-1-9	BISHOP- TRAILHEAD

KERN SUB-DISTRICT

•	3-1-1	WALSH
•+	3-1-2	JOSTAD **ALL KERN**
•+	3-1-3	PILEWSKI, **RCRABTREE**
+	3-1-4	LARSON **LITTLE FIVE**
•+	3-1-5	PILEWSKI **ROCK CREEK**
+	3-1-6	VACANT
+	3-1-7	VACANT **HOCKETT**
	3-1-8	VENTURA **KERN**
	3-1-9	LONEPINE

CEDAR GROVE

•+	4-1-1	KELLEHER
•+	4-1-2	WARREM
+	4-1-3	COWELL
	4-1-4	RIGGIN
•+	4-1-5	KENAN
	4-1-20	DOWNEY
	4-3-1	VACANT
	4-3-2	SEASONALS
	4-4-1	KARPLUS, D.
	4-4-2	WORKMAN, J.
	4-4-3	PHILLIPS
	4-4-4	SMYTHE
	4-4-5	BROWN
	4-4-6	SHARP
	4-4-9	CG MAINTENANCE

GRANT GROVE

•	5-1-0	VACANT
•+	5-1-1	INOUYE
•+	5-1-2	GOULD
•⊕	5-1-3	ANDERSON
•+	5-1-4	VACANT
	5-1-5	VACANT
	5-1-9	ERNST
•+	5-1-11	WOOD
	5-1-20	CHICK (SUPERVISOR)
	5-1-21	GG CAMPGROUND
	5-3-0	PILLSBURY
	5-3-1	PURCHIS
	5-3-2	SATNAT
	5-3-3	SEASONALS
	5-4-0	SLINDE
	5-4-1	MCCARTHY
	5-4-2	WALLIS
	5-4-3	DUNCAN
	5-4-4	LOVIN
	5-4-5	PEREZ
	5-4-6	ALCAZAR
	5-4-7	ALDRICH
	5-4-8	O'BOSKY
	5-4-9	APPLEBEE
	5-4-10	ROMERO
	5-4-11	FAULKNER
	5-4-12	THORNBURY
	5-4-18	SEASONAL
	5-4-19	SEASONAL
	5-4-20	LOGSDON
	5-4-21	VARGAS
	5-5-1	TORRES
	5-5-3	UHLIK
	5-5-4	VACANT
	5-5-5	AVESON
	5-5-6	MCCALL
	5-5-7	FISKE
	5-5-8	PAINTER
	5-5-9	COOPER
	5-5-10	HILDEBRAND
	5-5-11	PALMER
	5-5-12	HOWELL
	5-5-13	RAMSEY
	5-5-14	ROBERTS
	5-5-15	WEAVER
	5-5-16	PETRIE
	5-5-17	VACANT
	5-5-18	VACANT
	5-5-19	VACANT
	5-5-20	VACANT

KINGS DISTRICT FMO

	5-6-0	BARTLETT
	5-6-1	SMITH L. (ENGINE 51 CAPTAIN)
	5-6-2	COONFIELD C. (ENGINE 51 ASST. CAPTAIN)
	5-6-3	SUNDEL, B. (ENGINE 51 OPERATOR)
	5-6-4	CLEMENT P.
	5-6-5	PATTERSON C.
	5-6-6	MILLER J.
	5-6-7	BUXTON B.
	5-8-1	LANGE
	5-8-2	GONAZALES

LODGEPOLE

•+	6-1-1	VACANT
•⊕	6-1-2	VACANT
•+	6-1-3	FARMER
•⊕	6-1-4	WALDSCHMIDT
•+	6-1-5	WALKER
•	6-1-6	AAGESON
•+	6-1-7	ROHRBACH
•+	6-1-8	CORRAO
•+	6-1-11	SANGER
•+	6-1-12	WEISMAN
+	6-1-15	LILES
+	6-1-16	TAYLOR
	6-1-17	MURPHY
	6-1-20	ELAND
	6-1-21	LP CAMP (BARKER)
	6-1-22	LP CAMPGROUND
	6-1-24	DORST-VAMVAKIAS
	6-1-25	DORST CAMPGROUND
	6-3-1	ULLMANN
	6-3-2	CARLTON
	6-3-4	SEASONALS
	6-3-10	SNOW
	6-3-11	CAVE STAFF
	6-4-1	STILTZ, K.
	6-4-2	VACANT
	6-4-3	BOTKIN
	6-4-4	REYES
	6-4-5	SCHWAB
	6-4-6	BEASLEY
	6-4-7	DAVIS
	6-4-8	DENNIS
	6-4-9	HENDRY
	6-4-10	SCHARNICK
	6-4-12	VACANT
+	6-4-13	SMITH
	6-4-14	SURRATT
	6-4-15	BUCK
	6-4-16	SANCHEZ
	6-4-17	BERRY
	6-4-18	SEASONAL
	6-4-19	VACANT
	6-4-20	SEASONAL
	6-4-21	DOMINGUEZ
	6-4-22	RATCHFORD
	6-4-23	LP CAMPGROUND MAINTENANCE

ASH MOUNTAIN

•+	7-1-0	GREDIAGIN
•⊕	7-1-1	WALTON
•+	7-1-2	CLARY
•+	7-1-3	MARTIN, S.
•+	7-1-4	BAUWENS, J.
	7-1-8	
	7-1-9	SNELL
+	7-1-10	VACANT
	7-1-13	POTWISHA HOST
	7-1-14	BUCKEYE HOST
	7-1-21	AM CAMPGROUNDS
	7-3-0	PFENNINGER
	7-3-2	OBERG
	7-3-4	SEASONALS
	7-4-0	VANCE
	7-4-1	SAKAGUCHI
	7-4-2	JOHNSON
	7-4-3	BLEGGI, F
	7-4-4	VACANT
	7-4-5	BOATMAN
	7-4-6	O'ROURKE
	7-4-7	WOOD
	7-4-8	SULLIVAN
	7-4-9	KESSNER, C
	7-4-10	VACANT
	7-4-11	ROBERTSON
	7-4-12	BAUMAN
	7-4-13	RENEAU
	7-4-14	RODRIGUEZ
	7-4-15	AM MAINTENANCE
	7-4-16	AM ROADS
	7-4-17	JONES
	7-4-20	RICKSHEIM
	7-5-1	MOFFIT
	7-5-2	HARVEY
	7-5-3	YEMM
	7-5-4	HANCOCK, B
	7-5-5	DAVENPORT
	7-5-6	MORGANELLI
	7-5-7	MORENO
	7-5-8	KNUTSON
	7-5-9	FELTIS
	7-5-10	BRANTLY
	7-5-11	LENZ
	7-5-12	ESSON
	7-6-0	ALLEN
	7-6-1	BROTHWELL
	7-6-2	VER, G
	7-6-3	VACANT
	7-6-4	VACANT
	7-6-5	SEASONAL
	7-6-6	SEASONAL
	7-6-7	SEASONAL
	7-6-8	SEASONAL

MINERAL KING

	8-1-1	VACANT
•+	8-1-2	EDENS
•+	8-1-3	HAMILTON
	8-1-9	JOHNSON
	8-1-16	DICKEY
	8-1-17	STOVALL
	8-1-18	GARY
	8-3-1	ROWELL
	8-5-2	SAMPIETRO
	8-5-3	BUDGE
	8-5-4	HATCHER

ADMINISTRATION

	9-0-0	MARTIN, D.
	9-0-1	WILSON
	9-0-2	TWEED
	9-0-3	RUESCH
	9-0-4	
	9-0-5	GRIEGO
	9-0-6	KEELEY
	9-0-7	ROWLANDS
	9-0-8	GRABER
	9-0-9	PUTRE
	9-0-10	VACANT
	9-0-11	GAGLIOLO
	9-0-12	BONHAM
	9-0-13	VACANT

CRO

•	9-1-0	WILSON
•	9-1-2	VACANT
•	SA 845	INMAN
	9-1-3	FAUTH
•	9-1-4	VACANT
•	9-1-5	BAILEY
	9-1-6	THETFORD
	9-1-7	DISPATCHERS
	9-1-8	VACANT
	9-1-9	STEPHENS

RESOURCES AND USGS/BRD

	9-2-0	ESPERANZA
	9-2-1	WERNER
	9-2-2	AUSTIN
	9-2-3	WARNER, T.
	9-2-4	LINEBACK
	9-2-5	VACANT
	9-2-10	MAZUR
	9-2-11	LONG
	9-2-12	YARKOVICH
	9-2-13	CLARKE
	9-2-14	STONE
	9-2-14	CHADWICK
	9-2-15	VERT CREW
	9-2-16	VACANT
	9-2-17	CAPRIO
	9-2-18	WEBSTER
	9-2-19	**FIRE EFFECT MONITORS**
	9-2-20	DEMETRY
	9-2-21	THIEL
	9-2-22	HUMPREY
	9-2-23	MEADOWS
	9-2-24	BIO TECH
	9-2-25	VACANT
	9-2-26	WORKMAN
	9-2-27	ALONZO
	9-2-28	MARTIN JR.
	9-2-29	REVEG CREW
	9-2-30	HAULTAIN
	9-2-31	AKIN
	9-2-32	KARPLUS, K.
	9-2-33	ROLL
	9-2-34	VEG MAPPING CREW
	9-2-35	RARE PLANT CREW
	9-2-36	HERD/GRABER
	9-2-37	BOIANO
	9-2-38	AQUATIC CREW
	9-2-39	VREDENBURG
	9-2-40	DESPAIN
	9-2-41	FRYER
	9-2-42	REDWOOD CANYON
	9-2-43	VACANT
	9-2-44	FOLGER
	9-2-45	VACANT
	9-2-46	DUMAIS
	9-2-47	AIR QUALITY CREW
	9-2-50	STEPHENSON
	9-2-51	PFAFF
	9-2-52	VAN MANTGEM, P.
	9-2-53	FAIN
	9-2-54	KNAPP
	9-2-55	BRENNAN
	9-2-56	DEMOGRAPHY CREW
	9-2-57	FFS CREW
	9-2-58	MCGINNIS
	9-2-59	CO-OP RESEARCH
	9-2-60	MUTCH
	9-2-61	COOK

INTERPRETATION

	9-3-1	CRAPSEY
	9-3-2	BURGE
	9-3-3	
	9-3-4	HAMM
	9-3-5	PICAVET, A.
	9-3-6	LYLE

PUBLIC HEALTH

+	9-4-0	SCHWARZ, P.
	9-4-1	TAYLOR

FMO

	9-6-0	KAAGE
	9-6-1	JACOBS
	9-6-2	DEMPSEY
	9-6-3	VACANT
	9-6-4	ROMO, R.
	9-6-5	JENNINGS
	9-6-6	CARDER
	9-6-7	VACANT
	9-6-8	UHR
	9-6-10	ZIEGLER
	9-6-11	VERNON
	9-6-12	COONFIELD, R.
	9-6-13	MASON
	9-6-14	SWEPSTON
	9-6-20	YOUNG T.
	9-6-21	METCALFE
	9-6-22	RAGUSIN, R.
	9-6-23	ERDODY, T
	9-6-24	VACANT
	9-6-25	MILLER, N.
	9-6-91	TURLEY
	9-6-92	BROWN, M
	9-6-93	SMITH, J
	9-6-94	VACANT
	9-6-95	**CREW 91 GENERAL**

ARROWHEAD

Superintendent 6	ROSSO
Arrowhead 6A	MORGAN **EMT+**
Arrowhead 6B	VACANT
Arrowhead 6-1	RESSLER **EMT+**
Arrowhead 6-2	BASYE
Arrowhead Cook	FRANKLIN

AUTO SHOP

9-8-0	FISCUS
9-8-1	WHITEHAIR
9-8-2	UNHOLZ
9-8-3	MORENO

COMMUNICATIONS

9-9-0	PURVIS
9-9-1	ORTIZ
9-9-2	EAKINS
9-9-3	CORY, D.
9-9-4	SCHWARZ, S.
9-9-5	STILTZ, M.
9-9-9	WARD, (VIP)

IF YOU ARE NOT ASSIGNED A RADIO CALL NUMBER, USE YOUR LAST NAME

C:\WINWORD\DISPATCH\SUMRCALLNUM

10/9/2004

KEY: • COMMISIONED
+ EMT
⊕ PARK MEDIC
♥ WILDERNESS RESPONDER

Appendix 8A-1

STATION LOG

CDF 7540-130-0046

TIME	DATE	MESSAGE
		10/02/04
1615	10/02	9621 I/S to Elk Creek.
1630	10/02	760 - will be O/S at Grant Grove
1631	10/02	Helibase O/S
1632	10/02	761 + P71 I/S to Ash Mtn. ~~From~~ Grant.
1633	10/02	763 + 767 on Patrol at Lion Fire
1634	10/02	E-51 Back in Station.
1727	10/02	9621 Back in Station
1730	10/02	PARK Ridge O/S
1740	10/02	763 + 767 I/S Back to Ash Mtn. from Grant Grove.
1746	10/02	C-91 + Fuels 1 Back in station.
1757	10/02	E-51 O/S
1800	10/02	P-71 Back in station.
		O/S
0800	10/2	FIRE I/S
		HOT SHOTS I/S + 19
		E-51 + 4 I/S
		CREW - 9-1+6 I/S ~~Guest~~
		9-6-20 - 2
		P-51 + 2
		HELIBASE + 3
0807	10/2	9-6-20 ARRIVED G.G.T.
0820	10/02	E-51 - B.I.S.
0832	10/02	9-6-21 ARRIVED GG
0841	10/02	C-91 ARRIVED - GG
0924	10/02	PARK RIDGE I/S
1042	10/02	BURN BOSS GWI TEST IGNITION

FORM FC-46 Rev. (3-78)

STATION LOG

-5-6-2-

CDF 7540-130 0046

10-02-04

TIME	DATE	MESSAGE
1255	10/02	GRANT WEST BURN BOSS CALL OUT EMG - EMT SNAG ON FIREFIGHTER -
1258	10/02	CALL SKY LIFE - Pick up AT Cherry Gap - 1½ Miles North G.G.
1302	10/02	SKY LIFE IN OUT
1312	10/02	5-6-2 will BE Ground contact - Cherry Gap -
1319	10/02	ETA 20 MIN FOR SKY ~~FIRE FIGHTER~~ LIFE °36 46 .382 118 57.655 HELISPOT - Road
1327	10/02	FOR SKY LIFE H1 ETA 6 MIN.
1339	10/02	1 MIN OUT FROM HELISPOT
1532	10/02	H-1 ON Ground McGEE OVER LOOK —
1525	10/02	TAMMIE J. Called IN To SERVICE
1526	10/02	9620 in Fuels 1 I/S to Grant Grove Fire house
1528	10/02	760 - I/S Back to Fire Station Grant Grove
1538	10/02	9621 En P-72 I/S to Fire house in Grant Grove.
1539	10/02	C91 I/S to Grant Grove Fire station.
1629	10/02	DICK MARTIN CELL 559-240-1036 / BILL PUTNE 559-280-1382
1631	10/02	Helibase O/S
1657	10/02	935 - Pickerit In front of Visitor Center
1701	10/02	513 → Pick up ~~KAMC~~ 760 At PAN POINT.
1703	10/02	960 → I/S to helibase
1710	10/02	960 + 761
1724	10/02	935 Back in HQ
~~1731~~	~~10/02~~	761 + 765 I/S to PAN Point. in Div 1 + Personal Car 960
1748	10/02	935 → will be going home to re-coop. Will be available at Home Today Call → 935 - Pickarit at residence - Do official statement Tomorrow.
		~~Burn has been~~

FORM FC-40 Rev. (3-78)

STATION LOG

CDF 7540-130-0046

TIME	DATE	MESSAGE
		10/02/04
1750	10/02	Burn will be handed over to Supt. 3 & Crew 3.
1841	10/02	7-6-1 +76-5 ARRIVED G.G.
1901	10/02	761 I/S Back to ~~Ash~~ Mtn from Grant Grove.
1901	10/02	Jennings + Ross O/S.
~~0800~~	~~10/03~~	
		10/03/04
0800	10/03	FIRE I/S
0808	10/03	Supt 3 + horseshoe Hotshots + Sq. E-31 on scene.
0823	10/03	9611 + 9612 + 9615 I/S
0832	10/03	Supt 3 Firestorm night shift has been released.
0849	10/03	960 Arriving Grant Grove
0932	10/03	PARK Ridge I/S
0935	10/03	E-72 I/S w/ T3
0928	10/03	John Sequoia Forest Smoke report N.W. of Twin lakes by Kettle PEAK. T14S R30E Sec33. Kathy Buckrock Smoke rising 1500 ft. rising straight up. white Smoke. 126° 20 Miles
0951	10/03	E-72 I/S Rec. half for Training.
0957	10/03	760 - E-51 on duties, However, E-73 will be covering Grant Grove station.
0930	10/03	Jim Loach CALLED - WERE TO MEET - (1-402-871-8184) CELL Ask for meeting location. Back on schedule. Be in PARK at 1400 - 1430
1048	10/03	C-91 I/S G.W. SEQ 3
1118	10/03	E-73 I/S LOST GROVE
1123	10/03	Div 3 - DAVE McKanlis - SNF + Supt Stan Stewart + Supt Mike Beckett from Los PADRES Forest and Alderado.
1128	10/03	9620 + monitors + Whiskey town + BLM 3130 + C91 PATROLLING Burn and Lions Fire.
1128	10/03	E-72 Back in Station

85 35062

DA 0102104

SEKI DISPATCH CENTER RADIO LOG

DISPATCHERS: JL

PAGE 2

TIME	UNIT #	DESCRIPTION - NARRATIVE
1133	712	1/5
1151	714	enroute N. Fork
1151	714	disregard staying in Area
1250	Grant West	Snag fell on Fire fighter
1251	GG Amb	1/5 7125
1253	GG Amb	1/4 N. of Dump on
1255	511	L.O.C.
1255	760	Cherry
1256	GG Amb	on scene
1257	Seq. SAFety	order life flight
1259	760	Ground Contact will be engine 51 562
1302	562	Ground Contact at Cherry Gap
1313	560	enroute to Amb. let
1313	Seq SAFe	20 min ETA to Cherry Gap
1317	GG Amb	departing scene for Cherry Gap
1320	760	confirming all are going to Cherry Gap
1322	GG Amb	on scene Cherry Gap
1404	617	1/5
1409	GG Amb	Departing Helisp

Appendix 8C-1

DATE: 10/02/04

SEKI DISPATCH CENTER RADIO LOG

DISPATCHERS: JL

TIME	UNIT #	DESCRIPTION - NARRATIVE
1417	GG Amb	Ending 7132
1429	Disp	call Fauth, Wilson, Martin
1452	PX	6 1/2 up toyota White R hand side downhill
1525		Pat Road Service called to render assistance to disabled vehicle above
		Hospital Rock
1530	618	Cleared
1535	413	O/S
1544	735C	Request cancel tow service -- Pat's Road Service called to cancel assistance
1544	618	4 PAX transfer from Giant Forest Museum to LP starting mileage 41482
1548	618	Canx PAX transport ... returning to Giant Forest Museum starting mileage
		41488
1611		Sue in radio shop
1612	111	Back in Pack
1619	910	Returned call
1620	513	I/S
1621	714	Stop to assist disable vehicle above Foothill Visitor Center
1624	713	Assisting 714
1640	713	Cleared of visitor assist w/ 714
1656	412	I/S @ Giant Grove

SEKI DISPATCH [CEN]TER RADIO LOG

DATE: 2 October 04 — DISPATCHERS: MR — PAGE: 4

TIME	UNIT #	DESCRIPTION - NARRATIVE
1708	613	o/s
1706	412	at G^2
		Veh. 6-7 mi up from AM Ent. / Silver [illegible]
		Broke down, will get it tomorrow
		Billy Schurkamp @ [illegible] 559-732-5611 Rm 121
1744	311	o/s.
1754	9-2-12	o/s
1758	Px	FMO — new burn boss for G^2 is Sup. 3
1804	812	o/s
1837	618	o/s
1840	711	- we have contacted OSHA + left message
		they may call back.
1906		Received call from John Muir Lodge (Liz, receptionist) / restaurant IRT incident w/ waitress
		Chrissy. 511 notified @ this time
1919	411	o/s
1934	513	@ Grant Grove concession looking into angry visitor complaint Refer to 1906 entry
1938	714	o/s
1942	412	G^2 to CG
1943	513	Clear of concession incident. Enroute to Meadow Camp to assist 517.

SEKI DISPATCH CENTER RADIO LOG

DATE: 2 October 04 DISPATCHERS: MR PAGE: 5

TIME	UNIT #	DESCRIPTION - NARRATIVE
1948	513	Cleared of Meadow Camp incident
1954		Received call from Camping visitor Azalea site 62 IRT noise from Azalea site 63
		513 informed.
1956	513	Cleared of vehicle stop -- warning for speeding. Enroute to Azalea site 62-63
2000	712	O/S
2004	735C	O/S
2004		Returned Ms. Dawn Brown's call of 1850 (661-424-0224) IRT husband Joe Brown
		5'7" bald, 30 y/o, Cauc. w/ med problem has not called from his 12mi hike. husband called. everything's okay.
2005	713	O/S
2008	711	Request autopsy from T.C.C. & blood drawn
2013	513	Cleared of Azalea site 62-63, roaming campground @ this time
2019	Arrowhead 33	Arrowhead 33 returning to quarters after turning over Forest Service Patrol
2034	618	Enroute to Grant Grove - Backup assist LE
2037	412	O/S
2051	736C	O/S
2104	618	I/S @ Grant Grove
2119	511	Grant Grove now available / in service
2129	111	O/S
2130	511	O/S @ home

Daniel P. Holmes Fatality Accident Investigation
ID- FCP-01
Sequoia and Kings Canyon National Park
Transcript of Recorded Dispatch Tape

Tape Number:	Copy of Dispatch Tape
Date and Time:	October 2, 2004
Location:	Sequoia Park Dispatch
Agency Unit	NPS, CA-KNP/SEKI
Transcribed By:	Irene Burlingame
Date and Time:	October 9, 2004, 15:30
Revised Transcription By:	Mark Harvey (with assistance from Jane Lobato)
Date:	October 10, 2004
Timed By:	Mark Harvey and John Kraushaar
Date:	October 12, 2004

TRANSCRIPT

Time Keys:

[1200] = times recorded in Park Dispatch log.

[1200] = times determined from playing recorded Park Dispatch tape against a clock.

1200 = times recorded on Park Dispatch tape.

SPEAKER	CONVERSATION
[1248]	
Grant Grove West (Uhr):	…need an ambulance response from Grant Grove to respond to the burn unit.
Fire Dispatch (Hyatt):	…ambulance at the unit right now.
Grant Grove West (Uhr):	Grant Grove Ambulance to respond to unit right away.
Fire Dispatch:	Copy.
Grant Grove West (Uhr):	Park medic, too.
Fire Dispatch:	We need an ambulance and park medic at the Grant Grove West burn right away.
Park Dispatch (Lobato):	Okay, do we know that the problem is?
Fire Dispatch:	No, they haven't told me yet, they need an ambulance and medic there as soon as you can.

