Lessons Learned
Bridge Creek Wildland Fire – August 2008
Ochoco National Forest

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Executive Summary

The Bridge Creek Fire was ignited on August 7, 2008 during a widespread thunderstorm. The fire was initially managed for resource benefits. The fire rapidly transitioned from a small, low intensity, slow moving fire to a rapidly moving crown fire. More than 4900 acres burned between Aug 16 and 17, much of it on private lands.

Ochoco National Forest and Central Oregon Fire Management Service personnel conducted an After Action Review to identify areas for improvement in responding to unplanned ignitions. An additional review was conducted by fire management specialists from other Forest Service regions and the national office. The results of these reviews are presented in this document.

Key Points – Lessons Learned from the reviews are:

- The Forest will take an aggressive posture for pre-emptive actions as well as rapid response to fire behavior when managing WFU in the future.

- Incoming Incident Management Teams need to be completely operations-ready (all positions filled). Ochoco National Forest and Central Oregon Fire Management Services managers need to provide clear direction to incoming IMTs that there is an expectation that the incoming team be immediately ready for aggressive action if needed.

- Strategic placement of fuel treatments will be implemented in concert with continued implementation of Wildland Fire Use. Over time, these tools will develop a network of confinement areas for use during management of wildland fires in the future.

- Preplanning – the Forest will include a customized risk rating for the Ochoco to provide more specificity to the general risk rating nomograms found in the WFI Implementation Guide. In addition MMAs and MAPs will be developed in advance to ensure critical deliberation is conducted concerning defensibility of these locations ad practicality of the actions.

- Local operations personnel will be assigned to incoming Fire Use Management Teams to ensure strategy and tactics which have been successful on the Ochoco are utilized and unsuccessful tactics are discarded

- Training and practice of tactics and strategies will be conducted to better prepare fire and resource management personnel on the Ochoco for management of WFU

- Local fire managers had considered the previous fire scars (Maxwell 2006, 747 Fire 2003, and Hash Rock 2000) as effective fire barriers. This assessment proved to be correct.

- The Black Canyon, Wolf and Whistler Wildland Fires were successfully managed as WFU during the same timeframe and weather as the Bridge Creek Fire.

- Weather and fuel data are adequate to support decision support tools for managing wildland fire safely and effectively.

