

Staff Ride

Resources



Wildland Fire Leadership Development Program

Rattlesnake Fire – Facilitator's Field Reference, July 2004

Staff Ride Difficulty Rating:

Physical

Light – All stands are located along the Alder Springs Road and can be accessed by vehicle except for Stand 5. The walk to the Missionary Spot Fire is about a ¼ mile off the road and this route has been brushed open.

Moderate - If the group moves between all of the stands by walking instead of driving, the Alder Springs Road is well maintained and has a moderate grade. Total distance along the Alder Springs Road is about 3 miles from Stand 1 to Stand 5. Elevation for the area is approximately 2000 feet.

Arduous – If the optional TDGS #6 is utilized.

Logistics

Easy – Site is less than a one-hour drive on paved roads from Willows, California. A well maintained dirt road provides access through the entire site.

Hazards

Low – Normal wildland hazards (possible snakes, bees, etc.)

Note to Facilitators: This is a suggested format. Do not feel limited by the identified stands or discussion items. It is provided as a word document so that users may adapt and revise it to fit their specific audience and time demands.

Stand 1 – Forest Boundary

Maps

Travel map

Orthophoto with fire edge and NAD 27 GPS locations for stands shown.

Access

NAD 27 GPS Coordinates: 39.39.401 x 122.35.445

Leave Willows going west on State Highway 162

Turn right at the stop sign at the intersection near Elk Creek

Turn left, continuing on State Highway 162, heading towards Alder Springs

Stand 1 is at the Forest Boundary

FOR SPECIFIC MILEAGES REFER TO COMPLETE “TRAVEL DIRECTIONS.”

Terrain Orientation

Front country of the Coast Range

Sacramento Valley

Mouth of Powder House Canyon

Powder House road entering from the north

Events to Describe

General fuel conditions and seasonal situation in July 1953

Origin of the fire and the discovery of the fire

Discussion Guide

- During a typical July day in the Sacramento Valley it is not uncommon to have temperatures over 100 degrees. Those temperatures foster reliable diurnal winds, particularly along the eastern front of the Coast Range.
- Records dating back to 1911 did not indicate that Powder House Canyon had burnt. Therefore, the chamise brush was very mature...over 40 years old.
- Fire season of 1953 was affected by part of an extended drought.
- Fire was eventually controlled on July 11th by burning Powder House Road which you can see coming in from the north to this location.
- The Incident Command System had not been developed and the Large Fire Organization was being used for a command and control system. Line Boss is roughly equivalent to an Operations Section Chief and Division Boss is roughly equivalent to Division Supervisor.
- Crews for large fire suppression came from a wide variety of sources. Dedicated agency staffed crews were not common. Most crews came from outside sources such as inmates, loggers, and organizations willing to contract to the U.S. Forest Service such as the New Tribes Mission.
- A number of equipment limitations existed in 1953 to include:
 - Communications were marginal, at best. Some people had heavy pack set portable radios, but communications on the fireline were typically carried out by passing voice messages or by message runners to adjoining crews and fire overhead.
 - Chainsaws were not in use and crews used brush hooks for clearing all vegetation.
 - Aircraft for tactical use were not common.
 - No personal protective equipment (PPE) existed except for hardhats, which were not mandatory.
- Leadership styles were influenced by numerous returnees from the military due to the draft being in effect from WWII through the Vietnam War. Typically individuals were put into roles of significant responsibility after 4 or 5 years of firefighting.

Conduct TDGS #1a and #1b.

Handout TDGS #2.

Stand 2 – Oleta Point

Maps

Investigation Report Figure 1

Orthophoto with fire edge and NAD 27 GPS locations for stands shown.

Access

NAD 27 GPS Coordinates: 39.39.500 x 122.36.126

From Stand 1, drive west on Alder Springs Road (dirt) about 1 ½ miles.

Road will bend around Oleta Point and through a small cut in the ridge.

Stand 2 is at that cut.

Terrain Orientation

Powder House Canyon

Oleta Ridge running east / west up to Rattlesnake Ridge

Events to Describe

Fire was started at approximately 14:20 about 100' west of Stand 2.

Initial attack attempts were made by first in crews at about 15:15.