Daniel P. Holmes Fatality Accident Investigation
ID- FCP-01
Sequoia and Kings Canyon National Park
Transcript of Recorded Dispatch Tape

Park Dispatch:	Okay, I'll get them rolling.
Fire Dispatch:	I guess closest one – Grant Grove.
Park Dispatch:	Grant Grove.Yeah.
Fire Dispatch:	I'll tell them it's on way.
Park Dispatch:	Okay. Bye.
Park Dispatch:	511-Dispatch. Did you copy that radio traffic getting an ambulance to Grant Grove West prescribed burn?
[1249] 511 (Inouye):	Yes.
Park Dispatch:	Should I call out 513 at this time?
511 (Inouye):	Negative. He's not around…I'll get down there and where in Grant Grove are they needed?
Park Dispatch:	I'm not sure right now. Grant Grove West fire this is Dispatch. What locations do you need the ambulance at?
Grant Grove West (Uhr):	I need about ¼ mile north of the dump on Hwy. 180.
Park Dispatch:	511-Dispatch. Did you copy?
511 (Inouye)	The nature of call?
Park Dispatch:	Have not gotten that information. They haven't released any. Grant GroveWest. What is the nature of this incident?
Grant GroveWest (Uhr):	Snag fallen on firefighter.
[1250] Park Dispatch:	Sorry, say again.
[1250] Grand GroveWest:	Snag has fallen on a firefighter.
Park Dispatch:	Copy that.
Park Dispatch:	511-Dispatch.We have a snag that's fallen on a firefighter.
511 (Inouye)	511 Copies.

Park Dispatch:	511. Would you like me to get the park medic en route to that location?
Grant Grove West (Uhr):	Affirmative.
Park Dispatch:	511. Would you like me to get the park medic en route to that location?
Grant Grove West (Uhr):	We need a park medic.
Park Dispatch:	I copy that…I'm trying to get 511.
511 (Inouye):	Dispatch-511. No park medic available.
[1251] Park Dispatch:	Copy. Do we know if 614 is available for this?
Park Dispatch:	[on phone] Dispatch, Jane.
711 (Dave Walton):	[on phone] Hi, Jane, there's a helicopter here if they need a park medic, I can get on and be there in 10 minutes
Park Dispatch:	[on phone] Okay.
711 (Walton):	[on phone] What do they have?
Park Dispatch:	[on phone] Got snag that fell on firefighter.
711 (Walton):	[on phone] How serious?
Park Dispatch:	[on phone] I don't know…starting to get background…helicopter fly him out.
Fire Dispatch:	[on phone] Okay, Jane. Bye.
Park Dispatch:	Unit calling dispatch?

[1251]

Grant Grove Ambulance:	Grant Grove Ambulance in service..mileage 7125.
[1251.50] Park Dispatch:	Copy. ***12:51***.
[1252] Park Dispatch:	[on intercom] Bill, what were you saying now?

Fire Dispatch:	[on intercom] If you have a park medic down here we could fly him up from here?
Fire Dispatch:	[on intercom] Yeah…that's what Dave was saying, too. Hold on.
Park Dispatch:	[on phone] Dispatch, Jane.
711 (Walton):	[on phone] Hi, Jane, what did they say?
Park Dispatch:	[on phone] I'm trying to get a hold of them…everybody calling at the same time…Bill on intercom telling me one thing…the ambulance on the other…so I'm going to get hold of Nate and see if he wants to do that.
711 (Walton):	[on phone] Yeah, see who is the IC, identify an IC, and see what they want [Grant Grove Ambulance background traffic].
Park Dispatch:	Grant Grove Ambulance.
Grant Grove Ambulance:	What was that location again?
Park Dispatch:	¼ mile from dump site.
Grant Grove West (Uhr):	¼ mile north of the dump site on Hwy. 180.
[1253] / **[1253]** Grant Grove Ambulance:	Copy.
Park Dispatch:	511, are you assuming IC on this?
511 (Inouye):	Affirmative…I need information on this location.
Park Dispatch:	¼ mile north of dump site on 180.
Grant Grove West (Uhr):	¼ mile north of the horse corral road on Hwy. 180.
511 (Inouye):	¼ mile north of what?
Grant Grove West (Uhr):	The corral road.
Park Dispatch:	511-Dispatch.711 in service if you need medic…we can put him on the helicopter and fly him out there if need be.
[1254] 511 (Inouye):	Standby.

Daniel P. Holmes Fatality Accident Investigation
ID- FCP-01
Sequoia and Kings Canyon National Park
Transcript of Recorded Dispatch Tape

Park Dispatch:	Copy, standing by.
[1255] 511 (Inouye):	Dispatch-511. Preliminary report…snag fell on top of firefighter…he's about ¼ mile out …they're back boarding him out right now…he did lose consciousness and hasn't regained it so far…I'll be headed in…so go ahead and get the life flight out this way…
Park Dispatch:	Copy that.
Fire Dispatch:	[on intercom] I heard that Jane…I'll get life flight.
Park Dispatch:	[on intercom] Thanks a lot, Bill.
Fire Dispatch:	[on intercom] Do you want them up at the…where do we want them?
Park Dispatch:	[on intercom] I'm not sure, let me clarify that.
Park Dispatch:	511-Dispatch.Which landing zone will you be using?
[1255] 511 (Inouye):	I'm talking it over with that crew right now…we're thinking Cherry Gap right now.
Park Dispatch:	Copy...Cherry Gap.
Park Dispatch:	[on intercom] Bill, did you copy?
Fire Dispatch:	[on intercom] I copied that, Jane. I'll get someone on it.
Fire Dispatch:	Helibase. Carrie, what's the closest place to the Grant Tree that we can land on life flight?
9611 (Carrie Vernon):	They can land at the wye, they can land at Pan [Point], they can land at Cherry Gap…I don't know how close you guys are to those…
Fire Dispatch:	We're right at the Grant tree.
511 (Inouye):	Carrie, go for Cherry Gap.
Fire Dispatch:	Copy.

Daniel P. Holmes Fatality Accident Investigation
ID- FCP-01
Sequoia and Kings Canyon National Park
Transcript of Recorded Dispatch Tape

760 (Dave Allen):	Dispatch-760.
Park Dispatch:	760.
[1256] 760 (Allen):	You can incident control orders for life flight and you don't need to go through Fire Dispatch…so order and have them come to Cherry Gap.
Park Dispatch:	Copy, will do.
Grant Grove Ambulance:	Dispatch, Grant Grove ambulance on scene.
Park Dispatch:	Copy, Grant Grove ambulance on scene at ***12:56***.
760 (Allen):	Fire Dispatch-760.
Fire Dispatch:	760.
760 (Allen):	760, did you copy life flight has been ordered directly through dispatch?
Fire Dispatch:	I'd already talked to them…I was getting on the phone.
760 (Allen):	We will have an engine there at the helispot to help them out.
Fire Dispatch:	12:57.
[1257] Park Dispatch:	[on phone to Sequoia Safety] Hi, Ryan, this is Jane at SNP…we need a life flight to go to Cherry Gap…we have a firefighter that had a snag fall on him.
[1257] Sequoia Safety (Ryan):	Okay, you know, ma'am, one second, you need a helicopter, right?
Park Dispatch:	Yes.
Sequoia Safety (Ryan):	Hold on one second, I'll let you talk to our supervisor.
Fire Dispatch:	[on intercom] Have you contacted them yet, Jane?
Park Dispatch:	[on intercom] I'm on the phone now, Bill.
Fire Dispatch:	[on intercom] Copy that.

Daniel P. Holmes Fatality Accident Investigation
ID- FCP-01
Sequoia and Kings Canyon National Park
Transcript of Recorded Dispatch Tape

Unknown:	Bill or Jane, if you need Lat or Long…tell them to go a mile and one-half north on Hwy. 180 from Grant Grove.
Park Dispatch:	[on intercom] I copy that, too, Bill.
Park Dispatch:	[on phone to Skylife] We need a life flight, have a firefighter that just got knocked out by snag and obviously it was burning and they're hiking him out now, but we need them to go to Cherry Gap helispot.
[1258] Fire Dispatch:	Will have to work on the highway from Grant Grove.
Park Dispatch:	I copy that, too, Bill.
Sequoia Safety:	[on phone] Ma'am, I'm sorry, you're calling from?
Park Dispatch:	[on phone] Sequoia National Park.
Sequoia Safety:	[on phone] Your call back number?
Park Dispatch:	[on phone] 559-565-3195.
Sequoia Safety:	[on phone] And your name?
Park Dispatch:	[on phone] Jane.
Sequoia Safety:	[on phone] Do you have lat and long for that by any chance?
Park Dispatch:	[on phone] No. Our helibase just gave us…if you follow Hwy. 180…1 ½ miles north of Grant Grove…that's Cherry Gap.
[1259] Fire Dispatch:	[on intercom] Jane, is Skylife going to be able to respond quickly?
760 (Allen):	Dispatch-760.
Park Dispatch:	760.
[1259] 760 (Allen)	Will have Engine 51 respond to Cherry Gap. Ground contact on SEKI will be Engine 51. Will give a call on their position…
Park Dispatch:	Copy…ground contact will be Engine-51.
Park Dispatch:	[on phone] I guess he's still unconscious.

Daniel P. Holmes Fatality Accident Investigation
ID- FCP-01
Sequoia and Kings Canyon National Park
Transcript of Recorded Dispatch Tape

Sequoia Safety:	[on phone] You said ground contact 151?
Park Dispatch:	[on phone] Engine 51.
Sequoia Safety:	[on phone] Engine.
Park Dispatch:	[on phone] Yeah.
Sequoia Safety:	[on phone] And how do they contact on CAL-CORD?
Park Dispatch:	[on phone] It will be on SEKI Air and that…what's the stupid frequency…shoot…hold on….
Park Dispatch:	[on intercom] Bill, what's air to ground frequency again?
[1300] Fire Dispatch:	[on intercom] Going to be on air-to-ground, SEKI air to ground - 168.650.
Sequoia Safety:	[on phone] 168.650.
Park Dispatch:	[on phone] Yeah, thanks, Bill.
Fire Dispatch:	[on intercom] Are they en route or if there's a delay…we'll launch our helicopter…
Park Dispatch:	[on phone] Are they going to be en route soon?
Sequoia Safety:	[on phone] Yeah. We'll get them loaded in and then when they are loaded, we'll get an ETA.
Park Dispatch:	[on phone] Thank you.
Sequoia Safety:	[on phone] Thank You.
Park Dispatch:	[on intercom] Hey, Bill, they're getting them en route now.
Fire Dispatch:	[on intercom] Copy that…en route now.
[1301] Park Dispatch:	760 or 511-Dispatch. We got life flight coming out.
[1302] 562 (Clint Coonfield):	Ash Mt. Fire-562.

Fire Dispatch:	562.
[1302] 562 (Coonfield):	Bill, I'm going to be ground contact for SEKI air-to-ground for the life flight, just confirm that they are going into Cherry Gap.
Fire Dispatch:	That's affirmative with this, you will be ground contact for them at Cherry Point.
562 (Coonfield):	Yeah. Cherry Gap.
Fire Dispatch:	Correction, Cherry Gap.
Fire Dispatch:	You copy that, Jane?
Park Dispatch:	Uh-huh.
[1303] 562 (Coonfield):	Fire Dispatch-562.
Fire Dispatch:	562.
562 (Coonfield):	Yes. Bill…do you have an ETA for life flight yet?
Fire Dispatch:	[on intercom] Jane, do you have an ETA?
Park Dispatch:	562, we do not have that ETA yet.
562 (Coonfield):	I copy, as soon as you get it, please let me know…
[1303.35] Park Dispatch:	Affirmative, will do…

*Law enforcement radio traffic unrelated to the incident between Park Dispatch and 618. Times given: **1307** and **1308**.*

[1309] 562 (Coonfield):	9611-562. Right there at Cherry Gap or if they can't make it there…just be prepared to drive down to a wider spot in the road [walk-over conversations].
Skylife Dispatch:	[on phone] Skylife Dispatch.
Park Dispatch:	[on phone] This is Jane at Sequoia National Park again. Do you have ETA on life flight?
Skylife Dispatch:	[on phone] Let me get the supervisor.

Daniel P. Holmes Fatality Accident Investigation
ID- FCP-01
Sequoia and Kings Canyon National Park
Transcript of Recorded Dispatch Tape

Park Dispatch:	[on phone] Okay, thank you.
9611 (Carrie Vernon):	Copy that…I think Cherry Gap will work fine. Skylife is very good about air to ground…they haven't been there before to Cherry Gap. This pilot hasn't probably landed there before…
562 (Coonfield):	Okay. Copy that…
[1310] Park Dispatch:	[on phone] Dispatch, Jane.
Fire Dispatch:	[on phone] It's me, Jane.
Fire Dispatch:	[on phone] Did they give you an ETA?
Park Dispatch:	[on phone] I'm on the phone with them now.
Fire Dispatch:	[on phone] Okay. Bye.
[1311] 760 (Allen):	Dispatch-760.
Park Dispatch:	760.
760 (Allen):	Did you dispatch life flight or did you hand that off to Fire Dispatch?
Park Dispatch:	That's negative…I'm on the phone with them…they had said they were going to get them en route, but they've got me on hold right now…
760 (Allen):	Okay. People are asking on an ETA…I'll stand by.
Park Dispatch:	I'm aware of that…I'm trying to get an ETA from them…
760 (Allen):	Engine 51 is at the helispot ready to contact…
Park Dispatch:	Copy that…
Park Dispatch:	[on phone] Hi, this is Jane from SNP, I had called earlier for life flight and I was wondering if they have an ETA yet?
[1313] Skylife Dispatch:	[on phone] Yes, they have an ETA of 20 minutes.
Park Dispatch:	[on phone – acknowledges].

Daniel P. Holmes Fatality Accident Investigation
ID- FCP-01
Sequoia and Kings Canyon National Park
Transcript of Recorded Dispatch Tape

Park Dispatch:	760-Dispatch. We have ETA…we have ETA 20 minutes, did you copy that?
760 (Allen):	Yes. I copied…20 minutes…Thanks…
Park Dispatch:	You're welcome…***13:12***.
[1312] Fire Dispatch:	[on intercom} I copied that direct, Jane.
[1313] 560 (Dave Bartlett):	Dispatch-560. We're on our way out the trail to the Grant Grove ambulance…
Park Dispatch:	Copy that…Grant Grove ambulance did you copy…
Grant Grove. Ambulance:	Copy direct…
Park Dispatch:	Thanks a lot…***13:12.***
760 (Allen):	Engine 51-760.
562 (Coonfield):	Go for Engine 51.
760 (Allen):	Did you copy…20 minutes?
562 (Coonfield):	Yeah, that's affirmative.

Law enforcement traffic unrelated to incident between Park Dispatch and 618. Time given: 13:14

[1314] Fire Dispatch:	Skylife H-1.
Skylife H-1:	Responding to Cherry Gap LZ with 20 minute ETA…18 min ETA now….
Fire Dispatch:	Copy that… now about 18 minutes ETA, your ground contact will be 562.
Skylife H-1:	Copy that. 562.
961 (Ben Jacobs):	Dispatch-961.
Park Dispatch:	961.
Skylife H-1:	On this same channel?

961 (Jacobs): We'd like to divert that life flight to McKenzie heliport…

Fire Dispatch: That's affirmative.

Park Dispatch: Copy 961…

961 (Jacobs): Yes. Could you back me up confirmation?

Park Dispatch: Copy will do…

Park Dispatch: Life flight, this is Dispatch…can we divert this flight to McKenzie helispot, please……

[1315]

Grant Grove Ambulance: Dispatch-Grant Grove ambulance.

Park Dispatch: Grant Grove ambulance.

Fire Dispatch: Life flight, Skylife H-1-Ash Mountain Fire.

Park Dispatch: Grant Grove ambulance, go ahead.

Grant Grove Ambulance: I need to confirm that life flight is 20 minutes out and we are changing to McKenzie Ridge.

Skylife H-1: Skylife H-1, go ahead.

Fire Dispatch: Did you get that divert to McKenzie helispot?

Park Dispatch: Grant Grove Ambulance. Is this McKenzie Ridge or McKenzie helispot?

Skylife H-1: I copy that now…to the McKenzie helispot

Fire Dispatch: That's correct…

Park Dispatch: Grant Grove ambulance. Is this McKenzie Ridge or McKenzie helispot?

Grant Grove Ambulance: That's McKenzie helispot.

Park Dispatch: That's affirmative…they have…they will be responding to that location.

Daniel P. Holmes Fatality Accident Investigation
ID- FCP-01
Sequoia and Kings Canyon National Park
Transcript of Recorded Dispatch Tape

Grant Grove Ambulance:	Copy dispatch…
Park Dispatch:	You're welcome…
[1316] Fire Dispatch:	You're welcome, Jane…they pick me up a little better I guess…sometimes you do…you bet.
562 (Coonfield):	Engine 51.
760 (Allen)?:	When 203 returns are you going to go to McKenzie or are you there?
562 (Coonfield):	Negative. McKenzie Ridge helispot is about a 20-minute drive from here. We're at McGee Overlook…it's just about less than ¼ mile right up from Cherry Gap…
Skylife H-1:	Update ETA 10 minutes.
Fire Dispatch:	Update ETA 10 minutes…***13:17.***
Unknown:	Dispatch, call Grant Grove ambulance. They just gave an ETA of 10 minutes.
Park Dispatch:	Grant Grove ambulance…they just gave us an ETA of 10 minutes to McKenzie Ridge…so we change back to Cherry Gap?
Grant Grove Ambulance:	Dispatch, yes to Cherry Gap…
Park Dispatch:	Copy that…
[1317] Fire Dispatch:	Now do they want them back to Cherry Gap? Copy that.
Fire Dispatch:	Skylife H-1-Ash Mt Fire.
Skylife H-1:	Helicopter Skylife H-1, go ahead.
Fire Dispatch:	H-1, hate to put you through this, but they want you back at Cherry Gap….they figure that a quicker pick up for them…
Grant Grove Ambulance:	Departing scene to Cherry Gap.
Skylife:	H-1 Copy. Cherry Gap.

Daniel P. Holmes Fatality Accident Investigation
ID- FCP-01
Sequoia and Kings Canyon National Park
Transcript of Recorded Dispatch Tape

[1317] Park Dispatch:	Copy. Departing scene to Cherry Gap at ***13:17.***
Fire Dispatch:	Thanks a lot…***13:18***…know [or no] he's just getting bumped around a lot…I hate to do that to him, but he said he copied…
562 (Coonfield):	H-1. This is 562.
Skylife H-1:	562-H-1. Go ahead.
[1318] 562 (Coonfield):	I have a lat & long for you. We're just about ¼ mile up the road from Cherry Gap, they call the overlook – break…a…I gotta lat & long of 36-46-2382…break…118-57-655
Skylife H-1:	562-H-1. We copy that Lat-Long…
562 (Coonfield):	We'll have the traffic all shut down so don't worry about us, where your placement is around the road there…can I get ETA from you…
[1319] Skylife H-1:	562, standby just one, while we're in putting that in and I'll give you an exact ETA….
Park Dispatch:	760.
[1320] 760 (Allen):	I've been asked to triple check…everyone still going to Cherry Gap? Did you copy that?
Park Dispatch:	Affirmative. Everybody is headed for Cherry Gap, Grant Grove departed scene couple minutes ago and H-1 is en route.
760 (Allen):	Okay, so the helicopter's been notified?
Park Dispatch:	Affirmative.
760 (Allen):	Thanks for your help with this…
Park Dispatch:	No problem…760…hope everything is okay.
[1320] 760 (Allen):	Grant Grove ambulance-760.
Grant Grove Ambulance:	Grant Grove ambulance.
760 (Allen):	At this time confirming helicopter is going there and be there in about 10 minutes en route….

Grant Grove Ambulance:	Copy. We're about a minute and a half out.
Skylife H-1:	562-H1…what's that ETA to that location? [talk over background conversation, Park Dispatch on phone with Sequoia Safety regarding McKenzie Ridge].
562 (Coonfield):	Go ahead H-1…we're up the back and be there [UNINTELLIGIBLE].
Park Dispatch:	[on phone] …Grant Grove ambulance. Actually put you back to Cherry Gap, 'cause the ambulance would have hard time getting down to McKenzie in that timeframe, so they changed it back to Cherry Gap.
Sequoia Safety:	[on phone] Alright, I let them know or have you been talking to them?
Park Dispatch:	[on phone] Yes, we've been talking to them…they know. Appreciate your help…bye…
[1321] 9611 (Vernon):	562-Helibase.
9611 (Vernon):	562-Helibase on command.
562 (Coonfield)?:	Engine 51-Engine 52.
Engine 5[?}:	5[?] copies.
Grant Grove Ambulance:	Dispatch-Grant Grove ambulance. We're on scene at Cherry Gap.
[1322] Park Dispatch:	Copy Grant Grove ambulance on scene at Cherry Gap at ***13:22***.
9611 (Vernon):	562.
562 (Coonfield):	On [channel] one at Cherry Gap helispot.
[1322] 9611 (Vernon):	Ash Mountain Helibase-Cherry Gap helispot base in the blind…the, the K-2 is coming in with a very low rotor clearance on the nose, very low rotor clearance, if you do not shut down to load the patient be very aware of that.
Skylife H-1:	562-H-1.

562 (Coonfield):	562.
Skylife H-1:	Is there any air attack going on up here?
562 (Coonfield):	There's a prescribed burn.
Park Dispatch:	Grant Grove ambulance.
Skylife H-1:	H-1 copies…thank you.
Park Dispatch:	Grant Grove ambulance, did you copy helibase transmission about a low clearance in front of the helicopter?
Grant Grove Ambulance:	That's affirmative, dispatch.
[1323] Park Dispatch:	Copy that.
Park Dispatch:	Sorry, Carrie, just had to confirm that they heard you.
Park Dispatch:	Ash Mt. Helibase-Dispatch.
562 (Coonfield):	9611-562. I did copy that transmission in the blind about the low rotor blade off the top.
9611 (Vernon):	Base clear…I just wanted you to all be real safe, because that ship is a hot load…it's a pretty dangerous one…just be careful….
562 (Coonfield):	Copy that.
[1324] Park Dispatch:	[on intercom] Hey, Carrie, it's Jane on intercom…just wanted to make sure they had copied you earlier.
[1326.30] 562 (Coonfield):	H-1-562.
Skylife H-1:	562-H-1, go ahead.
562 (Coonfield):	Do you have ETA for me?
Skylife H-1:	1 minute out.
562 (Coonfield):	Copy that…1 minute out…this is most definitely going to be a hot load.
Skylife H-1:	H-1 copies…do you have a patient's condition?

[1327] 562 (Allen): I believe CPR has been initiated at this time.

Skylife H-1: H-1 copies. We'll see you on the ground.

562 (Coonfield): Copy that. I can hear you. Okay, I got you in sight. You're almost directly to the north – from here above McKenzie Ridge right now.

Skylife H-1: 562, do you got me?

[1328] 562 (Coonfield): H-1 that's affirmative. Can I get you to back off – hit your spot…

Park Dispatch: [talk-over communication]13:29

Law enforcement traffic unrelated to the incident between Park Dispatch and 613.

[1329] Fire Dispatch: [on phone] Jane, I had to call you on the phone 'cause we need…do you have a procedure for critical emergency… something-king?