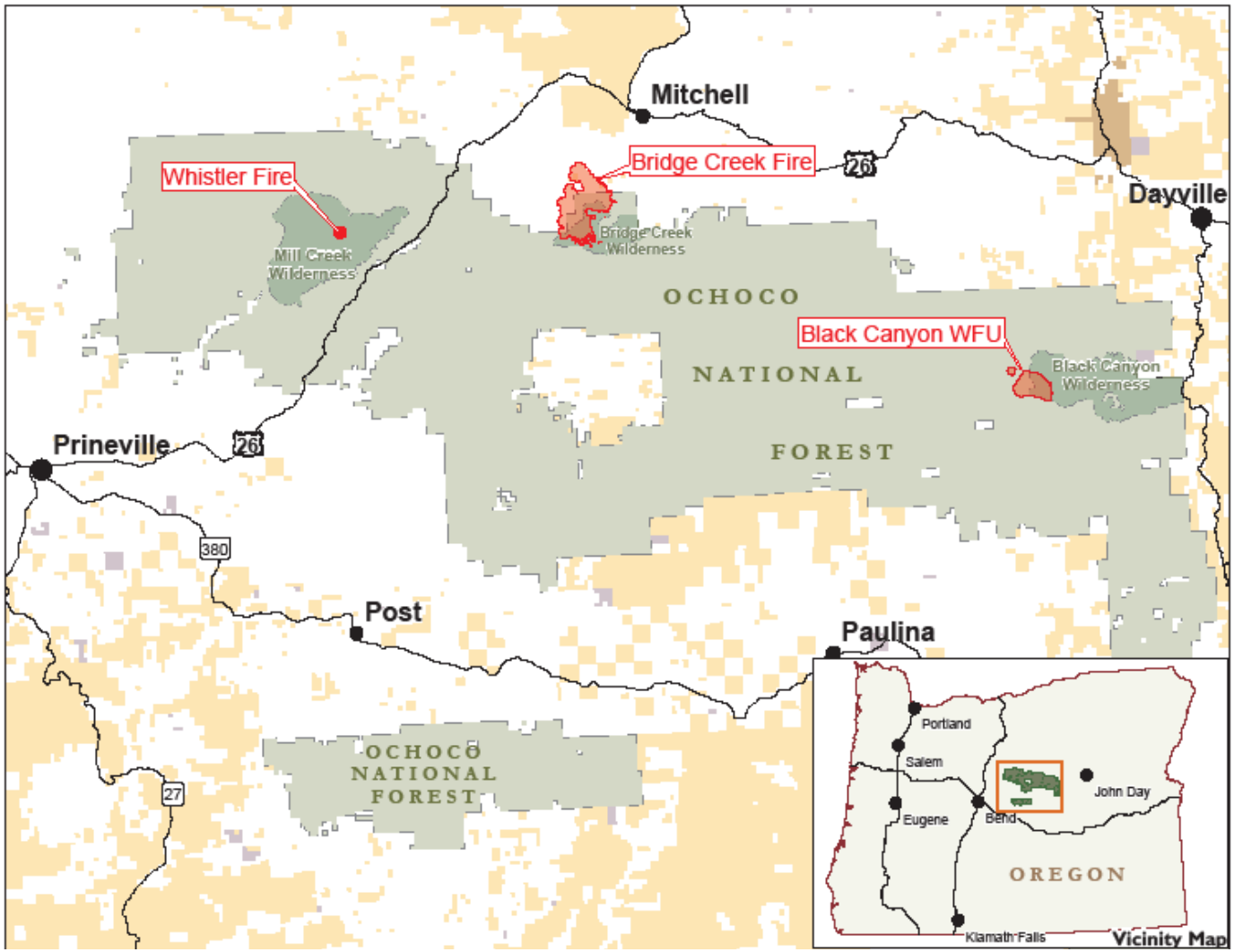


Figure 1. Vicinity map. Ochoco National Forest.

Background

On August 7, 2008 thunderstorm activity ignited 25 fires on the Ochoco National Forest. Most of these fires were suppressed at less than one acre in size. Five fires were considered for management as Wildland Fire Use (WFU). Fire 510 was located on the Lookout Mountain Ranger District within the Bridge Creek Wilderness. The ignition point was ¼ mile west from the 7,000-acre Maxwell Fire, which burned in 2006. This fire was selected for management as WFU.

The decision to manage the fire as WFU was based on it's location within the Bridge Creek Wilderness and the wilderness management philosophy of allowing natural processes to work insofar as possible. In addition, several factors led fire managers to believe that this fire held relatively low risk of rapid movement. The Maxwell Fire scar served as a barrier to fire spread on the east and north (the normal wind direction during August in this area) and the relatively high elevation (6,100 feet) and north-facing aspect in closed canopy stand typically exhibits low levels of fire behavior, except under extreme conditions.

Fire managers recognized that private lands to the west could be at risk if the fire were allowed to burn outside of the wilderness. Consequently, actions were taken to prepare FS Road 450 as a containment line to keep the fire to the east. Other precautions included assigning a Fire Use Management Team (FUMT) to manage all four WFUs on the Ochoco National Forest. Fire behavior specialists from the FUMT walked around the fire on the morning of August 16 and described the fire behavior as "very slow movement" and "low flame lengths".

On the afternoon of August 16th a thermal trough moved into the area and began affecting fire behavior. Thermal troughs bring an unstable airmass which can be likened to opening the vent of a woodstove. In addition, the airmass is very dry which lowers fuel moisture in fine fuels. Winds were from the east but very light (3-5 mph at the surface). The fire began torching small trees and moving upslope to the west. By late afternoon the fire had spotted onto a south-facing aspect above FS Road 450. The incident management team ordered air tankers, helicopters, additional ground personnel and the Ochoco NF ordered the Central Oregon Type II Incident Management Team. High intensity crown fire runs followed fuel concentrations downslope to the west across FS Road 450 and onto private lands. The fire had burned over 4500 acres by the early morning hours of August 18.

Light rain fell on the fire on August 18 slowing fire spread. The Central Oregon IMT was able to quickly contain the fire over the next several days with very little additional growth. Final fire size was 4, 882 acres.