Lafferty arrives at 16:00 and stops unsuccessful initial attack efforts.

Ewing arrives shortly after Lafferty and is assigned as Fire Boss (IC).

Fire spread in a westerly direction on both sides of Oleta Ridge.

Discussion Guide

- There were several rapid transitions in command.
 - Miller to Lafferty to Ewing.
 - Ewing was eventually assigned Fire Boss and Lafferty was eventually assigned Line Boss.
 - Refer to Appendix A – Timeline.
- Typical hot summer day with upslope wind conditions.
- The Rattlesnake Fire was the second fire of the day from the same arsonist.
- At the time, Alder Springs Road was the only road in the area.
 - State Highway 162 / Forest Highway 7 is a new road.
 - Constructed in 1969 and paved in 1971.

Conduct TDGS #2.

Handout TDGS #3.

Stand 3 – The Overlook

Maps

Investigation Report Figure 2

Investigation Report Figure 3

Fire Progression map

Orthophoto with fire edge and NAD 27 GPS locations for stands shown.

Access

NAD 27 GPS Coordinates: 39.39.692 x 122.36.744

Proceed west, up Alder Springs Road $\frac{3}{4}$ mile

Stand 3 is at the turnout overlook

Terrain Orientation

Recovery Road that was put in to retrieve the bodies.

Cross near the end of Recovery Road.

Old car was located on the road in the next ravine to the west.

ICP to the west at Powder House Turn.

View up and down Powder House Canyon.

Sacramento Valley to the East.

Routes traveled by the Missionary Crew to and from the spot fire.

Alder Springs Road.

Events to Describe

Shift from initial attack to extended attack.

Change in suppression strategy.

Firing operations were taking place along Alder Springs Road.

Firing operations were also taking place down from High Point.

Spots at old car and the discovery of the Missionary Spot Fire.

Discussion Guide

- Overall objectives of the fire:
 - Changed by Ewing and Lafferty after initial attack failed.
 - Construct line and hold from the heel at Oleta Point to Rattlesnake Ridge.
 - Burn and hold along Rattlesnake Ridge to High Point.
 - Construct line, burn, and hold line from High Point down to Powder House Turn.
 - Refer to Appendix A – Timeline.
- Burning conditions
 - Crew burning down from High Point was having difficulty getting the brush to burn.
 - Crew along Alder Springs Road got held up dealing with spot fires near the old car.
- Suspected source and location of the Missionary Spot Fire.
 - Local turbulent wind that was short lived.
- Initial reaction to the Missionary Spot Fire.
 - Supervisor Thomas originally thought that the spot was going to burn to the ridge top. Therefore, action was not immediately taken.

Conduct TDGS #3.

Handout TDGS #4a.

Stand 4 – Powder House Turn

Maps

Investigation Report Figure 2

Investigation Report Figure 3

Fire Progression map

Orthophoto with fire edge and NAD 27 GPS locations for stands shown.

Access

NAD 27 GPS Coordinates: 39.39.851 x 122.37.025

Proceed west, up Alder Springs Road $\frac{3}{4}$ of a mile.

Stand 3 is located at the sharp turn to the left at the head of Powder House Canyon.

Terrain Orientation

Head of Powder House Canyon

High Point is south up the spur ridge from Powder House Turn

Powder House Road splits off to the northeast on Powder House Ridge

Grindstone Canyon to the north

Sacramento Valley to the east

Events to Describe

Burning operations from High Point to Powder House Turn.

Dispatching of personnel to the Missionary Spot Fire.

Routes taken to the spot fire.

Wind shift between 21:45 and 22:00.

Spot fires below Alder Springs Road at the head of Powder House Canyon.

Spot fire at Point 28 of Report Figure 3.

Lafferty leaving to warn people at the spot fire at 22:15.

Discussion Guide

- Decisions and communications regarding the New Tribes Mission crew.
 - Refer to Appendix A – Timeline.
 - Topography that fosters the west wind.
 - Easy funneling down Grindstone Canyon when valley begins to cool.
- Meteorological events that cause strong and rapidly changing down canyon winds.
- Refer to Appendix B – Weather Summary.

Conduct TDGS #4a.

Handout and Conduct TDGS #4b.