Park Dispatch: [on phone] Do you mean CPR?

Fire Dispatch: [on phone] I don't know CPR…you know, it's critical stress… critical stress.

Park Dispatch: [on phone] Oh…Oh…debriefing?

Fire Dispatch: [on phone] Yes. Debriefing.

Park Dispatch: [on phone] Yes. We would have to get a hold of Sue Schwarz…

Fire Dispatch: [on phone] Oh…well, we need, we need to do that. I don't have a...stuff for that…and I need Greg Fauth's number…

Park Dispatch: [on phone] Greg Fauth's number. Okay, can I call you back in just a few?

Fire Dispatch: [on phone] You certainly can.

[1330] Park Dispatch: [on phone] Bye.

Law enforcement radio traffic unrelated to incident between Park Dispatch and 812.

Daniel P. Holmes Fatality Accident Investigation
ID- FCP-01
Sequoia and Kings Canyon National Park
Transcript of Recorded Dispatch Tape

[END OF SIDE A ON TAPE]

[1332] 760 (Allen): 560-760.

562 (Coonfield): Ash Mountain Fire-562.

Fire Dispatch: 560.

562 (Coonfield): Ash Mountain Fire-562 [on] command.

Fire Dispatch: 562.

562 (Coonfield): Be advised H-1 is on the ground at McGee Overlook.

Park Dispatch: H-1 on the ground at McGee Overlook…***13:34***.

Law enforcement radio traffic unrelated to the incident between Park Dispatch and 613.

[1333.50] 760 (Allen): 960-760 [on] command.

960 (Bill Kagge): Go ahead for 960.

760 (Allen): Jody, I'm sending Jody Lyle to help out with that, she'll be there in about 5 or 10.

960 (Kagge): Can you repeat, this is 960.

760 (Allen): I'm confirming you're at the fire station, so I'm sending Jody Lyle over there to help you guys out.

960 (Kagge): Copies. Thanks.

[1335] *Law enforcement radio traffic unrelated to the incident between Park Dispatch and 812.*

[1335.50] Fire Dispatch: [on intercom] …also Greg's phone number.

*Law enforcement radio traffic unrelated to the incident between Park Dispatch and613, and then 812. Time given: **1338**.*

[1337.15] Fire Dispatch: [on intercom] Yes, Also I'm going to try and find…do you have maybe John Kraushaar's phone number?

Park Dispatch: [on phone - dialing…hang-up]

Daniel P. Holmes Fatality Accident Investigation
ID- FCP-01
Sequoia and Kings Canyon National Park
Transcript of Recorded Dispatch Tape

[1338] Park Dispatch: [on phone, dialing…561-3042, answer machine message] Hey, Sue, it's Jane in dispatch, I think we may have just had our first fatality of the year. It's a firefighter, we need to have somebody talk to them about stress…doing a stress debriefing…if you could give us a call back at dispatch or fire dispatch, we'd appreciate it…Thanks a lot, goodbye.

[1339.48] Park Dispatch: [on phone, dialing…Extension 31…hang up…redial…] Hi, you've reached the desk of Georgia Dempsey in the fire dispatch office…[hang up].

[1340.39] Park Dispatch: [on phone, redial Dempsey's extension…answering machine message…hang up].

[1341.25] Fire Dispatch: [on intercom] Hi, Jane, I was on the phone with some people…I was able pick that up…I had it here and didn't know it, sorry about that. Hold on one minute.
…I've got two numbers…home phone and cell…office 817-1370
…Thanks for you help.

[1343]

[THE END OF SIDE B OF TAPE]

Comment on tape by unknown person following conclusion of making of this tape recording of the dispatch tape:

"This is the end of the tape, no other real pertinent things on it, except the helicopter leaving and the ambulance getting back to the Grant Grove Bay".

APPENDIX 11

Tree Failure Reports

FOREST HEALTH PROTECTION
Pacific Southwest Region
South Sierra Shared Service Area

FHP Report No. C05-1 3420
October 7, 2004

Evaluation of the White Fir Involved in the Holmes Investigation, Sequoia and Kings Canyon National Parks

John Wenz, Entomologist
John Pronos, Plant Pathologist

Background

On October 5, 2004, the Holmes Investigation Team requested that technical specialists John Wenz, Entomologist and John Pronos, Plant Pathologist, (USDA Forest Service, Forest Health Protection, South Sierra Shared Service Area, Stanislaus National Forest, Sonora, CA) assess the condition of the white fir tree involved in the fatality associated with implementation of the Grant West Prescribed Burn. This evaluation was conducted on October 6, 2004.

Observations

The subject white fir (*Abies concolor*) is 132 feet tall, 57.9 inches in diameter at breast height (DBH) and one of the largest trees in the area (Figure 1). The entire tree was dead at the time of the evaluation, and based on crown condition, dead needle retention and branch dieback, had likely died within the past one to two years. The portion of the tree that broke out and caused the fatality was consumed by fire and was not available for examination.

Older dead branches were scattered throughout the length of the crown and only a few dead needles were still present on branches in the lower crown. The amount of debris present near the base of this white fir shows that branches have been falling out of it for several years (Figure 2). Some dead branches had broken loose of the bole and were hung up within the crown ("widow makers") (Figure 3). Remnants of true mistletoe (*Phoradendron* sp.) plants were observed in the upper 10 % of the bole, and although this common parasite of white firs does not kill entire trees, it does contribute to the death of tree tops. There was no dead needle retention visible in the top 20% of the bole suggesting that it had died prior to the death of the entire tree. This may have been influenced by Douglas-fir tussock moth, *Orgyia pseudotsugata* (Lepidoptera; Lymantriidae) defoliation during the 1997-1999 outbreak that occurred in the general vicinity of Grant Grove.

The original leader is no longer present, as evidenced by lack of a vertically continuous main stem and the presence of dead lateral branches that had assumed dominance (volunteer tops) and continued to grow for a few years before also being killed (Figure 3). Death of the original top and the more recent dieback of the secondary laterals probably resulted from attack by the fir engraver, *Scolytus ventralis* (Coleoptera: Scolytidae), although positive identification was not possible by observation from the ground. The fir engraver commonly attacks true firs throughout western North America causing top kill, branch kill and, if attacks are numerous enough along the bole, whole tree mortality. Other less aggressive engraver species in the same genus, including *S. praeceps*, *S. abietis* and *S. subscaber*, may also be involved with the top and branch dieback. Through time, tops and laterals killed by the fir engraver will lose structural integrity and eventually break off due to the effects wind or snow. The wood of dead white firs is highly susceptible to decay, which causes rapid deterioration. The decayed wood is weak and, when dry, very easy to ignite.

Extensive boring dust was observed in bark crevices around 100% of the bole circumference at the base of the subject tree up at least 15 to 20 feet above ground level (Figure 4). Examination under the bark revealed the presence of extensive, well developed feeding galleries, probably caused by larvae of the roundheaded fir borer, *Tetropium abietis* (Coleoptera: Cerambycidae). Oval holes in the sapwood indicated the larvae had also tunneled into the sapwood. A few round exit holes were present in the outer bark suggesting that at least some of the woodborer adults had completed development and emerged. In addition, very small round holes in the sapwood indicated the presence of *Platypus wilsoni* (Coleoptera; Platypodidae), an ambrosia beetle that mines in the sapwood and heartwood of dead and dying fir. The outer sapwood exhibited superficial decay and termites were also observed working in the sapwood. These secondary insects typically colonize white fir following successful attack by the fir engraver.

Several other dominant and co-dominant white fir were present in the stand in the vicinity of the examined tree. Many of these firs also exhibited broken tops, varying degrees of top and branch dieback and true mistletoe infections similar to the subject fir (Figures 5 and 6). In addition, several nearby firs of various sizes were either dead or had very poor crown condition and needle retention likely resulting from defoliation during the recent Douglas-fir tussock moth outbreak and/or attack by fir engravers.

Discussion and Conclusions

The condition of, and associated factors found on, the subject white fir, are typical of situations commonly present in mature mixed conifer-true fir stands throughout the Sierra Nevada. Many decadent, large, old white firs have similar characteristics. Such conditions usually result from a variety of interacting biotic and abiotic factors that tend to weaken and reduce tree vigor rather than a single cause. Trees thus affected are predisposed and at higher risk to successful attack by bark and engraver beetles. In the case of the white fir under consideration, the interacting factors included attack by the fir engraver, true fir mistletoe, tree age, probable decay, periodic moisture stress and possibly defoliation by the Douglas-fir tussock moth.

The examined tree had been dead for probably one to two years at the time of the Grant West Burn. The top 20% of the tree had likely been dead for a few years prior to the death of the lower portion. Dead branches were scattered throughout the crown, and older ones had already broken loose from the bole. Such dead tops and branches eventually become structurally unsound.

JOHN WENZ, PhD., Entomologist

JOHN PRONOS, PhD., Plant Pathologist

Figure 1. 57.9” DBH dead white fir.

Figure 2. Debris adjacent to examined white fir showing examples of dead branches that have broken out. Some of this material is from a very old down log (arrows).

Figure 3.

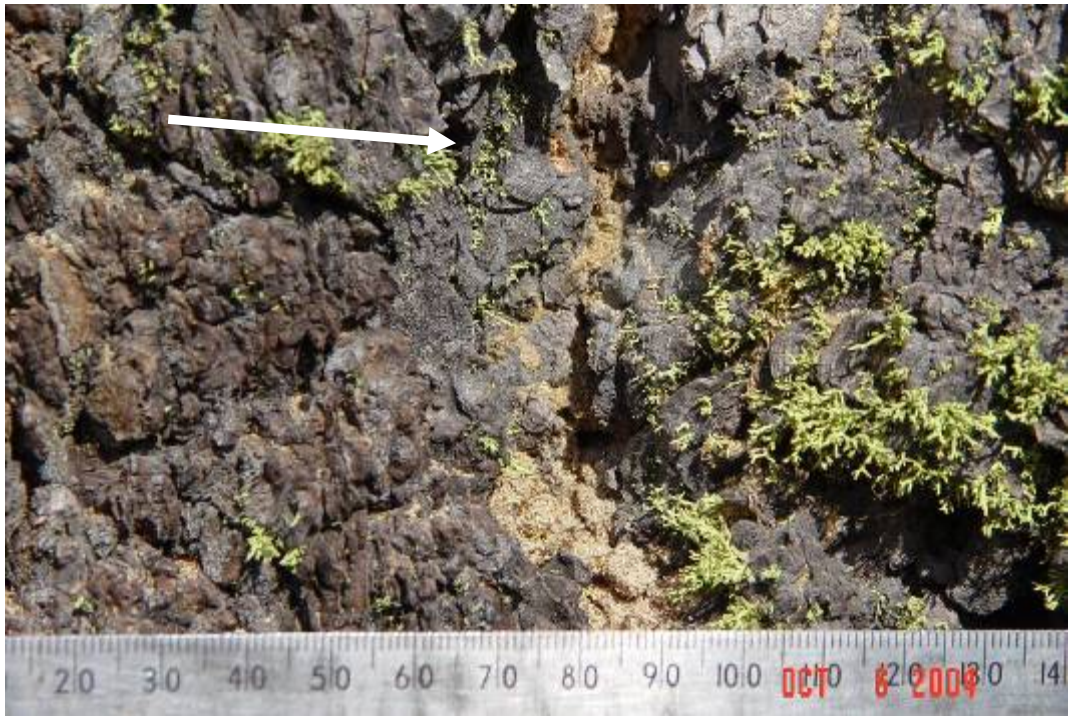


Figure 4.

Figure 5. Examined tree on right. Adjacent live white firs also show top dieback, top kill, and multiple tops.

Figure 6. Different white fir in Grant Grove area with dead tops and leafy mistletoe.

October 15, 2004

Memorandum

To: Jim Loach, Serious Accident Team Leader

From: Tom Warner, SEKI Park Forester

Subject: Holmes Incident Tree Measurements

John Workman (SEKI Tree Worker), who has been assisting with Team's investigation of incident, was requested to measure direction and degree of lean of 58" DBH (Diameter at Breast Height) white fir involved in incident. On 10/12/04 and 10/13/04, I assisted John with those measurements. This memorandum reports those findings.

Direction of lean was determined ocularly by John Workman (and corroborated by Harold Kiper, Squaw Valley logger with 40+ years experience tree falling/logging) on 10/12/04 to be approximately 331 degrees azimuth from base of tree, as measured with Silva Ranger compass. Tree has some sweep and twist, but, it was felt that was overall direction of lean. (By comparison, point of impact of failed portion of tree, as marked in field with pink flagging, was approximately 30 degrees from base.) Lean of lower bole was measured with inclinometer on compass (from approximately 90 degree angle to lean) to be approximately 4 degrees (7%).

On 10/13/04, tree height and degree of lean were measured with Keuffel & Esser transit from point 123.5 feet at 70 degree azimuth from base of tree. (This was closest point at approximately right angle to direction of lean from which I could get unobstructed view of both top and base of tree.) Based on measurements and calculations involving trigonometric relationships, offset of center of bole (trunk) at top (relative to center of bole at base) was determined to be 3.71 feet. Based on total height of 146 feet (as measured with transit) that translates into lean of 1.5 degrees (3%).

Attached is copy of my field notes. If you or any other member of Team has further questions, do not hesitate to contact me at 565-3722. (I will be out in field for remainder of day today, but, will check my voicemail for messages this evening, and will get back to you this evening or tomorrow.)

Tom Warner

Tom Warner

Attachment

cc: John Workman

10/13/04

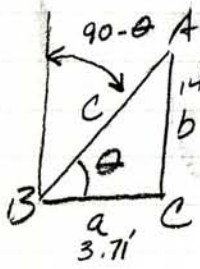
HOLMES FACILITY SITE 900 -

58" WF
Direction of lean -- 331°
Direction of impact ~~egress~~ -- 30°
Transit set up -- 1235' @ 70°

Offset -- ℄ of 44.5"
to ℄ (3.71') from ℄ base =
3' 8.5" / ~~143~~ 146' ht*

Ht (Clinometer)
~~119~~ 146 × 1.23.5 = 143'

Ht (Transit)
+46°46' up
7° down



$\tan\theta = \frac{b}{a}$

$b = a \tan\theta$

$b = 131 + 15 = 146'$

Lean

$\theta = \tan^{-1} b/a$
$= \tan^{-1}(146/3.71)$
$= 88.5°$

$90 - \theta = 1.5°$

Number: _____

REPORT OF TREE FAILURE ①
(Mechanical break, collapse, or uprooting)

REPORTING AGENCY: SEKI N.P.S. UNIT: RESOURCE MGT

(A) Tree and stand

Species: white fir
Approximate dbh of tree: 58 inches
Approximate age of tree: _____ years
Forest type: Mixed Conifers
Stand age class: ___ Overmature
___ Mature
___ Young-growth
X All-age
Elevation of site: Appx: 6500'

(B) Class of mechanical failure

X Upper bole (top half)
___ Lower bole
___ Butt (lower 6 feet)
___ Limb
___ Root, including uprooting

(C) Tree defect or fault leading to failure ②

* X Rot (trunk, limb, or root)
___ Sweep
X Tree dead - snag
(*) X Fire wound
___ Leaning
___ Lightning wound
___ Mechanical wound
___ Cracks or splits
X Fork or multiple top
___ Twin bole or basal fork
X Dead top or branch
___ Widow-maker or hang-up
___ Canker, rust
___ Canker, mistletoe
* X Other: Rot in Top ⑥ Fire Active in Top
___ Unknown or none

(D) Contributing factors

___ Wind
___ Snow
___ Erosion
___ Soil - saturation
___ Stream bank erosion
___ Shallow rooting
___ Tree striking tree
X Other: Fire in Top
___ Unknown or none

(E) Time and location of incident

Approximate hour: 1315
Month, year: 10/02/04
County: TULARE
State: Calif.
Site open for public use: Yes ___ No X

(F) Land ownership

X Federal
___ State
___ Other public: _____
___ Private
___ Public utility

(G) Site category

___ Established camp or picnic ground
___ Other established public use site ③
___ Volunteer site ④
___ Marked trail
___ Special use site ⑤
___ Roadside
___ Residence site ⑤
X Other: ⑦ Prescibed Fire unit
___ Urban

(H) Property or person directly affected

X Agency
___ Recreationist
___ Forest industry
___ Permittee-Concessionaire
___ Other: _____
___ Contractor
___ Public utility

(I) Consequences

___ Clean-up work required
___ Property damaged: _____
___ Property loss estimate: $_____ (Do not give tree values)
___ Injuries
___ Medical attention required
X Fatalities

(J) Name of site: ⑧ GRANT GROVE WEST Segment #1

Comments: See ATTACHMENTS 1-3
TREE Location .4 miles EAST of GRANT TREE drive on HWY 180 SEE MAP

Only failures of a size capable of inflicting some damage or injury should be reported. Minor limb failures should not be reported unless they were potentially dangerous. Do not report simple death of a tree or part of a tree unless it resulted in mechanical failure. Trees removed prior to failure should not be reported.

Investigated By: John G WORKMAN
Title: TREE WORKER
Date: 10/04/04

Forest Service Form PSW-4600-3 (Rev 6/75)

Attachment 1

Observation done by:
John Workman Tree Worker
Division of Resource Management
Sequoia/Kings Canyon National Park
October 04, 2004

Species: White fir
D.B.H. 58"
Height: 115'

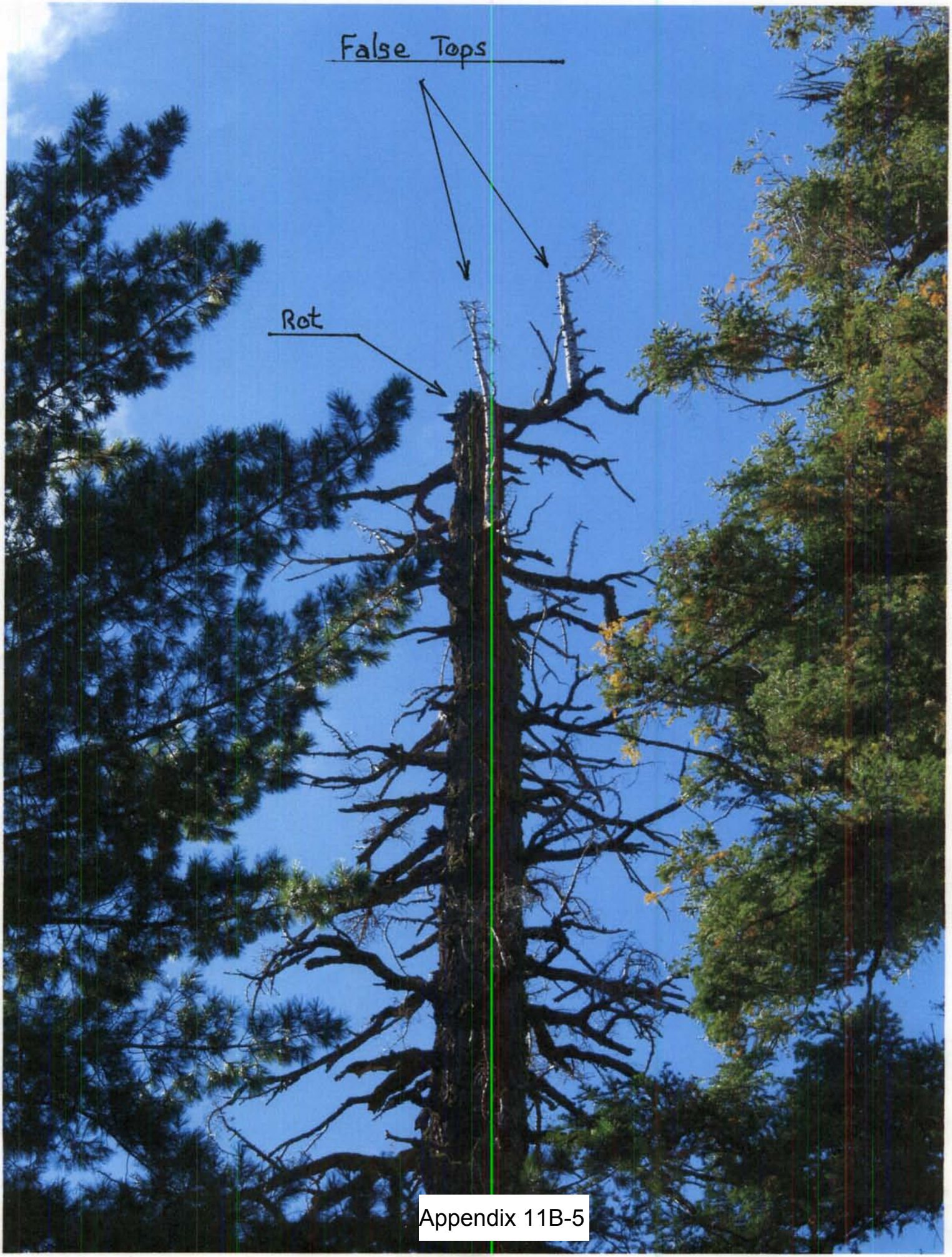
Observation of defects

Observation was done using binoculars within 100' of tree at different points; 360 degrees around tree, and brief inspection of bole during D.B.H measurement.
Some evidence of True Mistletoe, previous top failure, rot in very top, multiple false tops and hanger on southwest side at approx: 100'high.
No visible conks, puff balls or slime flux to indicate sapwood or bole rot.
No mushrooms, conks, soil mounding, or stress cracks were observed at base of tree to indicate root rot or root lift (tree failing).
Tree had not started losing bark and bark seemed to be intact and tight knit.
Some frass was observed in bole. Crown retained some needle cast and most of the fine limbs.

'Comments of Observer, Opinion Based'

Upon inspection, bole structure seemed to be sound (due to circumstances tree was not sounded with rubber mallet or axe). Tree crown was still holding some needles and fine limbs although bark retained evidence of frass. Normally this would indicate to me that the mortality was within one year, but due to lack of substantial rain/snow fall to wash out needles and frass, perhaps longer (within two years) for total tree mortality. Treetop however had died and failed at unknown time. Evidence of this was the multiple false tops. Because the failed top was not available for observation (burned) my conclusion is, after original top died, top failed resulting in tree forming new false tops, but retaining rot from former top mortality. At this point, a top was formed on the northern side of tree at remaining portion of top with weak attachment. Tree later died, perhaps due to Tussock moth outbreak in 1997-1999, resulting in lower bole stability, but weak and rotten top. During prescribed fire operations, an ember was blown into already rotten and dry top, burning off holding wood of false top resulting in failure. Tree lean was northwesterly, and failure was on the north side landing approx. ten feet from bole.