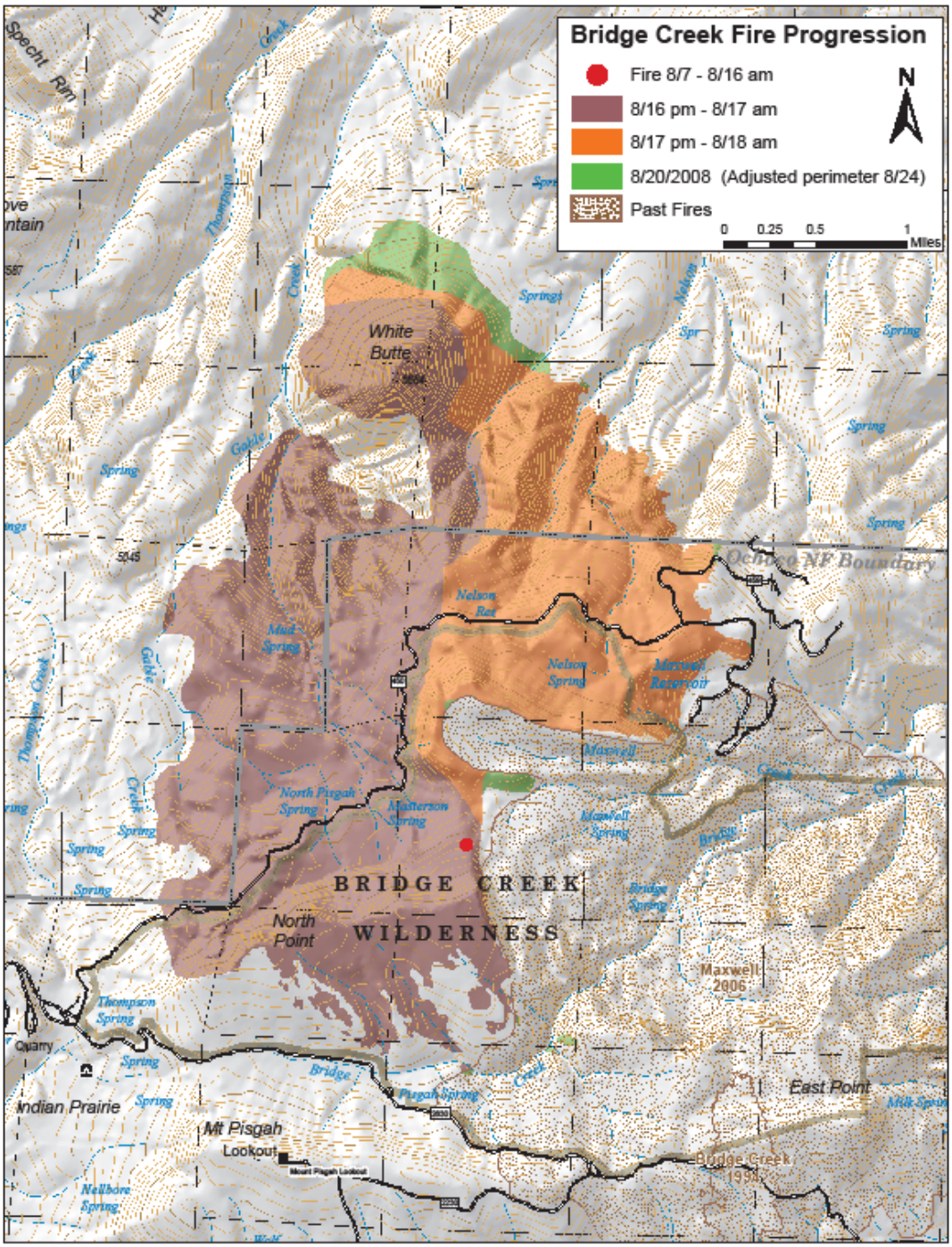


Figure 2. Fire progression map.

Chronology of Events

August 7: Thunderstorms over the Prairie Division started 45 wildfires, of those 25 were on the Ochoco NF. Full fire suppression was given to 40 of those incidents. Five fires (#503, 510, 547, 644, and 676 all in Wilderness Areas) were considered for WFU designation following the Ochoco Fire Use Plan. Stage 1 assessment were completed and presented to Forest Supervisor Jeff Walter. Walter approved the Stage 1 assessment for Incident #503 and 644. These were the first fires managed for resource benefit on the Ochoco N.F. in more than ten years. These fires were located west (#503) and northeast (#644) of Wolf Mountain and burning on a north aspect in the Black Canyon Wilderness Area on the Paulina RD. Both fires were less than a .10 of an acre burning in snags with some surface fire spreading through down logs. These fires later joined and were designated as the Black Canyon Fire.