Handout TDGS #5.

Stand 5 – Missionary Spot Fire

Maps

Investigation Report Figure 2.

Fire Progression map.

Orthophoto with fire edge and NAD 27 GPS locations for stands shown.

Access

NAD 27 GPS Coordinates 39.39.808 x 122.36.712

There were 3 access routes to the spot fire taken by 3 different groups:

Route #1 – Route taken by Johnson and 3 New Tribes crewmembers at about 21:00.

From Powder House turn step off the road proceeding east.

The route proceeds slightly downhill and contour.

Cross one ravine and get on top of a small ridge that runs to the bottom.

Western edge of spot fire is near the top of the ridge.

Route #2 – Route taken by Vote and 14 New Tribes crewmembers at about 21:15.

From Powder House Turn walk northeast on Powder House Road about 100 yards.

Turn right on Recovery Road.

Continue approximately 75 yards to the first spur ridge heading south into the canyon.

Walk down the ridge approximately 40 to 50 yards to the spot fire.

Route #3 – Route taken by Powers and 4 New Tribes crewmembers at about 21:45.

From Powder House Turn walk northeast on Powder House Road about 100 yards.

At the junction of Powder House Road and Recovery Road turn up Powder House ridge.

Continue up Powder House ridge to the first crest or point.

Turn right down the spur ridge.

Route continues down the ridge and slightly back up drainage to the west to the spot fire.

Terrain Orientation

Head of Powder House Canyon

Recovery Road

South Aspect

Alder Springs Road

Oleta Point

Events to Describe

Routes taken by the people to the spot fire

Actions taken on the spot fire

Location of lunch spot

Weather and wind conditions

Spotting at the head of Powder House Canyon

Discussion Guide

- Spot fire becomes the lunch spot for the New Tribes Mission crew.
 - They began to eat lunch in the ravine on just to the east of the spot fire after they contain the spot fire.
 - Vote and Powers walk up to the ridge and are aware of fire activity increase.
- Warning given to the crew by Lafferty shortly after 22:15 and the various escape routes taken by the people on the spot.
 - The crew broke into two distinct groups as they began their escape.
 - One group of 9 made their escape up to the newly constructed dozer line on the top of Powder House Ridge.
 - The rest of the people began heading east, down canyon, as directed by Lafferty.
- Rattlesnake Fire influences U.S. Forest Service Fire Task Force in 1957
 - Blackwater 1937 – Shoshone NF – 15 Fatalities
 - Rock Creek 1939 – Toiyabe NF – 5 Fatalities
 - Hauser Creek 1943 – Cleveland NF – 11 Fatalities
 - Bryant Canyon 1946 – Angeles NF – 2 Fatalities
 - Mann Gulch 1949 – Helena NF – 13 Fatalities
 - Rattlesnake 1953 – Mendocino NF – 15 Fatalities
 - Tunnel 1954 – Tahoe NF – 3 Fatalities
 - Inaja 1956 – Cleveland NF – 11 Fatalities

Conduct TDGS #5.

Handout and Conduct Optional TDGS #6.