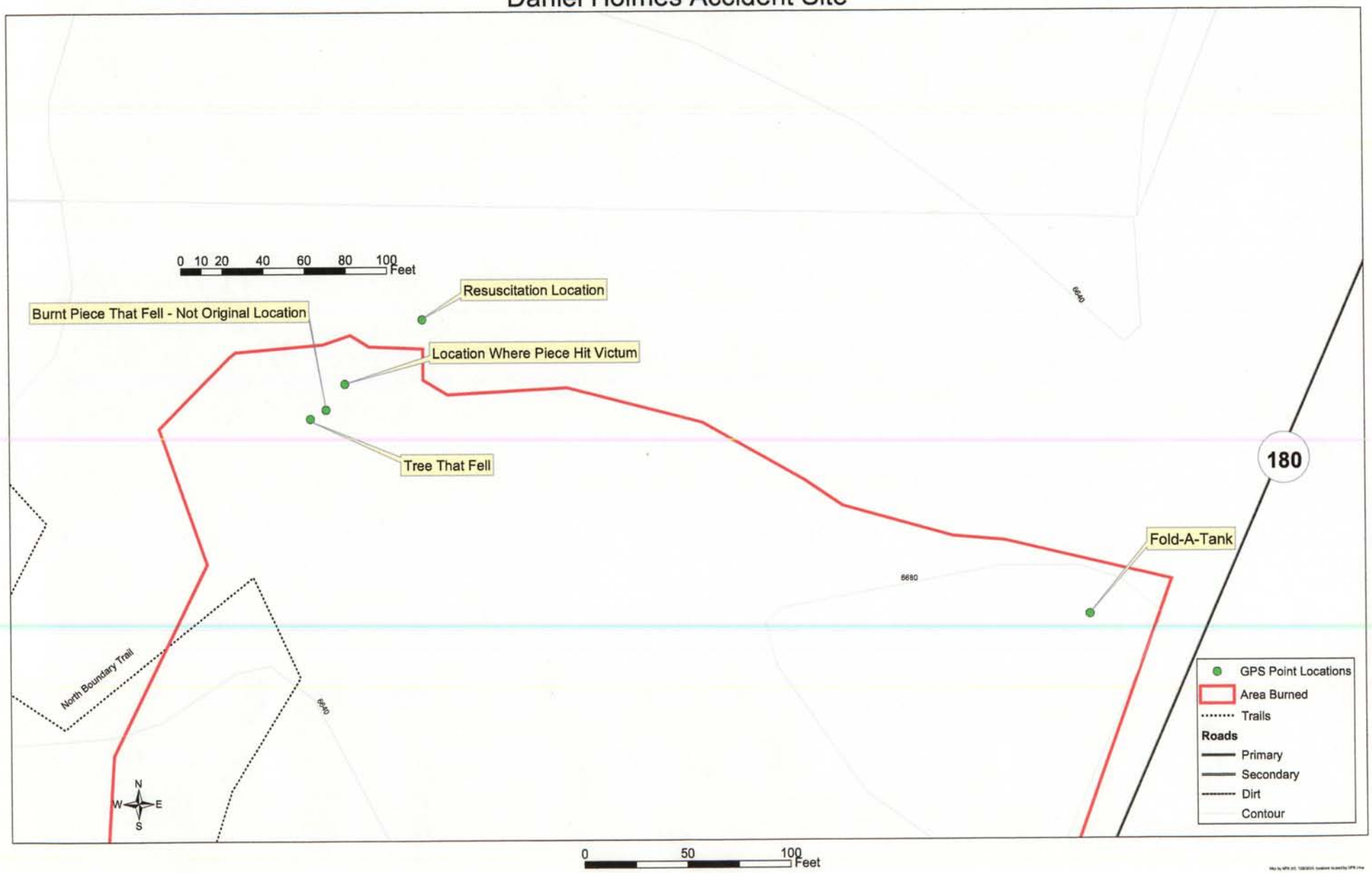
Reminder: This scenario is speculative due to the fact; I was not on site when failure occurred.



Appendix 11B-5


2
Failure
Hanger

Daniel Holmes Accident Site



Appendix 11B-7

APPENDIX 12

Safety and Prescribed Fire Policies, SOPs, and Guidelines

Sequoia and Kings Canyon Fire and Aviation Operations Guide as well as other interagency wildland fire guides are available on file at the parks.

JOB HAZARD ANALYSIS		Date: 12/28/03	4 New JHA θ Revised JHA
Park Unit: Sequoia and Kings Canyon National Parks	Division: Fire and Aviation	Branch:	Location: Ash Mt.
JOB TITLE: Operating chainsaw		JHA Number:	Page 1 of 2
Job Performed By: various fire personnel	Analysis By: G. Dempsey	Supervisor: Bill Kaage	Approved By: Bill Kaage

Required Standards and General Notes:	Standards outlines in S212
Required Personal Protective Equipment:	Long sleeves and pants, hard hat, gloves, eye and ear protection, leather gloves, sturdy work boots, chaps
Tools and Equipment:	Chainsaw, dolmar, wedges, ax, jigs, files, fuel and bar oil

Sequence of Job Steps	Potential Hazards	Safe Action or Procedure
Don PPE, Fill bar oil and fuel reservoirs	Fumes could cause damage to lungs; spills in contact w/ skin can cause cancer	Wear full PPE when handling a saw including safety goggles, long sleeves and glasses. Do not breathe fumes, avert head as much as possible and don't sniff gas.
Size up tree, brush etc.	Crushing injuries, cuts, loss of life or limb	Is tree bigger than your qualifications? If so, don't cut tree, get someone qualified. Clear an escape route around tree. Estimate which way tree will fall and what impediments are in the way. If necessary, clear impediments first. Have all personnel move away from fall zone except for swamper and faller.

Start saw by placing it on ground and insert foot in opening by fuel switch to safely anchor it. Set brake, choke and pull the pull cord until machine slightly fires. Turn off choke and put into run position. Pull pull cord until you get full ignition.	Cuts, severe bleeding, loss of life or limb	Always wear full PPE. Do not drop start saw. Set brake until you are ready to operate the saw, then release brake. Never operate saw alone so if you have problems someone is there to call for immediate help.
Fall tree by cutting a pie cut from the tree w/ saw running on high revolutions. Be careful of tip and its location. Once the pie cut is made, do the back cut, going through enough wood to insert falling wedges. Pound wedges in w/ sledge hammer to drive tree to ground.	Cuts, crushing injuries, loss of life or limb	Have communications between swamper and faller worked out in advance. Swamper will watch for tree to wiggle and will alert faller. A careful eye will be kept on tree and its condition at all times to assess path of falling tree. As soon as tree begins to go down, quickly set brake on saw and step away from tree in a safe direction.
Limb fallen trees w/ a careful eye towards sprung-loaded branches or compressed limbs. If in doubt, do not cut.		Remove debris from the area to be worked so that you can clearly see condition of work area. If bar bogs down, this may be a sign of a lot of sprung-load energy behind bar. In some cases a cut from the opposite direction may alleviate problem; in other instances, cut should not be made. Work at your experience level.
Buck fallen trees from down hill side first, making sure that you have an escape route. Make final cut on uphill side.	Cuts, crushing injuries, loss of life or limb	Have a preplanned escape route cleared and in sight.

Listing of SEKI JHAs and JHGs by Division

Division of Administration

JHAs-none

JHGs:
Computer Use and Sitting
Crawl Space Traversing
Telephone Use

Division of Interpretation

JHAs:

Arch Survey
Cataloging and Storage
Darkroom
Site Monitoring
Site Testing

JHGs-none

Division of Natural Resources

JHAs:

Cardboard Baler
Lifting Heavy Items
Pack Test
Remove Himalayan Blackberry

JHGs:

Air Quality and Water Sampling	Backcountry Travel	Burning Slash Piles
Cave Gating	Cave Restoration	Horizontal Caving
Vertical Caving	Chainsaw Operations	Driving Safely
Environmental Hazards	Forest Plot Work	Forestry Crew Equip
Handling HazMat	Helicopter Flights	Herbicide Use
Physical Training	Power Tool Operations	Revegetation-Restoration
Tree Climbing	Wildlife Management	

Manually Removing Non-Native Plants (General Field Work)

Division of Rangers and Fire

Ranger JHAs-none

Ranger JHGs-none

Fire JHAs:

Backcountry	Chainsaw	Driptorch	Fire Engine	Fire Line
Fire Monitoring	HazMat	Helispot	Helo Flights	Hose Lays
Insects	Lightning	Long Line	Office	Operating AFIDS
Pack Test	Physical Trng	Power Tools	Radio	RX Burn
RX Crew	Safe Driving	Slash Piles	Snakes	Terratorch

JHGs:

Same as listed for their JHAs except for the following.

Aerial Ignition
Fire Fighting
PX Burning

Division of Maintenance

JHAs:

Cheater Bar	Asphalt Overlay	Brushing	Ditching
Level Patch	Rebuilding Gas Engine		Snow Guide Installation

JHGs:

Blood Borne Pathogens	Bears	Bridges	Brushing
Chainsaws	Cold Related Hazards		Environmental Hazards
Fence Building	Heat Related Hazards		Helicopters
High Altitude	High Water Crossing		Insects
Lightning	Pionjar Use		Poison Oak
Rockwork	Stock/Packing		Water Borne Hazards
Work Zone Safety (Traffic)			

SEKI JOB HAZARD GUIDELINE

Job Description: Prescribed Burning			Date of last update: 11/07/03
Division with primary responsibility for this JHG: Fire and Aviation	Last updated by: Georgia Dempsey	Reviewed by: Bill Kaage	Approved by: Bill Kaage

Required standards and general notes:	Standard firefighting orders, 18 watchout situations; LCES; jobs are conducted by taskbook standards and agency training
Required personal protective equipment:	Full firefighter PPE to include nomax clothing over cotton underclothes; gloves, fire boots, hard hats, eye protection, ear protection, IA pack, headlamp, fusees, fire shelter, chaps when needed
Typical tools and equipment:	Standard firefighting tools; fusees, drip torches, fire shelter, fire engines, mark III pumps, hoses and hose lays, hand held radios

Activity	Potential Hazards	Safe Action or Procedure
Planning and writing burn plans	Errors in fire behavior runs, not ensuring that resources are on hand in the event of an escape; making sure you have personnel who are qualified to carry out each phase of the burn	Double check burn plans and fire behavior data; run all plans through the formalized sign off process so errors can be caught prior to ignition; check on resources in contingency plan to ensure that they are available to help as stated; make sure current information and technology is used properly; make sure that each person assigned to a task is qualified for the position held; trainee positions will be under the direct supervision of appropriately certified individuals.
Pre-Ignition Phase	Weather/fuel conditions that are out of prescription; Not enough resources on hand to safely conduct the burn as planned; Safety talk not given or incomplete; PPE missing	Make sure that weather and fuel conditions fall within acceptable parameters as defined by the burn plan; Check to make sure that burn and contingency staffing is adequate; Safety talk should include information on current and expected weather, escape routes, safety zones, communication procedures, contingency planning, local hazards and fire behavior; Ensure that all staff on the burn are in full PPE, if not, they need to be dismissed from the burn
Test Burn Phase	Fire behavior is out of expected norms thus causing concern over the ability to hold the burn; drip torch fuel is mixed incorrectly either being too hot, or not hot enough; test burn immediately jumps holding lines. Threats: losing the fire thus endangering fire fighters, visiting public and property. Problems: smoke inhalation, burns, exhaustion	If test burn does not go well and fire behavior exceeds expected behavior, the burn boss should halt ignitions, review weather and fire behavior conditions and make a determination on whether the burn should be conducted. To safeguard against hot fuel mix, always make sure drip torch is assembled correctly with loop pointing towards ground; adjust fuel amounts and conduct a small test burn by dripping a small amount of fuel onto the ground and then carefully igniting the spot to see how the fuel reacts. If the fuel is either too hot, or not hot enough, replace fuel. If fire immediately jumps the lines, cease ignition and concentrate efforts on extinguishing the fire. Avoid working midslope and sucking fumes as much as possible. Use good work rest ratio, and call for contingency help to avoid exhaustion. LCES should be used at all times to ensure that no one gets burned. Personnel should be well trained in shelter deployment techniques.

Ignition Phase	Not understanding directions, role or how to do the job you were assigned; Getting out of touch w/ crew, burn boss or current weather information due to communications problems; Being threatened with fire hazards such as snags (possible death or traumatic injury), extreme or erratic fire behavior (burns, smoke inhalation, or death); causing exteme fire conditions by not following ignition patterns established by burn boss; exposure to fire or elements due to getting lost on fire	Have employees repeat directions back to make sure that they were clearly understood; ask employees outright if they understand their mission and how to safely accomplish it; go over plan in detail during briefing. Communications training should be conducted each season so that each employee feels comfortable using park hand held radios. They must be trained in how the radio works, channel selection, volume, priorities, and basic trouble shooting procedures. During the safety briefing, the channels being used need to be stated clearly. Known hazards should be discussed in detail with extra attention paid to explaining info. on lookouts, communications, escape routes and safety zones and snags. Standard navigation procedures, using a map and compass, should be taught to personnel. Working on the buddy system principal will also help to eliminate getting lost. Showing people the unit, on a map, during the briefing should also help to safely orient firefighters. IA packs should contain such safety items as water, matches, space blanket and extra food.
Holding Phase	Burns or smoke inhalation caused from holding actions; cuts caused from use of firefighting equipment; back strains from carrying heavy gear or improper starting techniques for pull cord equipment; loss of hearing or vision; crushing injuries caused from falling trees	Burns and smoke inhalation can be avoided by good use of LCES, correct placement of holding line w/ particular attention to using midslope lines as little as possible and constantly watching the weather and fire behavior for unusual changes; Cuts can be avoided by careful use of tools, tool guards, spacing techniques and use of safety equipment such as chaps, fire boots, gloves and hard had; Back strains can be mitigated by using proper bending and lifting techniques, stretching prior to work, and using sound procedures for starting large pieces of equipment; Earplugs and safety goggles should be worn whenever running equipment, or hazards such as slapping branches are a problem. Snag hazards should be identified, flagged and monitored carefully from a safe distance. Medical plan will be covered in the briefing and first aid gear will be carried by designated crew members to assist w/ first aid.
Long Work Shifts During Burn	Fatigue, mental and physical stresses;	All personnel will drink water, eat food and take appropriate breaks; shifts should adhere to national standards and work/rest ratios should be adhered to; personnel will take advantage of physical training to be prepared for arduous duty to lessen fatigue related accidents
Monitoring Phase	Crushing injuries from snags; burns from hot stump holes; driving injuries to and from fire	Snag hazards will be identified as much as possible and flagged; briefings to new crews will include information on snags and other hazards; PPE will assist in protecting from burns; driving injuries will be avoided by following the safe driving guidelines

SEKI JOB HAZARD GUIDELINE

Job Description: Wildland Fire Suppression\Prescribed Fire Crew Member			Date of last update: 11/08/0
Division with primary responsibility for this JHG: Fire and Aviation	Last updated by: Georgia Dempsey	Reviewed by: Bill Kaage	Approved by: Bill Kaage

Required standards and general notes:	Standards for survival, agency required training per position, LCES, 18 watch out situations, standard fire fighting orders
Required personal protective equipment:	Nomax clothing to be worn over all natural fiber undergarments (cotton, silk, wool); hard had with chin strap, eye protection, ear plugs, firefighting boots, leather gloves, IA pack, fire shelter, fusees; lighter also recommended
Typical tools and equipment:	Various handtools, mark III pumps, hoses and hose lays, chainsaws, fusees, drip torches

Activity	Potential Hazards	Safe Action or Procedure
Briefing	Not getting or asking for critical information could cause serious bodily harm or death	Crews being deployed to a fire should always ask for information regarding the fire, including fire behavior and current and expected weather. Ask if there are any known hazards. Ask the person in charge what your safety routes and escape zones are. Find out what the communications and medical plan consists of and make sure you understand how to use the radio and get help if needed. Take personal responsibility for your own safety by getting as much information as you can. If the information is not being provided to you, go up the chain of command and get the information you need to safely do your job. Do not take on jobs that you are not officially qualified to do.
Deployment to Scene	Vehicle accidents, or accidents caused from the fire, power lines, exploding tanks, etc.	Rule 1: Do not race to the scene of a fire. Drive safely and defensively, not offensively. By getting as much information as possible about the fire, you should be able to make a determination about the safety of the roadway. If you question the safety of an entry or exit into the fire via a roadway that could readily be impinged, ask for an aerial recon. of the fire. Follow agency guidelines for dealing with fires in the vicinity of power lines. Call LEO dispatch to make sure that threatening lines have had the power turned off before entering the area. Regarding propane tanks, etc. hazmat courses offer invaluable information regarding fires in urban interfaces with numerous hazards at hand. If you do not have the appropriate training to handle a situation, back off and call for help. Always wear appropriate PPE and use safety equipment on the vehicle to your advantage.

Suppression/Holding	Crushing injuries due to snags, falling injuries, burns caused from the fire itself	Always wear full PPE; Obey the Standard fire fighting orders and pay attention to the 18 watchout situations. Use LCES. Following these procedures to the T will usually save your life. Identify local hazards, flag them, and pass the information on from one crew to another; make sure you use good spacing patterns and use tools as you were trained (example: never ask for a line to be charged unless you have first checked to make sure that the nozzle is closed); Use common sense when walking through an area of particular concern; monitor hazards from a safe distance; do not station yourself in an unsafe area; communicate safety concerns to the person in charge immediately; watch footing and try not to overload packs; distribute weight evenly in pack; use physical training time to condition yourself for hard work
Burnout Operations	Burns from drip torch, not using safe ignition patterns; not understanding directions clearly; not forseeing problems w/ fire behavior	Read the JHA for drip torch use; practice putting together and using a drip torch w/out lighting it; ask for clarification from someone who is well trained in drip torch use; only fill jobs you are qualified to do by taskbook such as ignition specialist; watch fire behavior and weather conditions constantly; notice how the fire is burning under current ignition patterns; if burning conditions are too intense, adjust pattern (if you are ignition specialist or burn boss) or alert people in charge to what you are seeing if you are not; make sure that you understand your job very clearly by repeating back what you have been told and asking for clarification on any unclear points; stay in communication w/ all divisions of the fire when conducting burnouts so no one is taken by surprise by increased fire behavior
Mop Up	Burn injuries; crushing injuries from snags, injuries caused by falls	Continue to follow LCES and standard firefighting orders; make sure that hazards such as snags that are close to the line are identified, flagged and communicated to all crew members; watch footing – in particular be careful about not stepping into burnt out stump holes which are frequently full of hot ash and embers; watch footing placement and always carry tools on downhill side; load packs evenly and do not overload; follow guidelines defined in the Saws class for safe chainsaw useage; always wear full PPE
Removing Hose and Other Equipment	Back injuries due to moving heavy, wet hose; slipping injuries	Use proper lifting techniques when loading heavy hose and equipment into vehicles; Stretch and warm up prior to doing heavy work; get assistance for moving large items; watch footing and be sure to carry sharp tools on the downhill side

American National Standard for Industrial Head Protection

ANSI Z89.1-2003

This is the fifth revision of the standard that provides performance and testing requirements for industrial helmets, commonly known as hard hats. It is a revision of ANSI Z89.1-1997, which established the types and classes of protective helmets, depending on the type of hazard encountered. The 1997 version included specifications for helmets designed to offer protection from lateral impact, or top-only impact, giving employers and users the flexibility to specify the helmet that best meets the needs of their specific workplace.

Industrial head protective helmets meeting the requirements of the 2003 standard are classified as Type I for top protection or Type II for lateral impact protection. Both types are tested for impact attenuation and penetration resistance. Type II helmet performance requirements include criteria for impact energy attenuation from impacts from the front, back and sides as well as the top; off-center penetration resistance, and chin strap retention.

The three classes indicate the helmets electrical insulation rating, unchanged from 1997:

Class E (electrical) are tested to withstand 20,000 volts;

Class G (general) helmets are tested at 2200 volts; and

Class C (conductive) provide no electrical protection.

Changes in this revision of the standard are minor compared to the 1997 version. Redundancy in the previous test methods has been eliminated, with only the most severe anvil test retained. In an effort to recognize state-of-the-art materials performance and technology, some physical requirements for helmet components that did not provide added user value, or limited design or performance, were removed.
Copies of the standard are available from the ISEA. Order on-line at: www.safetyequipment.org

The following Bullard hard hats/helmets meet the revised ANSI Z89.1-2003 standard:

Model		Standard Type and Class
3000		ANSI Z89.1-2003, Type I, Class E & G
302RT		ANSI Z89.1-2003, Type I, Class E & G
303		ANSI Z89.1-2003, Type I, Class E & G
5100		ANSI Z89.1-2003, Type I, Class E & G
4100		ANSI Z89.1-2003, Type I, Class E & G
911C		ANSI Z89.1-2003, Type I, Class E & G

911H		ANSI Z89.1-2003, Type I, Class E & G
5100P		ANSI Z89.1-2003, Type I, Class E & G
502		ANSI Z89.1-2003, Type I, Class G
Advent		ANSI Z89.1-2003, Type II, Class E & G
Vector		ANSI Z89.1-2003, Type II, Class E & G

Dave below is a swag from Rick Oleson @ Bullard, remember this is just a estimate for YOUR information. questions call. gmj

George Jackson

Fire & Aviation

Missoula Technology & Development Center (MTDC)

5785 Highway 10 West

Missoula, MT 59808

406-329-3967

Fax 406-329-3719

"Rick Oleson" <rick_oleson@bullard.com>

10/07/2004 16:47 EST

To: <gjackson@fs.fed.us>

cc: '"Rick Miller"' <rick_miller@bullard.com>, <Crogerinut@aol.com>, <john_king@bullard.com>

bcc:

Subject: Impact energy and safety helmets

Hello George:

The basic minimum information that is necessary to try to determine the severity of an impact event is the weight of the falling object, and the distance of the vertical drop leading to impact. If this is known, the height in feet can be multiplied by the weight in pounds to produce the impact energy in foot-pounds.

Helmets are designed to provide protection from a very limited amount of impact energy; beyond a certain point, the structure necessary to provide increased protection becomes impossible to wear on the head (and at some point, more than

the body itself can support). In the current standards typically used in the US for head protection (NFPA 1971, NFPA 1977, NFPA 1951, ANSI Z89), the impact energy is specified as 40 foot-pounds. When dealing with something on the order of magnitude of a snag, both the mass of the object and the distances involved are such that this energy value is vastly exceeded in many cases.

After receiving some more information on this incident through Roger Andrews, I will offer a rough calculation: Roger's memo suggests that the snag may possibly have been 6-8 inches in diameter, 10-12 feet long and falling from a height of 110-115 feet. Wood varies widely in weight depending on species, from around 25 pounds per cubic foot for red cedar to 60 pounds for oak. If we assume a density of about 40 pounds per cubic foot, a diameter of 6 inches, a length of 10 feet and a falling height of 110 feet we will probably be at the lower end of the possibilities as described. Using these values, the snag would have had a weight of about 80 pounds and the impact energy would have been between 8,500 and 9,000 foot-pounds. This represents a level of energy that is more than 200 times in excess of what the helmet is designed to withstand.

I hope this information is helpful; I think that any comment on my part beyond providing this information would probably not be appropriate.

Rick Oleson

Dave A's

United States Department of the Interior

NATIONAL PARK SERVICE
Sequoia and Kings Canyon National Parks
47050 Generals Highway
Three Rivers, California 93271-9651
(559) 565-3341

IN REPLY REFER TO:

Y-14

August 12, 2003

Memorandum

To: Sequoia and Kings Canyon NP's Red Carded Employees

From: Fire Management Officer, Sequoia and Kings Canyon NP's

Subject: Class C Faller Taskbook Implementation Standards

Effective immediately the parks will begin use of the attached class C faller taskbook for documentation of class C faller skills in wildland fire management. Class A and B faller skills documentation will continue to use the existing process of S212 training followed by documented skills based field assessment conducted by qualified class B or C fallers followed by FMO certification in the SACS database. The certification of C faller skills will build upon A and B skills documentation.

As stated on page two of the C faller taskbook, taskbook implementation serves as fulfillment of standards as outlined in Interagency Standards for Fire and Aviation Operations 2003 (Redbook). This certification process may be amended upon development of additional NPS class C faller certification requirements.

William Kaage

attachment 1

SEQUOIA & KINGS CANYON NATIONAL PARKS

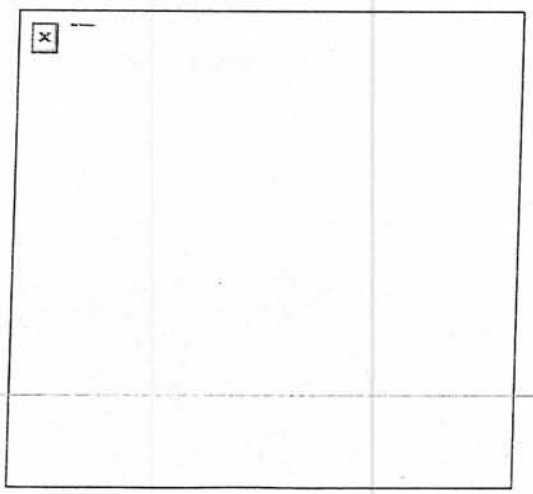
CLASS C FALLER CERTIFICATION TASKBOOK

ISSUED TO:_____

SUPERVISOR:_____

DATE:_____

ISSUED BY/TITLE:_____



DATE CERTIFICATION IS RECOMMENDED:_____

CERTIFICATION RECOMMENDED BY:_____

CERTIFIED BY:_____

TITLE OF CERTIFIER:_____

DATE OF CERTIFICATION:_____

This taskbook has been adopted by Sequoia and Kings Canyon National Parks to fulfill the requirement for certification of Class C Fallers per chapter 8, page 8-4 of the Interagency Standards for Fire and Aviation Operations 2003 (Redbook). This taskbook is NOT an official Position Task Book within the National Interagency Incident Management System. At this time there is no official National Wildfire Coordinating Group Position Task Book for Class C Fallers.

All trainees must be currently certified at the Class B Sawyer level and possess competent enough skills to be able to move up to the Class C level. Individuals will have five years to complete all the tasks within the book. Prior to final certification, trainees should be able to demonstrate expert proficiency in chainsaw operation.

Use of this taskbook should follow the same guidelines as an official NWCG Position Task Book. Issuance of this taskbook will be done only by the Park Fire Management Officer or his/her official designee, while following the SEKI policy for issuing NWCG task books.

Instructors must possess current skill levels to be able to safely instruct, evaluate, and recommend trainees for certification. Instructors should be qualified as a Single Resource Felling Boss if possible. However Single Resource Felling Boss qualification for instructors is not a SEKI requirement. The criterion to be a SEKI instructor is as follows:

- Fully qualified and current as a Class C Faller.
- Has been qualified as a Class C Faller for a minimum of 5 years.
- Successfully completed Instructor 1A and 1B, or M-411 Facilitative Instructor training.
- Written approval from the Park Fire Management Officer on file.

Evaluation of all tasks must be done within the SEKI park boundary, unless the trainee is accompanied by an approved SEKI instructor on an off-park assignment. Final certification of an individual as a Class C Faller will be done only by the Park Fire Management Officer.

Tasks within this book may be completed on projects, hazard tree removals, prescribed fires, or wildfires. A wildfire assignment is not mandatory, but it highly recommended, for Class C Faller certification.

This taskbook will become irrelevant and be replaced by an official Position Task Book for Class C Faller or its equivalent in the event one is adopted by NWCG. The following excerpt is taken directly from chapter 8, page 8-4 of the Redbook which pertains to and provides guidance for this taskbook.

"Chainsaw Operators and Fallers"

The DOI has established the following minimum qualification and certification process for Chainsaw Operators (Red Card certified as Faller A):

- *Successful completion of S-212, including the field exercise, or those portions of S-212 that are appropriate for Faller A duties.*
- *Agency administrator (or delegate) certification of qualifications after verification that training is successfully completed.*
- *Annual refresher training is required as specified by the local unit.*
- *Documentation must be maintained for individuals, including annual refresher training.*

The DOI has established the following minimum qualification and certification process for BLM/NPS Fallers (Red Card certified as Faller B or C):

- *Certification of employees will remain the responsibility of the agency administrator (or delegate) after successful completion of training has been verified.*
- *Training and certification of Fallers should be addressed case-by-case, and used only if a need is identified.*
- *Annual refresher training is required and specified by the local unit.*
- *Documentation must be maintained for individuals, including annual refresher training.*

***USFS** – FS direction can be found in FSH 5109-17 and FSH 6709.11, specifically in the 2000-01 supplement."*

Instructions to the instructor (please read carefully):

- Tasks do not have to be completed in any particular order.
- All bulleted items need to be completed before a task can be completely signed off.
- Instructors should circle each bullet item as it is completed and write their initials and the date of completion in the left margin adjacent to the bullet.
- It is recommended that trainees fall, limb, and buck the same tree during tasks 4, 5, and 6 for a smoother flow to the certification process.
- Trainees should fall at least four trees (two dead, two green if possible) of varying complexity in different situations before being recommended for certification. If live trees are unavailable, dead trees may be substituted.
- Instructors should thoroughly complete the field evaluation form at the end of this taskbook for each tree the trainee works on. Evaluation forms should be reviewed with the trainee after each tree.
- Trainees will need to give the evaluator a verbal size up for every tree they fall.
- Trainee must have and make good use of a swamper at all times.
- Swampers must play a silent role and will cause a trainee to be disqualified from a particular tree if they verbally assist in any aspect, unless the sawyer's safety is compromised.
- Instructors must give the trainee sufficient leeway to succeed or make mistakes and should only step in when there is an imminent threat to safety.
- When recommending certification for someone at the Class C level, the instructor must realize they are certifying that the trainee is able to work independently on any tree in any situation on fire, prescribed burns, or projects.

TASK # 1 – Personal Protective Equipment

Exhibit correct field use of all required PPE while completing trainee assignments as a Class C Faller (hardhat, ear and eye protection, nomex, gloves, chaps, boots, etc).

Date(s) completed:_____

Location:_____

Type of assignment:_____

Instructor:_____

TASK # 2 – Saw maintenance and troubleshooting

Demonstrate proficiency in basic chainsaw mechanics and field maintenance on project and fireline assignments.

- Clean and maintain the chainsaw in field environments.
- Ensure all chainsaw safety features are in place and functional.
- Field sharpen and adjust chain tension.
- Tune the high and low speed idle for proper performance at elevation in the field.

Date(s) completed:_____

Location:_____

Type of assignment:_____

Instructor:_____

TASK # 3 – Receive instructions

Receive task/assignment and briefing from supervisor.

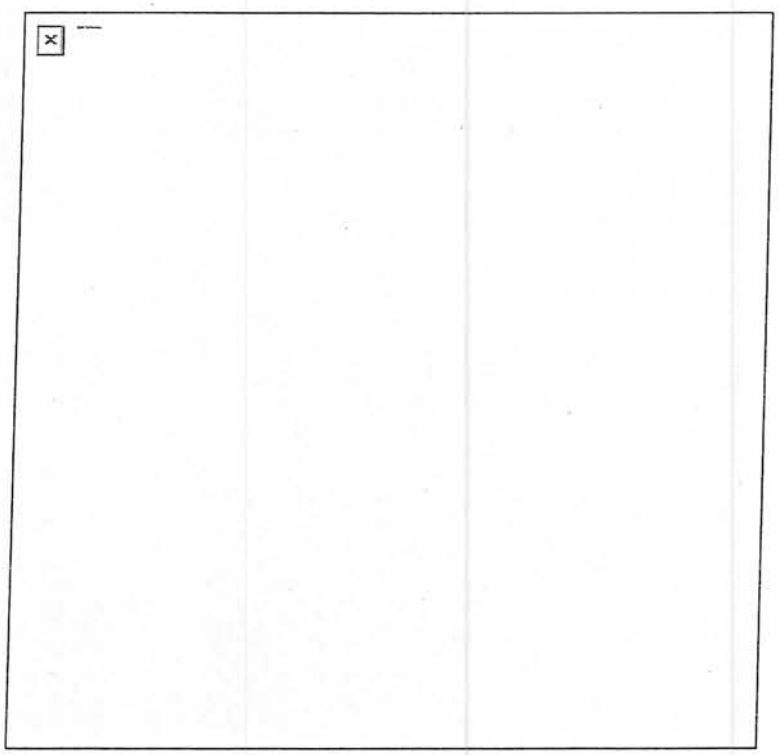
- Task/assignment from supervisor is clearly understood.
- Ask necessary questions to clarify information provided by supervisor.
- Take written notes when necessary to record pertinent information when receiving assignment/briefing.

Date(s) completed: _____

Location: _____

Type of assignment: _____

Instructor: _____



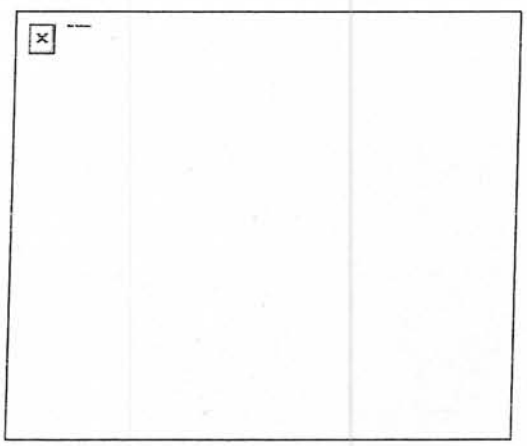
TASK # 4 – Limbing

Demonstrate competence in identifying hazards, handling the chainsaw and displaying satisfactory judgment and skill for each task. Complete the following tasks with a gasoline powered chainsaw equipped with no less than a 24 inch straight bar.

- Follow a procedural approach to identify overhead and ground hazards to be mitigated prior to beginning work.
- Given a complex log with multiple limbs and whose diameter is equal to or greater than 24 inches, limb log to prepare for bucking.
- Demonstrate a safe procedure for limbing trees up to head height.

	Date(s) completed	Location	Type of assignment
Tree #1			
Tree #2			
Tree #3			
Tree #4			

Instructor:_____



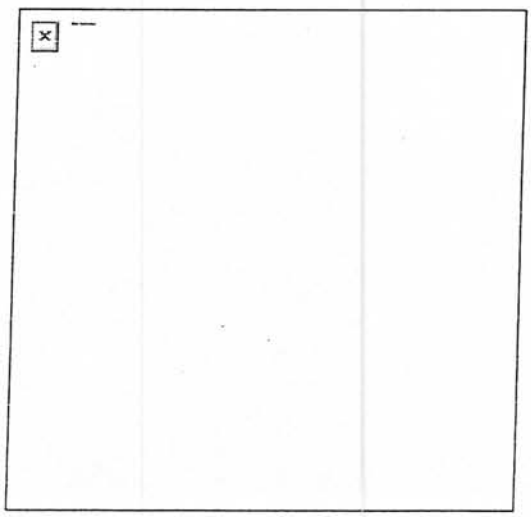
TASK # 5 – Bucking

Demonstrate competence in identifying hazards, handling the chainsaw and displaying satisfactory judgment and skill for each task. Complete the following tasks with a gasoline powered chainsaw equipped with no less than a 24 inch straight bar.

- Applies the procedural approach to identify overhead and ground hazards to be mitigated prior to beginning work.
- Given a complex log with multiple binds whose diameter is greater than or equal to 24 inches, perform correct relief cuts to eliminate bind(s) while bucking log into lengths for hand removal.
- Given a log whose diameter is greater than 24 inches, demonstrate double bucking techniques to eliminate binds and buck log into lengths for hand removal.
- Given a spring pole, demonstrate correct size up and relief cuts to remove the hazard.

	Date(s) completed	Location	Type of assignment
Tree #1			
Tree #2			
Tree #3			
Tree #4			

Instructor:_____



TASK # 6 – Falling

Demonstrate competence in identifying hazards, handling the chainsaw and displaying satisfactory judgment and skill for each task. Complete the following tasks with a gasoline powered chainsaw equipped with no less than a 24 inches straight bar.

- Applies the procedural approach to hazard assessment and describes overall plan for felling task including go/no-go walk away decision if applicable.
- Demonstrate knowledge of given tree species, stand conditions and visual indicators of disease that indicate hazards to falling operations.
- Demonstrate proficiency with the choice of cut (conventional, Humboldt, etc.), ensuring sufficient angle, size and depth of the face and backcut, and sufficient holding wood and stump shot to direct and guide the tree to the predetermined lay.
- Correctly applies wedges as needed and directs swamper to safely wedge over any tree as necessary.
- Execute felling tasks, correctly and safely felling no less than two standing sound trees (green or dead) whose diameter is equal to or greater than 24 inches, within 6 feet of the center of the predetermined lay measured at the top of the tree.
- Execute felling tasks, correctly and safely felling no less than two standing snags whose diameter is equal to or greater than 24 inches, within 6 feet of the center of the predetermined lay measured at the top of the tree.
- Execute felling tasks employing the double cutting method, correctly and safely felling standing trees (green or dead) whose diameter is greater than 30 inches, within 6 feet of the center of the predetermined lay measured at the top of the tree.
- Remove hang-up trees whose diameter is at least 12 inches (if available). If not available, describe the safe procedure for removing hang-up trees.
- Identifies falling tasks too dangerous for removal with a chainsaw. Flags hazard area and notifies supervisor.

	Date(s) completed	Location	Type of assignment
Tree #1			
Tree #2			
Tree #3			
Tree #4			

Instructor:_____

TASK # 7 – Fireline operations (optional – highly recommended)

Integrate cutting skills (limbing, bucking, falling, and brushing) into fireline operations under the supervision of a responsible fireline supervisor.

- Using information gathered from supervisory briefing, demonstrate appropriate tactics and saw team deployment for given fuel type and tactical objective.
- Conduct a briefing for assigned saw team(s) covering assignment safety, communication, tactics and chain of command. Ensures LCES is in place prior to beginning operations.
- Demonstrate physical stamina and technical ability to support complex fireline operations through a natural or activity (slash) fuel situation. Operations will include but are not limited to fireline construction, snag and hazard tree removal.
- Demonstrate fireline situational awareness, competent tactical application, and safe chainsaw handling practices while completing fireline assignments as a Faller Class C.
- Employ MIST guidelines to minimize visual impacts of chainsaw use.
- Trains, mentors, and evaluates Intermediate Sawyers during incident assignments.

Date(s) completed:_____

Location:_____

Type of assignment:_____

Instructor:_____

CHAINSAW CERTIFICATION FIELD EVALUATION SHEET
SEQUOIA AND KINGS CANYON NATIONAL PARKS

Candidate:_____ Date:_____

Previous Certification Level:_____ Year:_____ Location:_____

SEKI Unit:_____ Unit Supervisor:_____

NOTE TO INSTRUCTOR: *A scale of 1 through 5 will be used to identify proficiency in each area: 1 = Poor, 2 = Needs Improvement, 3 = Satisfactory, 4 = Very Good, 5 = Outstanding. N/A means trainee was not evaluated in that area. All blanks must be filled in. Include comments for all scores less than 3.*
Any safety violations will result in automatic failure. It is up to the candidate to ensure that all necessary equipment is present and in good working order.

PERSONAL PROTECTIVE EQUIPMENT CHECKLIST (check off when present)

	Tree #1	Tree #2	Tree #3	Tree #4
Hardhat				
Eye Protection				
Ear Protection				
Nomex / Long Sleeve Shirt				
Gloves				
Chaps				
Boots				

EQUIPMENT CHECKLIST (check off when present)

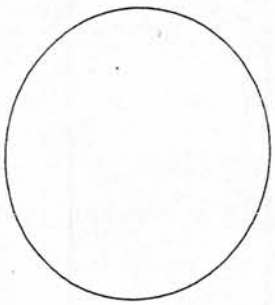
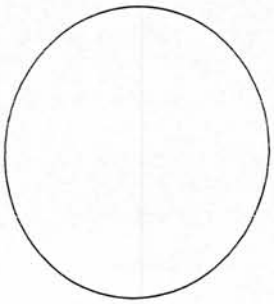
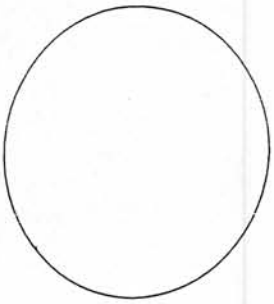
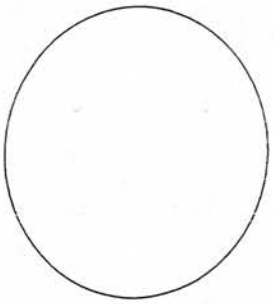
	Tree #1	Tree #2	Tree #3	Tree #4
Chainsaw				
Dolmar (or equivalent)				
Falling Axe				
Wedges				
Extra Chain				
Tool Kit				
Round Files				

SIZE UP / HAZARD ANALYSIS GUIDELINES	CHAINSAW USE & GENERAL SAFETY
• Procedural approach • Trunk lean • Top lean • Limb weight • Wind • Widow makers • Wood soundness • Snag vs. live tree • Tree species • Relationship to other trees • Slope • Escape routes • Tight/loose bark • Other (list in the space to the right)	• PPE checklist • Equipment checklist • Foot travel with chainsaw • Starting procedure • Thumb placement • Use of chain brake • Body position and footing • Awareness of the tip of the bar • General safe handling • Other (list in the space below)

	TREE #1	TREE #2	TREE #3	TREE #4
LIMBING				
Size up / hazard analysis (see page #11)				
Methodical approach / limbing sequence				
Limb/spring pole tension / compression analysis				
Throwing and/or binding of chain				
Use of swamper				
Avoids kickback				
Chainsaw use and general safety (see page #11)				
BUCKING (List log diameters to the right)				
Size up / hazard analysis (see page #11)				
Swamps out work area				
Methodical approach / bucking sequence				
Top bind/bottom bind / compression analysis				
Use of wedges / pie cut				
Pinching bar				
Kerf observation				
Use of swamper				
Avoids kickback				
Chainsaw use and general safety (see page #11)				
FALLING (Fill-in stump sketches for tree specifications)				
Size up / hazard analysis (see page #11)				
Work area preparation				
Escape route(s) preparation				
Use of swamper / communication procedures				
Level cuts				
Matching cuts				
Use of gunning sites				
Presence of dutchman				
Topping off saw as necessary				
Use of wedges				
Warning shout				
Keeps eye on tree and shutting off saw as it's falling				
Dealing with a hang up (if necessary)				
Holding wood				
Direction of the fall in relation to desired lay				
Avoids kickback				
Chainsaw use and general safety (see page #11)				

FIRELINE CONSTRUCTION (optional)	**SCORE**
Fireline safety – situation awareness, LCES, etc.	
Teamwork with swamper/communication	
Coordination with other saw teams	
Progressive versus leap frog line construction	
Throwing chains	
Physical fitness	
Avoids kickback	
Chainsaw use and general safety (see page #11)	

INSTRUCTOR'S STUMP ANALYSIS SKETCHES

 Tree #1	 Tree #2	 Tree #3	 Tree #4
Height: _____	Height: _____	Height: _____	Height: _____
DBH: _____	DBH: _____	DBH: _____	DBH: _____
Species: _____	Species: _____	Species: _____	Species: _____
% slope: _____	% slope: _____	% slope: _____	% slope: _____
Condition: _____	Condition: _____	Condition: _____	Condition: _____
Feet from center of the lay: _____	Feet from center of the lay: _____	Feet from center of the lay: _____	Feet from center of the lay: _____

COMMENTS: Include description of the tree, candidate's attitude, technical and verbal skills, etc. (use additional sheets if necessary)

_____

_____

_____

_____

_____

RECOMMENDED SKILL LEVEL (circle one) Class A B C

(circle one) Fully qualified Trainee

Instructor: _____ _____ _____

Name Title Signature

Candidate's signature: _____ Reviewer's signature: _____
(if necessary)

Date: _____

Division of Fire & Visitor Management

FY 2002 Safety Plan

The following systems designed to reach our goal of zero preventable accidents in the Division of Fire & Visitor Management will be fully implemented no later than April 29, 2002.

Performance standards: performance standards for every permanent position assigned to the Division will include a safety element. All performance appraisals will include a discussion of employee safety.

Accident reporting: all accidents will be reported in person or in writing to the District Ranger, Program Manager, or duty officer on the same day the accident occurs. The Chief Ranger, or acting Chief Ranger, will be notified in writing within 24 hours. The SEKI-134 (available on x/SEKI/FORMS/Seki-134) will be submitted to the Safety Office, with a copy to the CRO, within 7 days of the date of incident. The CA-1 will be submitted to Personnel within 7 days.

Job Hazard Analysis: job hazard analyses (JHA) will be developed for all tasks specific to wildland fire operations and backcountry ranger positions. The development of JHA's for all tasks associated with the Division will be an on-going process, and will be incorporated into Ranger Operating Procedures as appropriate.

Accident review: all accidents, **and all significant near-misses**, will be reviewed regardless of lost time and/or property damage amounts. The objective of the review will be to determine the root or underlying cause of the accident so that future occurrences can be prevented. The accident review process for the Division is as follows:

1. District Ranger or Program Manager arranges for an accident review to be chaired by another member of the Division senior management team. The senior management team includes the District Rangers, Fire Management Officer, Law Enforcement Branch Chief, Wilderness Coordinator and the Special Agent. The review team will include at least one subject matter expert. Interviews will be conducted of at least the employee and the employee's direct supervisor, and others as deemed appropriate.
2. The Accident Review Team will provide the District Ranger/Program Manager within with a written description of what happened and other findings within 14 days of the date of the incident.
3. The District Ranger/Program Manager will implement any needed improvements immediately. All accident reviews will be discussed on a monthly basis by the senior management team in order to understand the broader implication of

lessons learned for the entire Division.

The Division will report 100% of all accidents with potential for medical treatment. Supervisors will be held accountable for ensuring this is done.

Monthly Safety Meetings: will be conducted by the Chief Ranger. Weekly tailgate sessions will be led by District Rangers and the Fire Management Officer with documentation to the Superintendent's Office.

Perform Division level Management Walk-arounds: will be conducted on a monthly basis. Copies of reports will be provided to the Chief Ranger and Superintendent. Subsequent walk-arounds will indicate progress on problem areas. The objective of the management walk-arounds is to prevent accidents before they occur.

NATIONAL SNAG HAZARD REPORT

INTRODUCTION

Falling snags and green trees kill and injure more wildland firefighters each year. Nineteen have been killed since 1959, fifteen of those since 1985! The seriousness of this situation, in combination with changes in work force diversity and the increasing complexity of fire suppression goals suggest that we are in a new era of fire management; one in which our success is dependent on communication and cooperation rather than technological advances.