APPENDIX A – RATTLESNAKE FIRE TIMELINE

14:20	Fire is set on Alder Springs Road near Oleta Point
15:15	Initial attack crews arrive and attempt handline south from origin
16:00 M	Initial actions are unsuccessful, crews return to Alder Springs Road and are directed to the head of the fire
17:30	Direct attack on the head and along the Rattlesnake Ridge from the head to the High Point is successful, and head is contained.
18:40	A handline is completed between High Point and Powder House Turn.
19:00-19:20	Firing out commences along the handline from High Point to Powder House Turn. Crews have difficulty getting the brush to burn. Winds are Southeast/East - Upslope.
19:20	Firing out starts along Alders Springs Road moving towards Powder House Turn.
19:40	2 Dozers begin to widen the handline between Powder House Turn and High Point and on out the Rattlesnake Ridge.
20:05	Spot fires, including the Missionary Spot Fire, occur over the Alder Springs Road near the old car.
20:15	Burning is suspended along Alder Springs Road. Action is taken on spot fires.
20:15	Forest Supervisor Thomas discovers the Missionary Spot Fire.
21:00	Winds are light and from the South/Southeast - Upslope. Decision is made by Line Boss Lafferty to go direct on the Missionary Spot Fire. 4 New Tribes Mission crewmembers are assigned.
21:15	1 US Forest Service overhead and 14 New Tribes Mission crewmembers are assigned to the Missionary Spot Fire.
21:45	1 US Forest Service overhead and 4 New Tribes Mission crewmembers take lunches into the Missionary Spot Fire.
21:45	Winds begin to shift from South/Southeast to calm and the main fire is lying down.
21:45-22:00	Wind direction changes to West - Downslope, firing out is continuing along Rattlesnake Ridge from High Point to Powder House Point.
22:03	Spot fires develop below Alder Springs Road at Powder House Turn. Two fires are controlled quickly but little concern is shown for the other ones at this point.
22:10	Spot fire is noticed that will eventually blow up and over-run the New Tribes Mission crew.
22:15	Line Boss Lafferty becomes concerned with the position of the spot fire as it relates to the position of the New Tribes Mission crew. He runs out the Powder House Ridge to warn the crew.
22:18	Lafferty yells to the crew to get out and to go to the east.
22:23	Blow-up occurs; crewmembers going east are being overrun by the fire.
22:30	Some crewmembers choose to go up hill and arrive at the top of the Powder House Ridge at this time.
23:00	Fire reaches the ridge.

APPENDIX B – RATTLESNAKE FIRE WEATHER SUMMARY

The original accident investigation focused on normal down canyon winds as being the causal factor for the rapid spread and blow-up of the Rattlesnake Fire. The summary of the weather conditions during the accident investigation noted “major changes in the synoptic situations did not occur.” “Surface temperatures were moderately high and afternoon relative humidities were generally low. Winds, both surface and upper air, were generally light. Fair weather prevailed over the fire and nearby areas during the period July 9 through 11, 1953.

In 1954, Wilbert R. Krumm, a Fire Weather Meteorologist from Missoula, Montana wrote a paper entitled “AN EXPLANATION OF METEOROLOGICAL CONDITIONS WHICH PROBABLY CAUSED THE UNEXPECTED BEHAVIOIR OF THE RATTLESNAKE FIRE.....” In his paper, Krumm discounts the theory that normal, light down canyon winds were the cause of the blow-up and rapid spread down the Powder House drainage. Krumm theorizes that the blow-up was instead caused by gradient winds, which had developed because of pressure gradients between a thermal low over the San Joaquin/Sacramento Valley and a surface high-pressure system off the coast of Northern California. John Snook, a Fire Weather Meteorologist with the Northern California Interagency Fire Weather Predictive Service Center was asked to review Krumm’s paper in 1992 and again in 2004. Snook agreed with Krumm’s theory and summarized Krumm’s paper as follows:

During the warm season there is normally high pressure, both at the surface and aloft, stretching from the northeast Pacific to the coast range of California. During hot weather in the interior of California, an elongated area of surface low pressure forms in the Central Valley. It is this surface low pressure, which is the result of hot air rising out of the strongly heated Central Valley, that is commonly known as the "thermal trough," or "heat low." A fairly tight pressure gradient exists in the lower atmosphere between the cooler, relatively dense air from the Pacific High, and the hot buoyant air of the thermal trough inland. This combination produces a persistent onshore (west to northwest) wind at lower levels during the warm months.

During the day, heat rising up and out of the hot Central Valley takes on the form of first up slope, then easterly up canyon winds in the Grindstone (and other) drainage’s of the Coast range’s eastern face. These warm, up slope/up canyon winds are typically strong enough to keep the westerly gradient wind flow aloft during the day. Late in the day however, as the eastern slopes of the coast range become shaded and therefore cooler, the gradient wind begins to drop to the surface on the shaded upper reaches of the eastern-facing canyons. It then works its way down toward lower elevations, in other words, a down slope/down canyon wind.

The above description is a common scenario in California’s coast range during the summer. There are of course, times when the process is accentuated due the combination deeper-than-usual coastal marine layer and/or an especially strong thermal low inland. In these cases the reversal of the flow from up canyon to down canyon is more sudden, with stronger down canyon wind speeds than normal. This was the case during the Rattlesnake fire.