In the spring of 1993, the Safety and Health Working Team (SHWT) formed a special, ten-person, ad hoc task group to review and analyze snag accidents and fatalities and make recommendations. The National Snag Hazard Review Task Group (Task Group) is comprised of representatives from firefighters, crew boss, and national fire management levels. It also includes a Behavioral Scientist from the University of Montana. The chairman of the group is Jerry Schmidt, Forest Supervisor of the Routt and Medicine Bow National Forests. A complete list of the group members appears in Appendix A, p. A-1.

During the initial review of fire suppression history (in particular, accidents and fatalities), the Task Group identified several areas of concern. A preliminary report listing the topics of concern was sent to the National Wildfire Coordinating Group (NWCG) and all cooperating agencies last summer. The document is the Task Group's final report. It contains a number of proposals and actions that should be taken to reverse the trend we are experiencing with snag and hazard tree accidents incurred during wildfire and prescribed burning activities. I recommend that you review this information, and that we adopt the actions and proposals outlined here!

The information in this report resulted from the Task Group's review of 14 fatal and/or debilitating snag accidents which have occurred during the past six years. In addition, the group interviewed a cross-section of 100 fire suppression personnel about the safety standards, guidelines, training, and tactics currently in use. The Task Group has drawn conclusions and proposed actions to be taken to improve firefighter safety relative to snag hazards. The proposals focus on two areas: snag hazard awareness and fire crew/team cohesion.

FINDINGS

The Task Group extracted the following facts and professional perceptions from accident investigations, from numerous interviews with experienced leaders in fire suppression, and from discussions with Dr. Jon Driessen, Department of Sociology, University of Montana, Missoula:

There is a lack of hazard awareness at all levels in fire management.

More "snag hazard intelligence" is needed (i.e.: burn-through time by species and size class; the effect of slope, weather, and tree species on snag occurrences; etc.).

Management policies for snag retention, economic/safety trade offs, and strategy/tactical alternatives need to be clearly communicated and understood.

Fire crew capabilities are overrated at both crew and overhead levels. At the crew level, the crew boss often does not fully understand the level of cohesion, communication, alertness, and outdoor intuition among crew members and manage accordingly. At the overhead level, the Strike Team Leader or other crew supervisors in Operations often do not realistically evaluate crew capabilities when deploying fire crews.

There is a tendency for firefighters to become desensitized to hazards. Fatigue, boredom, and familiarity with an area can result in a fatal lack of attention to surrounding hazards.

Many of the basic rules and principles covered in training are not being applied during fire suppression maneuvers.

PROPOSALS AND ACTIONS

"Continuing Improvement Processes" and "Total Quality Management" concepts have been used to facilitate the learning process in fire management and suppression for years. They should continue to be used in conjunction with the actions, initiatives, and hazard awareness systems currently in use in various agencies across the country.

The Task Group developed the following proposals and actions designed to improve fire management at all levels and to focus attention on snag and tree hazards:

PROPOSALS FOR STRENGTHENING AWARENESS IN THE FIELD

PROPOSALS FOR ADDITIONAL TRAINING TO STRENGTHEN AWARENESS AND SAFETY

PUBLICATION OF AN AWARENESS FLYER FOR IMMEDIATE IMPACT

REQUEST FOR INCREASED RESEARCH EMPHASIS ON SNAG AND TREE HAZARDS AND ONGOING STUDIES OF CREW DYNAMICS

PRODUCTION OF AN INTER-AGENCY VIDEO FOCUSING ON SNAG AWARENESS AND SAFETY

The five proposals/actions are discussed in greater detail in the following sections. Four of the proposals include extensive lists of recommendations or information. These are listed in Appendices B-E.

I. PROPOSALS FOR Strengthening AWARENESS IN THE FIELD

Many crew members and supervisors lack necessary awareness and understanding in two critical areas: crew dynamics and snag hazards. The extent of communication, teamwork, and outdoor acumen within crews is overestimated; hazards are often underestimated. Individuals involved in fire suppression need to have a stronger awareness of snag hazards and a realistic sense of a crew's ability to function as a team.

The Task Group is recommending a very visual campaign to address snag hazard awareness, as well as advocating additions to the existing fire suppression literature. Numerous actions and effort are being employed locally, by all agencies, to ensure awareness of snag hazards. Building on some of these, the committee recommends the following actions to increase awareness:

CHOOSE A SLOGAN (this could be done with a national contest):
- S N A G S - Stop, Notice, And Go Safely
- SNAG SMART - GET SOME
- LOOK UP AND LIVE

ENCOURAGE LOCAL EFFORTS to develop snag hazard awareness projects. Institutionalize successful efforts.

CREATE POSTERS. One poster will feature the chosen slogan. The other poster, as part of the NWCG educational series, will focus on SNAG INTELLIGENCE. It will depict various tree species and list the species characteristics and associated disease/ infestation indicators that point to the presence of snags.

PRODUCE "SNAG AREA"- SIGNS to be posted by Safety Officers and others at appropriate spots on fires. The signs will be distributed to all fire caches and included in Safety Officer cache lists.

INCLUDE A 19TH SITUATION THAT SHOUTS "WATCH OUT"- Snag and hazard trees are present.

PUBUSH A SNAG HAZARD BOOKLET (pocket-size for field use) containing the snag hazard slogan, standard firefighting orders, snag mitigation measures, and the 18 or 19 Situations That Shout "Watch Out".

ADD A LIST OF SNAG INDICATORS AND SNAG MITIGATION MEASURES to the fireline handbook (see complete list in Appendix B, p. B-1).
DEVELOP A SNAG HAZARD ALERT CHECKLIST to be printed on cards (see Appendix B, p. B-2 for a list of recommendations).

CREATE A SNAG HAZARD MAP SYMBOL to be used on shift plans and in the field for hazards that are not immediately apparent.

11. PROPOSALS FOR ADDITIONAL TRAINING TO STRENGTHEN AWARENESS AND SAFETY

These proposals are designed to increase the emphasis on snag hazards at every level of fire training, from basic firefighting to fire supervision and management. The proposals also focus on recognizing and improving teamwork skills within the fire crews. Basic and intermediate fire training courses need to emphases situations that affect supervision and crew performance: crew diversity and complexity, varying levels of outdoor expertise among crew members, and the disparity between the time required to develop solid teamwork and the time available for training and the development of crew synergy. Fire suppression training at basic and managerial levels should emphases the dynamics of working with heterogeneous crews and overhead teams assembled from interagency representatives. The three courses to be targeted are S-130/S-190 Introduction to Firefighting/Basic Fire Behavior, S-201 Fire Supervision (SRIC), and S-301 Dynamic Unit Leadership (Div. Sup.). There are also specific proposals for Fire Suppression Tactics training to replace S 336 which is being phased out. Specific recommendations for each course are listed in Appendix C.

Ill. PUBLICATION OF THE AWARENESS FLYER FOR IMMEDIATE IMPACT

Modifications to the fire suppression literature and training schedules will take time. An approach that can, and is, being implemented immediately is the publication of the Awareness Flyer. It includes six rules to remember emphasizing communication skills, snag intelligence, standard firefighting orders, etc. It also lists snag-related fatalities from 1986 to 1992 (see Appendix D for the complete flyer).

IV. REQUEST FOR INCREASED RESEARCH EMPHASIS ON SNAG AND TREE HAZARDS AND ONGOING STUDIES OF CREW DYNAMICS

These two proposals focus research attention on snag and tree hazards and crew dynamics. The purpose of Proposal #1 is to expand knowledge and snag intelligence, to improve risk assessment and recommendation, and to recognize all fire suppression options while continuing current policies for snag maintenance and retention.

Proposal #2 focuses on crew dynamics. The proposal advocates studying and monitoring the techniques used by cohesive crews as they encounter and deal with snag and tree hazards.

Research Proposal #1

A. Situation:

Falling snags and hazard trees are the second leading cause of fatalities and serious injury during wildland firefighting operations. Fourteen fatalities and/or debilitating accidents have occurred on wildfires in the United States during the

past six years. Countless close calls go unreported. Most accidents occur when firefighters and fire mangers do not recognize potentially dangerous situations Fire managers do not have any decision aids to evaluate the hazard associated with firefighter assignment in specific stands and under specific environmental conditions.

B. Objectives:

Snag and tree hazard research efforts need to focus on the environmental and wildfire factors and the wood properties that contribute to the creation of snags. Research results would be used to to develop a risk assessment guide for incident managers to enable them to make informed decisions when staffing fires or portions of fires. The research would also provide firefighters and line supervisors with a guide for identifying specific stand conditions that are highly correlated to the presence of snags and hazard trees.

C. Scope:

The snag and tree hazard research project would consider all timber stand conditions during wildfire situations. The products developed (a risk assessment guide, snag intelligence information, etc.) would be beneficial to all agencies involved in wildfire suppression activities. Although the primary focus is wildfire operations, managers of prescribed fires could utilize the information in project planning.

D. Discussion:

Incident Managers would have numerous uses for a risk assessment guide. The guide could be utilized at the onset of the incident to evaluate snag safety for each strategy being considered. This might alleviate the selection and implementation of dangerous suppression alternatives. The Guide would also serve as a supplement to the proposed snag hazard alert checklist. The guide should require only variables that are easily gathered or assessed by firefighting personnel. In addition, the visual indicators of stand condition that are highly correlated to the presence of snags could easily be incorporated into firefighter training or developed into a supplement to the fireline handbook. Firefighters would then be able to assess on-site conditions and adjust fireline locations to provide a safe work environment.

Research Proposal #2

A. Situation:

The structure of fire crews and overhead teams has changed significantly in the past several years. In the past, crews and teams were fairly homogeneous and consisted of representatives from within one agency. Today, crews and teams are extremely diverse and are comprised of representatives from a broad spectrum of agencies. Generally, the available training time does not allow these diverse crews to develop a high degree of communication and cohesiveness. As a result, crew and team capabilities are often overestimated and misunderstandings are common. Driessen has found an inverse correlation between crew cohesiveness and accident rates in fire crews.

B. Objectives:

Studies need to be initiated and continued to define and monitor the methods used by cohesive crews when coping with snags and other hazardous situations. This information then needs to be disseminated to leaders and members of newly organized crews, and included into supervisory training courses. Recommendations should also focus on methods for decreasing the time necessary to achieve crew cohesiveness.

C. Scope:

Studies of crew dynamics would consider the social and institutional diversity and levels of outdoor experience and common sense encountered during fire suppression operations, as well as the time requirements for the development of cohesive crews.

The results should be disseminated to ail levels during pre-fire training and, where applicable, in fire operation briefings.

D. Discussion:

All people being trained for or involved in fire suppression would benefit from the study of cohesive crew interaction, crew coordination techniques, and the methodology used by cohesive crews and teams when coping with snag and tree hazards. Fire organizations, at all levels, would benefit from increased awareness and improved communication skills. Video portrayals, classroom presentations and role-reversal techniques could be used to teach these concepts.

V. PRODUCTION OF AN INNER-AGENCY VIDEO PROMOTING SNAG AWARENESS AND SAFETY

The production of this video is currently underway. It is intended to strengthen awareness, intuition, and discipline. After viewing this video, the audience will understand and appreciate the safety hazard posed by snags and be able to recognize the conditions under which snags are likely to occur. In addition, the audience will be able to list appropriate ways to identify, evaluate, and eliminate snag hazards after viewing the video (see Appendix E for a detailed description of the video schedule).

APPENDIX A - MEMBERS OF THE NATIONAL SNAG HAZARD REVIEW TASK GROUP

Jerry Schmidt, Forest Supervisor, Routt and Medicine Bow National Forests

Dave Dallison, Resource Staff Officer, Routt National Forest, Yampa District

Tom Zimmerman, Fire and Training Staff Group, National Park Service, Washington Office

Jon Driessen, Professor of Sociology, University of Montana - Missoula and Missoula Technology and Development Center(MTDC)

Kelly Esterbrook, IHC Foreman and Smokejumper, Dechutes National Forest

Buck Latapie, Group Leader for Fire Training and Safety, Forest SeNice, Region 6

Don Black, Fire Management Officer, Boise National Forest, Cascade District

Mary Kwart, Fuels Specialist, Sierra National Forest, Minarets District

Jerry Jefferies, Fire and Safety Group member, Forest Service, Region 1

Dave Aldrich, Leader for Fire Safety and Training, Forest Service, Washington Office

APPENDIX B -LIST OF RECOMMENDED ADDITIONS TO THE FIRELINE HANDBOOK

Indicators of Hazard trees/Hazard tree Zones

Fire burning in the base or top of a dead or live tree that may indicate the presence of rot which results in a weakened tree.

Tree species present in the work area that are susceptible to heart rot (such as fire), root rot, and shallow roots.

The presence of conks, broken tops, basal scars, cat faces, numerous down limbs, etc. that may indicate rot.

Trees with significant lean.

Numerous down trees and/or stump holes burning in an area that may indicate a pocket of trees with root rot.

Snag Hazard Mitigation Measures

Scout for hazard trees and post warning signs.

Post lookouts in areas of known or potential snag hazards.

Communicate presence of snag hazards and tactics for removal/avoidance to each crew member.

Make each crew member responsible for speaking out and adjusting tactics whom confronted by hazards.

Use snag intelligence when evaluating a fire and developing taics.

Employ tactics to avoid snag hazards or minimize exposure to snags.

Plan and discuss multiple escape routes and safety zones, considering vegetation and terrain.

Use field training to brief personnel on the visible indicators of snag hazards.

Choose rest locations where exposure to snag hazards is minimized, such as open areas or rock outcroppings.

When escaping the path on a falling tree, watch the tree while moving out of the way. Be aware of any deviation in its fall or roll caused by contact, breakage, etc.

APPENDIX C - SUGGESTIONS FOR A SNAG HAZARD ALERT CHECKLIST

Snags are falling or have fallen in work areas.

Hazard tree indicators are present in work areas.

High risk tree species are present in work areas.

Crews are working in a hazard tree area at night.

Crews are working in a hazard tree area, and the wind is blowing.

Crews are working in an area where trees have been burning for some time.

The operational period or functional briefing did not include a discussion of hazards.

Crew members are taking a break in a hazard tree area.

Lookouts have not been posted in a hazard tree area.

Lookouts are not advising the crew of the presence of hazard trees.

Winds are increasing or are predicted to increase.

Tree height within fire perimeter equals or exceeds distance to control line.

Escape routes pass through hazard tree area.

APPENDIX D - SUGGESTED COURSE INCLUSIONS FOR S-130/S-190 INTRODUCTION TO FIREFIGHTING/ BASIC FIRE BEHAVIOR

Establish a snag hazard awareness protocol for the crew to follow during incidents. The protocol should include the following steps:

Identify the snag hazard.

Avoid the hazard.

Communicate with the supervisor (squad boss or crew boss) and crew members about the hazard. Express safety concerns.

Mitigate the hazard with steps agreed to by supervisor. This would include flagging the hazard, posting a lookout, choosing to work away from hazard, planning escape routes, etc.

Have crew members yell "Snag!"- or "Snag Patch!"- as they walk by snags on line, just as they do for "Rock!" or "Watch your footing!".

Have crew members report close encounters with snags. If it is important, it is worth repeating.

Show the Snag Hazard Awareness video.

Change the Instructor's script in the basic firefighter training manuals:

Incorporate snag hazard awareness into discussions of 10 standard firefighting orders. In particular, elaborate on the order to establish lookouts. Include snag and tree hazard examples, as well as the usual fire behavior examples.

Incorporate snag hazard awareness into discussions of the 18 Watch Out Situations, particularly in the following situations:

#2. Crew members are working in an area they have not seen in daylight.

#3. Safety zones and escape routes have not been identified.

#5. Crew members have not been informed about strategy, tactics, and hazards.

#7. There is no means of communications between crew members and/or supervisors.

Provide blank lines on the back of the "18 or 19 Situations That Shout Watch Out-cards for incident-specific Watch Out situations.

Develop a booklet modeled after "Common Denominators of Fatality Fires" to be distributed at S-130/S-190. The booklet will contain common denominators of snag fatalities and near misses distilled from the snag accident reports.

APPENDIX D - SUGGESTED COURSE INCLUSIONS FOR S-201 FIRE SUPERVISION (SRIC)

Reduce the time necessary to establish crew cohesion by using team-building exercises, videos, and games and by having crew shirts and hats.

Have supervisors de-emphasize harmful attitudes that may lead to unsafe situations. Give all crew members permission to express their concerns about safety without fear of ridicule or reprisal.

Emphasize the dangers of complacency as well as over confidence. Incorporate snag hazard issues in routine job hazard analysis, if applicable.

Use the buddy system (experienced crew members paired with inexperienced members) to enhance crew cohesion.

Make safety a primary concern during every aspect of fire management and suppression.

Recognize that crew heterogeneity (diverse background, experiences, and perspectives) necessitates a more complex, flexible supervisory approach.

Recognize that misconceptions and lack of experience can occur at any level in fire management. Emphasize that this should not undermine confidence in leadership.

Develop and disperse personal descriptions of accidental deaths/injuries. Do a case study exercise from a supervision standpoint.

Emphasize that it is acceptable to question the planned or communicated use of unsafe tactics and to suggest alternatives.

Maintain communications about snag hazards with overhead as well as crews.

Assign an accountable, snag hazard awareness person on each crew. During breaks and down time, discuss the snag hazards already encountered.

Discuss potential snag hazards at crew briefings. The crew supervisor should request relevant local information (tree characteristics, presence of disease/infestation, etc.) during briefings with the Strike Team Leader.

Continuously monitor the presence of environmental hazards (including snags) and fire behavior related to the hazards. Convey this information to crew members during fire suppression maneuvers.

Develop tactics that limit the amount of time ground forces spend in snag "danger zones".

Realistically estimate the increased costs associated with utilizing tactics to avoid snag hazard areas.

Have Fire Behavior Officers develop a site-specific, snag hazard analysis based on fuel types, slope, aspect, and predicted fire behavior. For example, a fast moving grass fire on predominately northern slopes (higher fuel moisture content) with sparse timber would pose a low hazard to firefighters and would be a snag hazard "A". Dense timber stands with heavy ladder fuels on south slopes would pose a greater hazard and be classified as a snag hazard "D".

Have a qualified Strike Team Leader, Crew Leader, or Felling Boss evaluate burning snags that can't be felled to determine damage potential when they fall. If it appears that the snag will fall outside the established line. Firefighting resources should be prepared to pick up the slopover.

Identify snag areas in the Incident Action Plan. Include a specific message and map of the areas for firefighters in that division.

Conduct snag reconnaissance using air resources. Use the resultant information to determine snag hazard potential and line location.

Identify air attack retardant drops and helicopter bucket drops occurring in snag areas as a threat to firefighters.

Use Field Observers/Line Scouts to identify and flag snag areas for the Planning Section and for Ground Operations.

Evaluate the Field Observer's knowledge of snag hazards using a snag intelligence questionnaire.

Include signs or flagging with reflective lettering in the Field Observer/Line Scout package to warn crews of the presence of snags.

Restrict operations to daylight hours in areas with numerous snags.

Establish and maintain a close relationship between Operations and Safety.

APPENDIX D - SUGGESTED COURSE INCLUSIONS FOR FIRE SUPPRESSION TACTICS

Modify course curriculum to include a snag hazard identification section focusing on indicators of hazard trees/hazard tree zones, "Watch out" situations associated with snag hazards, and mitigation measures for working in snag hazard areas. Make this required training for all single resource Incident Commanders.

Integrate the following ideas into the instructor's guide:

Avoid creating or leaving hazardous trees and snags during/after dozer line construction.

Avoid the snag hazard resulting from air tanker retardant drops and helicopter bucket drops.

Locate the fireline outside the falling radius of the largest snag (use a distance greater than or equal to the snag height x 1.5).

Modify line location principles/techniques to avoid snag patches which could result in larger acreage or more expensive operations. Firelines should be located a distance greater than or equal to the snag height x 2 from the snag.

Emphasize that areas with crown fires may SOMETIMES be safer because much of the rotten material may have been consumed initially by the intense fire. THIS COULD BE RISKY AND SHOULD BE EVALUATED CAREFULLY.

Consider letting natural burn-out occur in snag hazard areas, rather than deploying crews to mop-up.

Consider blasting instead of felling trees. Use qualified people.

Use Field Observers and others to do reconnaissance and identify snag hazard areas.

Have the Strike Team Leader, Crew Leader, and/or Felling Boss determine the damage potential of burning snags which can't be felled. The assessment should include the following:

What portion of the line will the snag fall across?

Will the snag fall outside the fireline?

What is the extent of the impacted area the snag falls outside the line?

If a snag is likely to fall across the line, limit mop-up in the area until the snag falls.

After assessing the damage potential of the burning snag, consider the following steps:

Assign a snag lookout to monitor the burning snag during day and night shifts. The lookout will be responsible for informing all Firefighters in the area of the snag's location and potential.

Flag the danger zone; do not allow firefighters to enter the zone for any reason.

Establish alternate routes around hazard areas.

Identify snag areas in the Incident Action Plan. Include a specific message and map of the areas for the firefighters in that Division.

If it appears that snags will fall outside the established line, have personnel and resources reroute the line to secure the area.

Conduct snag reconnaissance using air resources. Use the information to determine line location and pinpoint snag hazard areas to be ground-checked.

Emphasize communication from ground troops to overhead to command, including cooperators and contractors.

Remember that green trees, as well as dead and dying trees, may be a hazard.

Consider having no night shift. If a night shift is unavoidable, make certain crews are well briefed on hazards and tactics. For example, avoid snag hazard areas pinpointed during the day or make it a priority to fell hazard trees during the day

Maintain accountability during the on-going formulation of fire tactics. Reinforce that awareness is critical at every level in fire suppression.

APPENDIX E - THE AWARENESS FLYER

EARLY ALERT
SNAG HAZARDS

FALLING SNAGS AND GREEN TREES KILL AND INJURE MORE WILDLAND FIREFIGHTERS EACH YEAR
19 HAVE BEEN KILLED SINCE 1959, 15 OF THOSE SINCE 1985!
RULES TO REMEMBER

* 1. Help maintain snag hazard awareness at all times for all firefighters.

* 2. Emphasize 10 standard fire fighting orders, and 18 situations that shout "watch out".

* 3. Include "SNAG INTELLIGENCE" in all fire suppression discussions and briefings. I.E. expected burn through time, location and marking, acres of snags, additional hazard due to slope, etc.

* 4. Strengthen Leadership communication skills for dealing with diverse organizations and crews.

* 5. Be aware of COMPLACENCY on fires of all sizes during all phases. Particularly during non-threatening and un-eventful periods.

* 6. Direct and train all firefighters to do their own safety assessments, and encourage all to interact with their supervisors to insure better safely.

Snag Related Incidents
1986-1992

* 8/18/86 A male firefighter working on the Ace Creek fire in northeast Washington was struck by a 132 foot "green" White Pine with heart rot, as his crew walked up the fire line.

* 7/17/87 An experienced male faller working on the 400 acre Reynolds fire was killed by a falling snag. The faller was clearing fireline and was aware of the hazardous snags in the area.

* 10/1 1/88 A male firefighter was killed on the Clover Mist fire by a falling snag that hit him on the head while watching a helicopter bucket drop on a hot spot in burned-over Lodgepole Pine.

* 8/13/90 A male CDF firefighter working on a hose lay on the Recer fire was killed by a 20-30 foot falling snag. The hoselay being made to control a spot fire in medium to heavy timber understory.

* 8/18/91 A second year male firefighter was struck and killed by a 6" diameter falling snag while taking a rest break on the fireline at night. The two person crew was taking initial attack action on the 70'X70' Vaughn Lake fire, in dense spruce with the presence of heavy downfall, and standing snags. There was no wind or fire above the ground in the snag that fell.

7/30/92 A female engine crew member was killed by a falling snag while establishing a pump and hoselay at the base of the, fire perimeter on the Silver Creek Fire. The fire was 4 acres in heavy logging slash within a 6 acre clearcut.

8/31/92 A male firefighter with the Oregon Dept. of Forestry working on the Pryor fire, Was killed by a 7" diameter snag which had been growing out of the base much larger Douglas Fir

In nearly every case victims were aware of the presence of snags and had warning shouted during the event, but did not hear the warning or were unable to to get out of the way in time.

APPENDIX F - SNAG AWARENESS VIDEO PLANNING, PRODUCTION, POST PRODUCTION PROCESSES

PHASE- 1 PRODUCTION PROCESS - PLANNING PHASE

1. Project Analysis And Determination Of The Apparent Need To Use Video (by Project Team and Video Production Officer) by 11/22/93 DONE -

   The NWCG SHWT has determined a need based on their on-going work in developing a snag hazard awareness program. A video contributing to this purpose is also a positive requirement of the Silver Creek fatality accident investigation.

2. Audience Analysis (by Project Team) by 11/22/93 DONE

   Target audience is all active wildland firefighters, including Incident Command teams.

3. Develop Objectives (by Project Team) by 11/22/93 DONE

4. Determine Constraints of Budget; Schedule Personnel (by Project Team and Video Production Officer) by 11/22/93 DONE -

   Budget:

   Total Project Budget $15,000:

   Phase 1 - Planning $6,000
   Phase 2 - Production $5,000
   Phase 3 - Post-Production $4,000

   Personnel:

   Personnel assignments between 11/22/93 and 2/20/94 are;

   Jody Howard, Video Production Specialist
   (funded,by project): as needed

   Frank Carroll, Video Production Officer
   (funded by home unit): 6 days

   Don Black, NWCG HSWT Snag Hazard Task Force Project Team Leader
   (funded by home unit): 10 days

   Steve Raddatz. Project Team
   (funded by home unit): 6 days

   Jack Gollaher, Project Team
   (funded by home unit): - 6 days

   Andi Kleinman. contractor; storyboard support
   (funded by project): 5 days

Identification Of Subject Matter Experts For Review
(by Project Team and NIFC Division of Training)
by 1/14/94

|

Development Of Sequence And Structure Of Learning, And Storyboard
(by Subject Matter Experts, Project Team, and Video Specialist)
by 2/20/94

|

First Review Of Budget And Schedule Status, Personnel Availability,
and Storyboard, WITH APPROVALS
(by Project Team, Video Production Officer, and NWCG-TWT)
by 5/15/94

|

END PRODUCTS OF PLANNING PHASE BY 5/15/94

|

Target Audience Identified
Program Objectives Identified
Sequence and Structure of Learning Identified
Storyboard Approved

SNAG AWARENESS VIDEO PRODUCTION
PLANNING, PRODUCTION, POST-PRODUCTION PROCESSES

PHASE 2 PRODUCTION PROCESS - PRODUCTION PHASE

Project Assignments made to Subject Matter Experts and Video Specialist
(by Project Team Leader and Video Production Officer)
by 3/31/94

Screening of Existing Visuals (by SMEs and Video Specialist) by 3/31/94

Audio Needs Identified (by Video Specialist) by 3/31/94

Narration Music, Sound Effects Chosen (by Project Team, Video Specialist, SMEs) by 7/29/94

Procurement of Needed Audio Components and Licenses (by Contracting Office) by 8/26/94

Video Shooting Plan Developed (by Video Specialist) by 3/31/94

Production Unit Video Log (by Video Specialist) by 8/26/94

Graphics Needs Ident. (by Video Specialist) by 3/31/94

Production Unit Graphics Created (by Video Specialist) by 7/29/94

Production Unit Narration
Production Unit Music
Production Unit Sound Effects (by Video Specialist) (by 9/15/94)

END PRODUCTS OF PRODUCTION PHASE BY 9/15/94
All Production Units Completed

SNAG AWARENESS VIDEO PRODUCTION
PLANNING, PRODUCTION, POST-PRODUCTION PROCESSES

PHASE 3 PRODUCTION PROCESS - POST-PRODUCTION PHASE

First Draft Of Production Compiled
(by Video Editor)
by 9/30/94

First Draft Reviewed
(by Subject Matter Experts, Production Officer, NWCG-TWT, and Standards Office)
by 11/1/94

Final Edit Completed
(by Video Editor)
12/1/94

Master Tape Reviewed
(by Project Team, Standards Office, and NWCG-TWT)
by selected meeting date, 12/94 or 1/95

Production Approved for Certification
(by NWCG-TWT)

Production Duplicated And Distributed
(by NWCG Publications Management System)
3/95

END PRODUCT OF POST-PRODUCTION PHASE BY 3/95

Video Tape is Available for National Distribution and Use Through NWCG-PMS

SNAG AWARENESS VIDEO PRODUCTION
PLANNING, PRODUCTION, POST PRODUCTION PROCESSES

IDENTIFICATION OF RESPONSIBLE PARTIES

PROJECT TEAM:

NWCG-SHWT Snag Hazard Awareness Task Force
Don Black; Task Force Member; Project Team Leader

Boise National Forest Public Affairs Office
Frank Carroll; Public Affairs Officer

Boise National Forest Fire and Aviation Management
Steve Raddatz; Assistant Fire Staff - Suppression

VIDEO PRODUCTION OFFICER:

Frank Carroll; Public Affairs Officer, Boise NF

VIDEO PRODUCTION SPECIALIST / VIDEO EDITOR:
Jody Howard; Videographer / PAO, Boise NF

APPENDIX 13

SEKI Death Investigation

Code SEKI

UNITED STATES DEPARTMENT OF INTERIOR
NATIONAL PARK SERVICE
INCIDENT RECORD
SEQUOIA & KINGS CANYON NATIONAL PARKS

Incident Number	Incident Date	Incident time	Report date used as incident date?
SEKI0400000784	October 2, 2004	1246 Hrs	No

Clearance	Cleared Exceptionally	Exceptional Clearance Date
Closed (All Other Reasons)	Not Applicable/Not Cleared Exceptionally	

Primary Agency: **NPS**

Reporting Officer ID: **01233**

Primary Location: **GG/GG SUBDISTRIC**

Offense/Incident Code and Description	A/C	Location Code and Type
86-00-00 DEATHS-ACCIDENTAL	Completed	5000 N/A
91-00-10 INJURY/ILLNESS		5000

Type Of Hate Crime Bias? **N/A**

Method Of Entry (If Burglary)? **N/A**

Number of Premises entered if location is a hotel/motel/lodging: **N/A**

Type of Criminal Activity: **N/A**

Type of Weapon/Force Involved

Type Code	Quantity	
N/A	N/A	N/A
N/A	N/A	
N/A	N/A	

Witness

Name	Date of Birth	Phone Business

Address	City	State	Zipcode	Phone Residence

Name of Investigator Notified	Date	Time

Reporting Officer's Name
DEBBIE BRENCHLEY

Supervisor's Name (Please Print)
GREGG FAUTH

Reporting Officer's Signature	Date	Supervisor's Signature	Date
Debbie Brenchley	10/26/04	Gregg Fauth	11/02/04

Appendix 13-1

> > > > E M S I N F O R M A T I O N < < < <

EMS 001
Name: HOLMES, DANIEL PAUL
EMS Save: No
EMS Intervention in a Fatality: Yes
Non-Traumatic Fatality (medical): No Traumatic Fatality: Yes
Level of Care: Advanced (Non-cardiac)
Method of Victim Transport: Aircraft

! ! ! ! ! E N D O F R E P O R T ! ! ! ! !

UNITED STATES DEPARTMENT OF THE INTERIOR	FORM 10-344
NATIONAL PARK SERVICE	CI# 04-0784
SUPPLEMENTAL INCIDENT RECORD	SEKI NP

Case Incident # 04-0784

SUMMARY:
Daniel Paul HOLMES was working on the Grant West Prescribed Fire when the top of a burning snag fell and struck him. Emergency Medical Technicians provided immediate medical attention and evacuation. HOLMES went into cardiac arrest during the evacuation. Resuscitation efforts were unsuccessful. HOLMES died of severe head trauma and a hemothorax.

DATE AND TIME OF DISPATCH: All times are Pacific Daylight Savings Time.
The accident occurred at 1246 hours.
Initial call to dispatch was 1248 hours.

SHERIFF/ CORONER NOTIFICATION:
Tulare County Coroner was notified. TCSO Case number: 04-15652
Deputy Travis Shaw arrived at 1715 hours.

SUBJECT INFORMATION:

Name: HOLMES, Daniel Paul

DOB: 01/16/1978 SSN: [redacted] OLN: [redacted]

Address: Present: [redacted]
Home: [redacted]
Parent's Home: [redacted]

Phone: SEKI- [redacted]
Home- [redacted]

Description:
- White Male
- 5' 09" tall
- 185 pounds
- Hair-Brown
- Eyes-Hazel
- Full Beard

Wearing:
- Hard hat
- Bandana on head
- Nomex fire shirt
- Dark blue cotton tee
- Nomex fire pants
- Leather gloves
- Watch
- Leather fire boots

NEXT OF KIN: The Mother was notified 10/02/2004 at approximately 2230 EDT hours by the Rochester Fire Chief and Rochester Police Department with a local Chaplain.

Reporting Officer's Name	ID	Supervisor's Name	ID
Debbie Brenchley	1233	Gregg Fauth, Acting Chief Ranger	
Reporting Officer's Signature	Date	Supervisor's Signature	Date
Debbie Brenchley	10/26/04	Gregg Fauth	11/02/04

UNITED STATES DEPARTMENT OF THE INTERIOR	FORM 10-344
NATIONAL PARK SERVICE	CI# 04-0784
SUPPLEMENTAL INCIDENT RECORD	SEKI NP

Name Delina Burke
Relationship Biological Mother
Address [redacted]
Telephone

Name Raymond Holmes
Relationship Biological Father
Address [redacted]
Telephone

ITEMS REMOVED:
No items were removed.

DISPOSITION OF DESEASED:
Released to Tulare County Coroner and Miller Memorial Chapel of Visalia

APPARENT CAUSE OF DEATH:
Massive head trauma: Basilar skull fracture and hemothorax

TIME OF DEATH: 1358 hours

BODY IDENTIFICATION: Arrowhead Superintendent Brit Rosso

EVIDENCE:
Digital photographs, Patient Care Report, video tape

WEATHER:
The general weather forecast was for mostly sunny in the morning becoming partly cloudy in the afternoon and clearing by night. The high temperature at the Grant Grove Ranger Station was 66 F and the low 46 F.

Weather information taken on site of the burn by Fire Monitor Rich RAGUSIN
1230 hours: Temp 65, RH 31%, winds 1 to 5 mph out of the southwest
1300 hours: Temp 66, RH 22%, winds 1 to 3 mph out of the southwest

SCENE INTEGRITY:
Emergency medical care was provided to HOLMES. He was moved from the accident site. The section of tree that struck HOLMES was moved away from him during EMS care and later burned to ashes. The area was secured with flagging tape by firefighters after the incident. Rangers John ANDERSON and Erin WARREM secured the site with police flagging at 1830 hours. A large section of the scene was within an actively burning area, so much of the scene was altered by fire.

ACCIDENT SCENE:
Grant Grove is in Kings Canyon National Park in California. The Grant West Omnibus Burn Unit is 436 acres in size, but was broken into smaller segments. Segment 1, known as Grant West I, is the largest segment at 271 acres. Grant West II is approximately 106 acres. Grant West III is approximately 59 acres.

Reporting Officer's Name	ID	Supervisor's Name	ID
Debbie Brenchley	1233	Gregg Fauth, Acting Chief Ranger	
Reporting Officer's Signature	**Date**	**Supervisor's Signature**	**Date**
Debbie Brenchley	10/22/04	Gregg Fauth	11/02/04

The Prescribed Fire Burn Plan had been approved. The Agency Administrator Go/No-Go Pre-Ignition Approval Form had been signed on September 27, 2004 with an expiration date of October 11, 2004.

On September 27, the Grant West III segment was burned. In the afternoon, a thunder cell settled over the Grant Grove area and winds increased. Embers from a burning snag in the prescribed fire were carried by the wind and started a fire 800 feet outside the burn area. Firefighters noticed the fire and were able to contain it at a half acre.

The accident site was within a 5 acre test burn for the Grant West I Burn Unit. This segment was larger than the Grant West III segment burned on September 27, so managers waited until October 2, 2004 for more available fire crews and the appropriate weather conditions. Prior to igniting the entire segment, a smaller test burn was ignited to check conditions. The test burn plot for the Grant West I Burn Unit was on the east side of the segment. Highway 180 was the east boundary. The hiking trail was the west boundary. The south boundary was near the old dump site. The north boundary was a cleared fireline.

The forest type is mixed conifers including White Fir, Ponderosa Pine, and Giant Sequoia with pockets of Manzanita and Chinquapin. There is a significant number of standing dead White Fir Trees in the Grant Grove area due to a Tussock Moth outbreak in the late 1990s.

The burn area was prepped in the weeks preceding. Boundaries of fire lines and trails were improved and snags were assessed and some dropped.

The Arrowhead Hotshot Crew was responsible for cutting down snags in the designated burn area prior to ignition. They had worked in the area a week or two prior to the burn operation. The specific snag involved in the accident had been assessed. The tree had good, tight bark indicating to the falling crews that it was less likely to be rotten. It was next to the cleared fire line, but in the middle of a larger burn unit. There was not a lot of fuel at the base of the tree, just pine needles and a few manzanita bushes. It was determined to be defendable, so a line was built around it to prevent fire from reaching the base of the tree.

The tree was near the northwest corner of the test burn segment at approximately 6,700 feet elevation. It was 12 feet south of the hand line. The tree was a White Fir, 115 feet tall. Circumference at 4' was 15' 5" with a diameter of 58". The original top of the tree had died and the top few feet did not have any bark. Some of the top most branches had grown upward. The tree was leaning to the northwest.

NARRATIVE:

Friday, October 1, 2004

Arrowhead had the day off. Don SHANNON saw HOLMES watching TV around 1400 hours. HOLMES said he might head to Fresno, but that it was kind of late to go to town. HOLMES left the Swale Work Center for a while, most likely to go up to Grant to make phone calls. HOLMES and SHANNON were the only two at dinner at Swale. HOLMES called his girlfriend, Julie SAUTTER at 1800 hours and talked for a few minutes. He called her again at 1900 hours and they talked for about an hour. That evening HOLMES, SHANNON and some other Arrowhead crewmembers watched TV and chatted.

Saturday, October 2, 2004

HOLMES ate breakfast with the crew and then prepared for working on the fire. At 0900 hours he attended a briefing with all the firefighters working that day. The briefing covered plans for the day, safety concerns and assignments. The hazards of snags were addressed in the briefing. A test burn to determine burning conditions was started at 1042 hours. During the fire HOLMES and Jake AKERBERG worked as a Saw Team cutting snags in an unburned section. By 1230 hours, they had already cut down a couple of trees with diameters of 42" and 50+". There was a snag they refused to cut down because they did not feel they could do it safely.

Reporting Officer's Name	ID	Supervisor's Name	ID
Debbie Brenchley	1233	Gregg Fauth, Acting Chief Ranger	
Reporting Officer's Signature	Date	Supervisor's Signature	Date
Debbie Brenchley	10/21/04	Gregg Fauth	11/02/04

David CABRIDO noticed there was a fire in the top of a snag causing smoke and reported it to Brit ROSSO, Arrowhead Superintendent. Fire in the top of the tree could throw burning material across the fire line and start spot fires out of the burn area. ROSSO assessed the problem and decided that the tree needed to be cut down. ROSSO told Mike RESSLER to bring in a falling team. The tree was large and hazardous, so a C Faller team was needed. AKERBERG and HOLMES were requested as the saw team. At the time they were sizing up another snag in the unburned section of the unit, but the tree with fire in it was a more immediate threat. It took them 10-15 minutes to hike up to the site. AKERBERG, HOLMES and Mark GERWE met with ROSSO and worked on assessing the tree. ROSSO assigned GERWE as the felling boss to oversee the operation of taking down the tree. RESSLER was assigned as the holding boss, responsible for making sure the fire stayed within the cleared fire lines. ROSSO and several command team personnel continued to work on the "Go/No Go" decision checklist to assess whether to proceed or cancel the burn.

AKERBERG was in a C Faller trainee position with GERWE as the qualified C Faller. HOLMES was the swamper, responsible for watching the tree during the falling operation, driving wedges during the cut and clearing debris as needed.

GERWE, AKERBERG, and HOLMES assessed the tree for the best direction to fall the tree. They initially wanted to fall the tree into the burned area of the fire. After a discussion which took 5-7 minutes and included ROSSO's input, they decided to drop the tree across the cleared fireline into the unburned area. This would take advantage of the natural lean of the tree, but would put fire across the line. There was a fire hose lying parallel to the fireline that would have to be moved before dropping the tree. To move the hose lay they needed a gated wye. Josh MILLER of Engine 51 was requested to get the needed equipment.

Both AKERBERG and HOLMES were wearing full PPE including helmet, nomex fire shirt, blue cotton tee shirts, nomex fire pants, leather fire boots, leather gloves, and Kevlar chaps. Neither had donned their hearing protection yet. Because of the danger the tree presented, only the assigned Saw Team was in the immediate area of the burning tree.

Accident: 1246 hours
While they were waiting for the equipment needed to move the hose lay, AKERBERG and HOLMES dropped their line gear (fire equipment packs) next to a tree at the junction of the fireline and the foot trail, so they would be lighter and less encumbered while working. They were walking down the fireline to help pull the hose out of the way. They were not engaged in felling the tree. At 1246 hours, other firefighters in the area saw the top of the tree break and fall. A number of people started yelling warnings to the Saw Team. AKERBERG and HOLMES were directly beneath the tree when this occurred. AKERBERG was 5 feet in front of HOLMES. Witnesses said HOLMES reacted immediately but was only able to take 2 to 3 steps before the section of the tree hit him.

The section of tree hit HOLMES on his helmet and slammed him face first into the ground. HOLMES ended up 12 feet north of the tree and laying on the fireline with his head to the north. The section of tree was on fire and was quickly moved away from HOLMES.

The size of the section of tree that fell was estimated from ashes on the ground to be 6' 08" long, 12-15" diameter at larger end and 6-8" diameter at the smaller end. It fell at least 100 feet from the top of the tree.

EMS / RESCUE EFFORTS:
AKERBERG was the first to reach HOLMES and rolled him onto his back using C-spine precautions to get his airway away from the ground. EMTs Pedro GUTIERREZ and Nick HRUBY, both on the Arrowhead crew, assisted with patient care. ROSSO directed the crew and immediately asked the Burn Boss to request an ambulance and a Parkmedic. At 1248 hours, David CABRIDO was sent to get the EMS line gear. Patrick

Reporting Officer's Name	ID	Supervisor's Name	ID
Debbie Brenchley	1233	Gregg Fauth, Acting Chief Ranger	
Reporting Officer's Signature	Date	Supervisor's Signature	Date
	10/26/04		11/03/04

MORGAN took notes. Patrick OWENS was assigned to take digital photos. Amy SKRABA was assigned to take video footage. RESSLER was assigned to watch the tree for any other hazards. Other firefighters were assigned to cool down the fire with the hose line and remove burning material from the area the EMTs were working in.

Initial assessment of HOLMES at 1249 hours: Pulse 70, respirations 5, Alert and Oriented x 0. HOLMES had a severe head injury with facial trauma. His pulse was weak and thready. He was unconscious and unresponsive to painful stimuli. There was blood and pink foam coming out of his mouth. He was also bleeding from his nose and from a laceration on his forehead. AKERBERG felt crepitus in HOLMES jaw indicating a fracture to the jaw. EMTs held HOLMES in c-spine and turned him onto his left side to help drain blood and fluid from his airway.

A life flight helicopter (Skylife) from Fresno was requested through dispatch at 1251 hours.

The request for an ambulance was relayed over the NPS radio. Maintenance worker Mike FAULKNER was near the ambulance bay and immediately started up the ambulance. Ranger/EMT Nate INOUYE responded to the call in his patrol vehicle. INOUYE saw FAULKNER driving the ambulance out of the bay and turned to drive directly to the scene.

INOUYE, the ambulance and the EMS line gear all arrived at the junction of Highway 180 and the handline at the same time. Duane FIELDS, Firestorm Superintendent, gave INOUYE his helmet. INOUYE and CABRIDO, with help from Bruce WILSON and Jake DAHL of the Firestorm crew, hiked in to the accident site with the EMS equipment.

The equipment and INOUYE arrived at the site at 1303 hours. HOLMES had not been moved and was still in the hazardous area under the snag. INOUYE directed the medical care and had EMTs place a c-collar on HOLMES then put him on a backboard. AKERBERG saw HOLMES' right eye open slightly and noticed the pupil was fixed, non-reactive to light, and looked dry. They quickly attached a few straps and then moved HOLMES to a safer location 60 feet away and out of the burn area (1307 hours).

HOLMES was securely strapped to the backboard as other EMTs suctioned his airway, inserted an oral airway, and gave oxygen via mask with reservoir at 15 liters per minute. HOLMES' respirations were undetectable, so a bag valve mask (BVM) attached to oxygen was used to assist with respirations.

HOLMES was carried on the backboard while one person continued ventilating with the BVM. His airway was suctioned at least 2 times while carrying him out. The last time they suctioned HOLMES' airway, his jaw, which had been clenched, was slack. HOLMES was loaded into the ambulance at 1317 hours. INOUYE and HRUBY were in the back of the ambulance with HOLMES.

At 1319 hours EMTs were unable to detect a pulse. CPR was started. A few minutes later (1322 hours), the ambulance arrived at the helicopter landing zone at McGee Overlook a quarter mile south of Cherry Gap. The Automated External Defibrillator (AED) pads were attached and the AED turned on. The AED indicated that no shock was advised and to continue CPR for 4 to 5 cycles. Later it indicated a shock was advised. The EMTs cleared from touching HOLMES and one shock was administered. There was still no pulse and EMTs continued with CPR.

At 1332 hours, the Skylife helicopter landed. Flight medics Cathy KONICKI and Jeff KOPINSKI continued resuscitation efforts including inserting an ET tube for airway, establishing an IV, administering drugs, and analyzing any heart activity with a monitor. There was no response from HOLMES. Efforts were terminated and the Skylife flight medics pronounced HOLMES dead at 1358 hours.

Reporting Officer's Name	ID	Supervisor's Name	ID
Debbie Brenchley	1233	Gregg Fauth, Acting Chief Ranger	
Reporting Officer's Signature	Date	Supervisor's Signature	Date
Deb Brenchley	11/26/04	Greg Fauth	11/02/04

UNITED STATES DEPARTMENT OF THE INTERIOR	FORM 10-344
NATIONAL PARK SERVICE	CI# 04-0784
SUPPLEMENTAL INCIDENT RECORD	SEKI NP

ILLNESS/INJURY: There was no report of any previous illness, medical problems, psychological problems or injuries that were related to the outcome of the incident.

ALCOHOL/DRUGS: There are no reports or indications of any alcohol or drug abuse.

MEDICAL/MENTAL HEALTH HISTORY:
HOLMES was healthy and fit. He had no recent illnesses or medical complaints. He was not seeing a doctor for any reason. HOLMES was happy and looking forward to seeing friends and family in November. He had a couple of trips planned for the winter.

CONCLUSION:
HOLMES death was accidental.

Reporting Officer's Name	ID	Supervisor's Name	ID
Debbie Brenchley	1233	Gregg Fauth, Acting Chief Ranger	
Reporting Officer's Signature	Date	Supervisor's Signature	Date
[signature]	12/20/04		

UNITED STATES DEPARTMENT OF THE INTERIOR	FORM 10-344
NATIONAL PARK SERVICE	CI# 04-0784
SUPPLEMENTAL INCIDENT RECORD	SEKI NP

CHRONOLOGY OF SUBJECT'S ACTIVITIES:

October 2, 2004

0800 Breakfast and chores at Swale Work Center
0900 Briefing prior to starting the Grant West Prescribed Fire at Grant Grove Fire Station
Moved to staging area
1042 Ignition started on the test burn
HOLMES and AKERBERG worked as Saw Team 1, dropping burning snags within the fire unit
Cabrido notices fire in the top of a snag near the northwest corner of the test burn
Saw Team 1 requested to remove burning snag
HOLMES, AKERBERG, and GERWE arrive at the site of the burning snag and begin size up
HOLMES and AKERGERG drop their packs
1246 Top section of the tree falls and hits HOLMES
1248 CABRIDO is sent to get more EMS equipment
1250 Dispatch notified of accident
1251 Grant Grove Ambulance responds from Fire Station, Ranger/ EMT Nate INOUYE responds
Skylife Helicopter is requested
1256 Grant Grove Ambulance and Ranger INOUYE at portable tank
1303 INOUYE and EMS equipment arrive at the accident site. HOLMES placed on backboard
1307 HOLMES moved to safer location. EMTs worked on airway, suction, O2, and securing backboard
1313 Carried HOLMES out to the ambulance
1317 HOLMES was loaded into the ambulance and it drives to McGee Overlook
1319 No pulse detected, CPR started
1322 Ambulance arrives at McGee Overlook. AED attached to HOLMES
1332 Skylife lands at McGee
1333 Skylife flight medics help with resuscitation efforts
1358 Resuscitation efforts stopped, HOLMES pronounced dead

Reporting Officer's Name	ID	Supervisor's Name	ID
Debbie Brenchley	1233	Gregg Fauth, Acting Chief Ranger	
Reporting Officer's Signature	Date	Supervisor's Signature	Date
Deb Brenchley	10/22/04	Gregg Fauth	11/02/04

Custody and Description of HOLMES Body

- Skylife personnel called HOLMES time of death 1358 hours at McGee Overlook.

- HOLMES body was transported by Grant Grove Ambulance to Grant Grove Ambulance Bay from McGee Overlook. HOLMES body was left on the gurney with a blue sheet covering. The Ambulance departed McGee Overlook at 1409 hours and arrived at the Grant Grove Ambulance Bay at 1417 hours. Mike FAULKNER drove the ambulance, Clint COONFIELD was the front seat passenger and Nate INOUYE was in the back with HOLMES body.

- The ambulance was parked in the Grant Grove Ambulance Bay with HOLMES body inside the ambulance. Nate INOUYE secured the Ambulance Bay.

- Brit ROSSO asked INOUYE if each Hotshot crewmember could enter the ambulance bay one at a time to say "goodbye". INOUYE allowed it as long as HOLMES body was not disturbed. The ambulance back doors were opened and HOLMES body was left inside the ambulance. ROSSO said that all but two Arrowhead crewmembers entered the ambulance bay alone to say "good bye".

- Coroner Travis SHAW arrived at 1715. SHAW and I entered the ambulance bay to inspect and photograph the body.

- I opened the back ambulance doors at 1719 hours. HOLMES was on the gurney covered by a blue sheet. The feet were all that were visible and were covered by fire boots. The back of the ambulance had blood in various areas and EMS gear was scattered.
  * Refer to Photograph Pa 020001jpg: Body in Ambulance from feet.

- Lead Investigator Debbie BRENCHLEY arrived and she and I removed the gurney from the ambulance. The blue sheet was removed from the body. HOLMES was strapped to the gurney. A backboard was directly under HOLMES and on top of the gurney. An oxygen bottle was strapped in between the legs. The yellow nomex shirt and navy T-shirt were cut open exposing the chest and abdomen. Various EMS items were in place on the chest, neck, face and head.
  * Refer to Photograph Pa 020002jpg: Full body out of ambulance from feet
  Pa 020003jpg: Full body from right side
  Pa 020004jpg: Full body from left side

- The chest had multiple heart monitor leads and two AED pads. The neck had a c-collar that was removed to intubate but was still under the neck and an IV was in the left side of the neck attached to a fluid bag. An intubation tube was in the mouth and had been secured to the head. An oxygen mask strap was around the head with the oxygen mask on the forehead. Head blocks were cradling the head with tape holding them in place across the forehead. I found an oral airway inside the head bed.
  * Refer to Photograph Pa 020005jpg: Left upper body
  Pa 020006jpg: Right upper body and head

- I removed all the EMS gear from the chest, neck, face and head except for the intubation items and the neck IV. A 2-3 inch laceration was above the left eye. The face was dirty from smoke and fire and had wet and dry blood covering it except for where the tape was across the forehead. Wet blood was pooled in the eye sockets, right ear cavity and underneath and around the head on the gurney. The area of the head containing hair was covered in wet and dry blood. I did not find any other lacerations with a visual inspection of the head. Wet and dry blood was on the upper back, which appeared to come from the head. The last photograph of the body was taken at 1734 hours. HOLMES body remained in the ambulance bay until it was transferred.

Reporting Officer's Name	ID	Supervisor's Name	ID
Erin Warrem	2410		
Reporting Officer's Signature	Date	Supervisor's Signature	Date
Erin Warrem	10/06/04		10/15/04

* Refer to photograph: Pa 020007jpg: Right head
Pa 020008jpg: Top left head
Pa 020009jpg: Back of head and upper back
Pa 020010jpg: Close up of face

- At 1759 custody of HOLMES body was transferred to Miller Memorial Chapel of Visalia. Miller Memorial Chapel picked up HOLMES body to transfer to Visalia by vehicle.

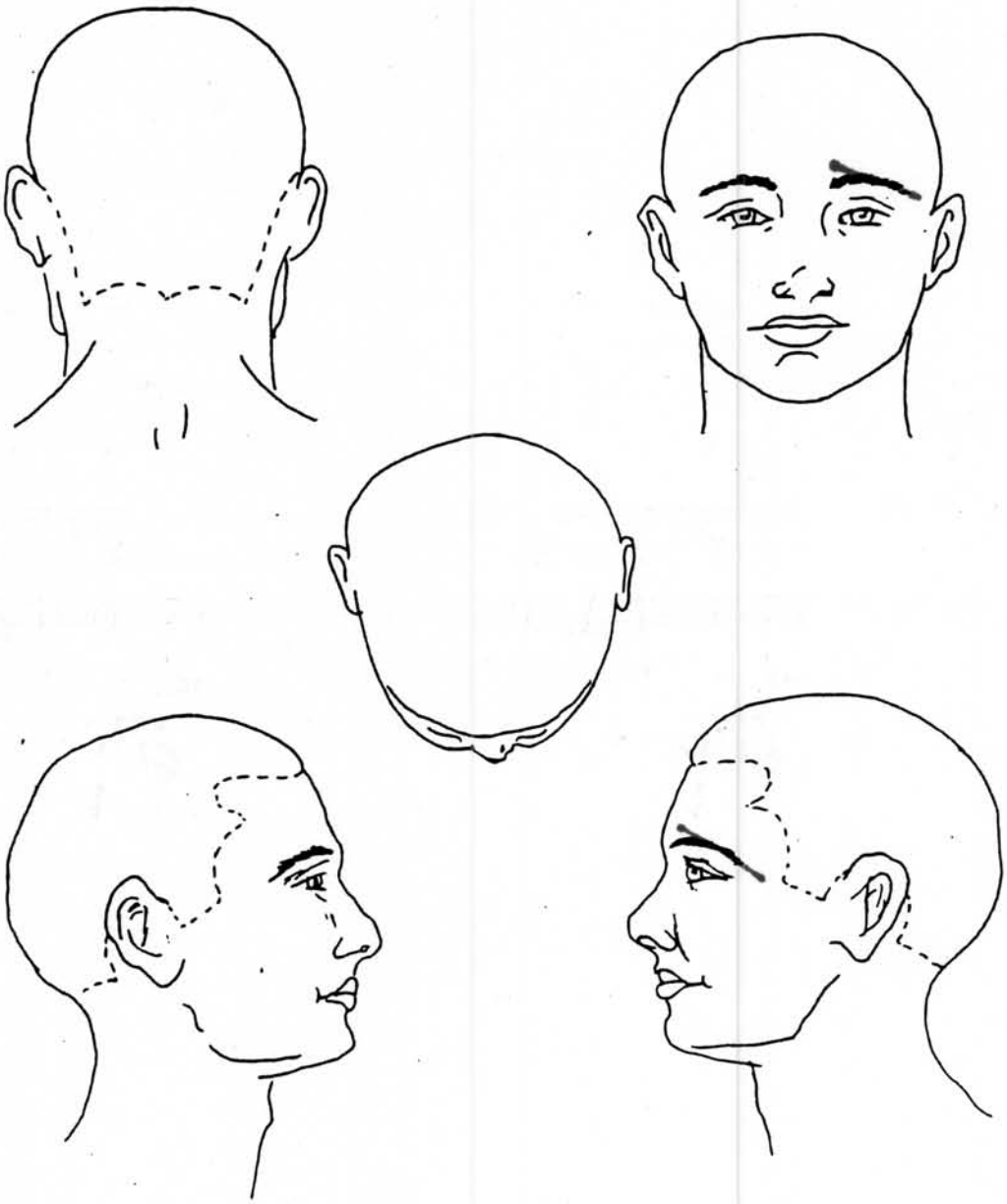
- I did not closely visually inspect any area of the body below the upper chest and back. I did not palpitate any of the body. The body was warm but no temperature was taken. The body was lying on the back fully extended and I did not see any lividity. Rigor mortis was beginning to occur based on slight stiffness in the fingers. No clothing or personal items were removed from the body. The body was rolled on its side to get full circumference photographs.

Reporting Officer's Name	ID	Supervisor's Name	ID
Erin Warrem	2410		
Reporting Officer's Signature	Date	Supervisor's Signature	Date
Erin Warrem	10/06/04		10/15/04

CASE # & NAME: 04-0784 Holmes

Prepared By: Erin Warren

Date & Time: 10/02/04 1734 hours



UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
SUPPLEMENTAL INCIDENT RECORD

FORM 10-344
CI # 04-0784
SEKI NP

Case #:	04-0784

Dan HOLMES' personal effects were secured by the Arrowhead Hotshot Superintendent Brit ROSSO until law enforcement personnel were available.

On October 7, 2004 at 1120 hours, Ranger Nate INOUYE and I entered Dan HOLMES cabin (1808) at Swale.

There were no prescription medications on the shelf or in his toilet kit. There was no evidence or indication of illegal drug use or other illegal activity.

There was a container for Ibuprofen (Wal-profren) on his shelf. In the toilet kit there was a bag with both Tylenol 1000mg pills and ibuprofen 200mg (I-2) pills.

We did not search the entire cabin since the cabin is shared with 2 other occupants.

Photos were taken of HOLMES corner of the room. We left at 1133 hours.

HOLMES' personal effects were released to ROSSO who secured them until HOLMES' mother could take custody.

Reporting Officer's Name	ID	Supervisor's Name	ID
Debbie Brenchley	1233	Gregg Fauth, Acting Chief Ranger	
Reporting Officer's Signature	Date	Supervisor's Signature	Date
	10/26/04		11/02/04

APPENDIX 14

Serious Accident Investigation Team

United States Department of the Interior
NATIONAL PARK SERVICE
3833 South Development Avenue
Boise ID 83705

IN REPLY REFER TO:
Y14 (9560)

October 3, 2004

Memorandum

To: James Loach, Associate Director, Operations, Midwest Region

From: National Fire Management Officer **/s/ Sue Vap**

Subject: Fatality Investigation Delegation of Authority

As delegated by the National Park Service Designated Agency Safety and Health Official (DASHO) I am providing this Delegation of Authority to your Serious Action Investigation Team (SAIT) for the conduct of a fatality investigation for:

Prescribed Fire Name: Grant West Prescribed Fire
Location: Kings Canyon National Park
Date of Occurrence: October 2, 2004

As Team Leader you are responsible for ongoing (daily) briefings to me. The information you provide will be shared with the DASHO. You are also responsible for the development of the following formal briefings/reports in accordance with Departmental Manual 485, Chapter 7.

Daily 1900

Preliminary Brief (24 hours)
Expanded Brief (72 hours)
Final Report, including the Factual and Management Evaluation Reports, provided to the DASHO (45 days)

This investigation shall be conducted objectively to gather facts and evidence, including casual and contributing factors related to the fatality, in accordance with the Departmental Manual 485, Chapter 7. You will also need to participate in the Board of Review if one is required.

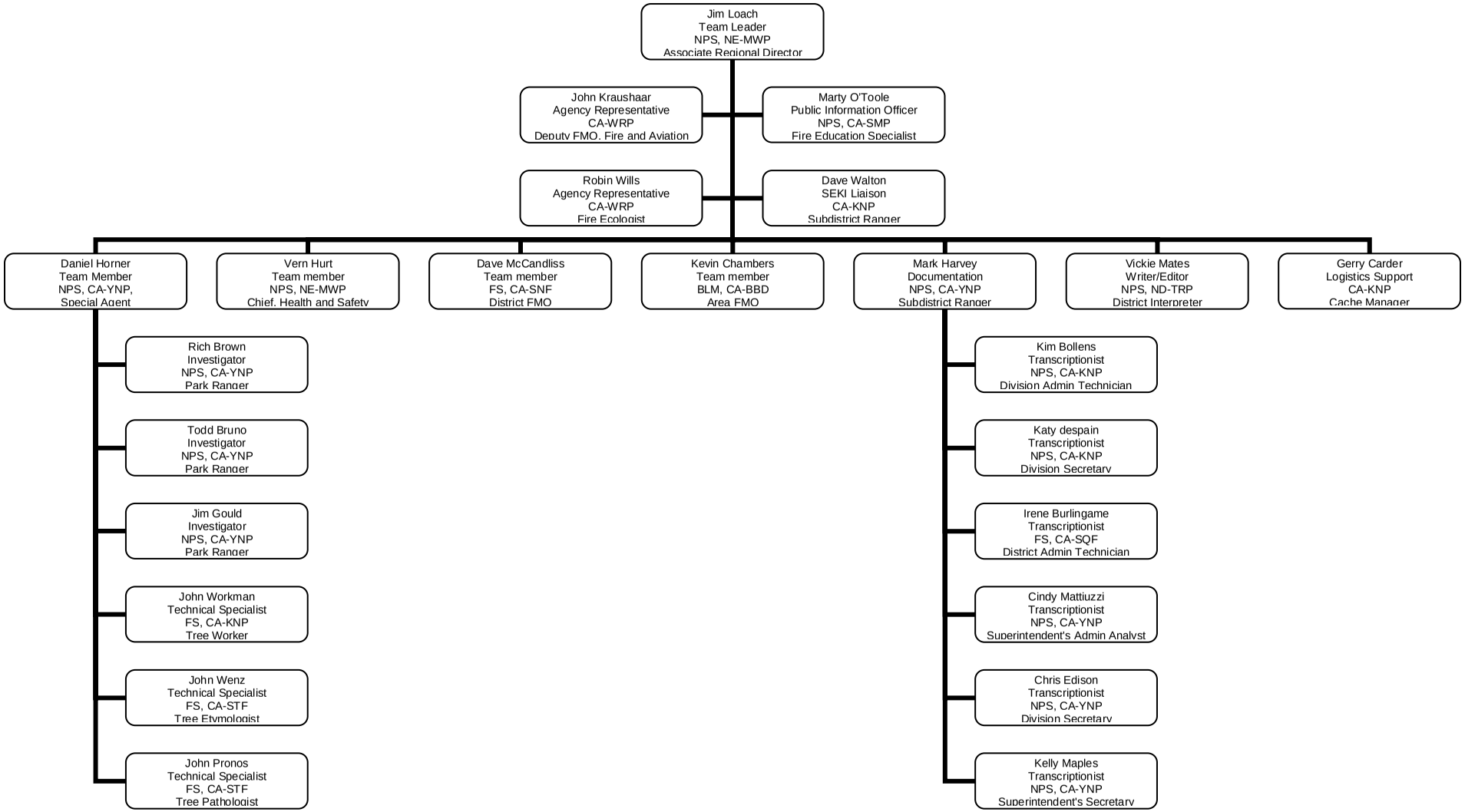
As you conduct the investigation you will be required to:

- Coordinate with Occupational Safety and Health Administration (OSHA) and other responsible officials as requested.
- Coordinate and cooperate with the SEKI Law Enforcement Fatality Investigation Team, led by Deb Brenchley.

Dave Walton, Ash Mountain Sub-District Ranger, has been assigned as the Park Liaison to your SAIT. The Park has also identified Jody Lyle as your Information Officer, and Bill Kaage as the Agency Representative.

cc: Associate Director, Visitor and Resource Protection/DASHO
Chief, Division of Fire and Aviation Management, WASO
Chief, Division of Risk Management, WASO
Superintendent, Sequoia and Kings Canyon National Parks

Daniel Holmes Fatality
Serious Accident Investigation Team



Appendix 14B-1

James A. Loach (Jim)
Associate Regional Director, Park Operations and Park Education
National Park Service Midwest Region, Omaha, Nebraska (12 years)

Jim has worked thirty-five years with the National Park Service at a number of parks in multiple capacities, including various park ranger positions and as district ranger at Yosemite. He also served in the Ranger Activities Division at NPS headquarters and the Office of the Assistant Secretary for Fish and Wildlife and Parks, both in Washington, DC.

Other background includes serving as a commissioned law enforcement ranger, special events team member in the Western and Mid-Atlantic regions, and special event team leader in the Western Region. He was an incident commander for all risk activities and planning section chief for fire suppression activities while stationed at Yosemite. Jim has also served with both Type 1 and Type 2 incident management teams (IMT). Loach served as a planning section chief and deputy planning section chief in northwest Montana; and performed as the NPS area commander for *Operation 4 July*, June–July 2002; served on Williams-Rhodes' area command team in various wildland fire assignments in 2001 and 2002 as the assistant area commander for plans and assistant area commander for logistics. He is currently deputy area commander for Area Command Team III.

Additional investigation experience includes serving as commander on the NPS Cerro Grande Fire Investigation in 2000 and the lead investigator on the Willy Pahnema firefighter fatality investigation.

Vern E. Hurt
Chief of Public Health and Safety
National Park Service, Midwest Region, Omaha, Nebraska (14 years)

For forty years, Vern has worked with the NPS at various parks in multiple capacities, including various park ranger positions and as district ranger at Cape Cod National Seashore.

He served as a commissioned law enforcement ranger, special events team member in the North Atlantic Region of the NPS, member of the Cape Cod drug task force, wildland fire crew boss and a crew liaison officer while stationed at Cape Cod, regional safety manager for the North Atlantic Region as well as the Midwest Region of the NPS, and chief of public health and safety for the last three years. In the mid 1990s, Vern served on a serious accident investigation team in Yellowstone National Park.

Daniel Horner
Special Agent
Division of Law Enforcement and Emergency Services, Office of Criminal Investigations
National Park Service, Yosemite National Park (10 years)

Daniel has twenty-nine years of experience with the NPS, including ten years as a park ranger, nine years as a supervisory park ranger, and ten years as a special agent. He worked seasonally at Mount Rainier and Yosemite National Parks and held permanent positions at Golden Gate National Recreation Area and Yosemite National Park. All experience was in law enforcement positions. Horner has also performed structural and wildland fire, and search and rescue duties, and spent fifteen years as a park medic (cardiac) and Advanced Life Support provider. For nine years, he served as the horse patrol supervisor in Yosemite Valley.

In 1997, Daniel attended interagency SAIT training at Lakewood, Colorado. He led the property damage documentation group in Los Alamos, New Mexico, after the Cerro Grande fire in 2000, which was separate from the fire investigation.

David McCandliss
District Fire Management Officer
High Sierra Ranger District, Sierra National Forest
United States Forest Service

David began his career in 1973 as a fire engine crewperson in the Downieville Ranger District, Tahoe National Forest. He served on helitack, engine, and hot shot crews in the Angeles, Los Padres, and Sierra National Forests. In 1987, McCandliss began working in fuels management in the Sierra National Forest.

He served as operations section chief on the South Sierra Type 2 IMT 1987- 1995 and air operations branch director on California Team 3 Type 1 IMT 1993-2000. Wildland fire qualifications include incident commander Type 2, operations section chief Type 1, air operations branch director, prescribed fire manager Type 2, and fire use manager. David also served as a member on an investigation team looking into an escaped prescribed fire on the Inyo and Sierra National Forests.

Kevin Chambers
Field Office Fire Management Officer
Bakersfield Field Office, Bakersfield, CA
Bureau of Land Management

Kevin began his career in 1979 as a firefighter on a hand crew in the Los Padres National Forest. He served for the next 24 years in various fire positions including engine captain at Kaluna Cliff fire station, assistant hotshot superintendent at Eagle Lake BLM Field Office, fire station manager at Carrizo fire station, and FMO at Ridgecrest BLM Field Office.

His work experience has provided knowledge of felling operations, hotshot crews, and prescribed burning. Special interest in this investigation stems from involvement with past accidents—one involving a fatality caused by a rolling tree during a fire rehabilitation operation, and another occurring during nighttime fireline construction when a fire-weakened, green tree fell and struck him, breaking his leg and ending his hotshot career.

John Kraushaar
Deputy Regional Fire Management Officer, Operations and Aviation
Pacific West Regional Office, NPS, Oakland, CA (8 years)

John has thirty-four years of experience with the NPS, serving as a fire management officer at Whiskeytown National Recreation Area and a law enforcement park ranger at Sequoia and Kings Canyon National Parks, Grand Teton National Park, and Mount Rainier National Park. He also spent three years working in fire management with the US Forest Service in California.

Kraushaar served as a commissioned law enforcement ranger for twenty years and as a safety officer on national incident management teams for twelve years. He participated in the Lowden Prescribed Fire and Sadler Entrapment fire investigations as well as annual fire and program reviews for fire management programs in the Pacific West Region of the NPS.

This page intentionally left blank.