August 8: The Stage I assessments for # 510 (later named the Bridge Creek Fire) and #547 (within the Mill Creek Wilderness) were completed and Jeff Walter approved them for Wildland Fire Use. Ochoco fire management personnel walked into #547 in the Mill Creek Wilderness Area to validate the resource benefits of this fire. They indicated that they could see another fire burning in the Mill Creek Wilderness (#676). All suppression fires were contained at the end of shift.

August 9: A recon flight over the Ochoco's was conducted to gather more specific intelligence in the preparation of the strategic assessment of incidents #510, #547, and #676. District Ranger Bill Queen reviewed the Stage 1 assessment for #676 and Jeff Walter approved #676 for WFU. Line officers and fire managers discussed the resource benefit options on # 547. After consulting with personnel who had evaluated the fires Supervisor Walter directed that the fire be suppressed.

August 10: Fire # 689 was suppressed with local forces. Control objectives were met at the end of shift. All WFU are within Stage I complexity. Fire managers consulted with Regional Predictive Services Chief, Dan O'Brien for assistance in updating the 209's and for information concerning upcoming weather trends.

August 11: Central Oregon Fire Management Services (COFMS) Deputy Fire Chief Craig Letz is assigned as FUMA and Division Chief Donham is assigned as his trainee. Ordering a Fire Use Team to help develop the Stage III assessment is considered but no order is placed.

August 12: The Pacific Northwest Fire Use Management Team was ordered for the Ochoco WFU Complex. The periodic assessment for the complex was reviewed and specific resource advisors were assigned. All four fires were still small within the Complex and were being monitored by Prairie Division Resources.

August 13: The Fire Use Management Team was in briefed at 1830 and assumed command at 0800 on August 14. The fire in Owl Creek in Black Canyon started to get active but was still less than 10 acres. No visible smoke was showing on #510 in the

Bridge Creek Wilderness Stephenson L.O. reported no smoke showing prior to going out of service.

August 14: Prairie Division Chief and COFMS Chief Chris Hoff reconned the Ochoco Complex via helicopter. Black Canyon Incident #644 had grown to 20 acres while #503 was still a spot. Incident #510 in Bridge Creek was hardly noticeable from the air. Mill Creek incident #676 looked to be out with no visible smoke showing.

August 16: By 1645 the #510 fire in Bridge Creek had moved to the south and crested North point Ridge (approx. ½ mile south of the origin). Winds began shifting to NNE and then easterly by sundown. The fire moved west more than one mile and then ran to the north after winds shifted to southerly. The fire continued burning actively throughout the night.

August 17: Fire activity continued throughout the day and evening subsiding only in the early morning hours of August 18th when rain began falling. The Central Oregon IMT assumed command at 1800 hours.

See Appendix D for a more detailed narrative of the Bridge Creek Fire and actions of the PNW Fire Use Management Team.

Evaluation of Decision Processes and Implementation and Recommendations for Improvement

Planning

In July 2008, the Ochoco National Forest reaffirmed capability and capacity to utilize the tool of wildland fire use (WFU) throughout the Forest by amending their fire management plan to include the Ochoco National Forest Wildland Fire Use Guide. Wildland fire use had not been an available fire management option on the Forest since 1995. Strong leadership support and current wildland fire use manager qualifications on the unit provided a great opportunity for the Ochoco National Forest to re-engage in wildland fire use management.

The Decision that was made on the Bridge Creek Wildland Fire Use (WFU) Fire followed established procedures in the Wildland Fire Use Implementation Procedures Reference Guide. The line officers were qualified and informed in the decisions that were made. Applying WFU was consistent with the Land and Resource Management Plan and Fire Management Plan.

How we could do a better job of planning for a more informed decision in the future?

Preplanning is crucial for successful WFU implementation. This is especially true in stand replacement fire regimes, or fuel types that have potential for high rates of spread.

Preplanning should include:

- identification of management objectives for specific areas within the Forest,
- potential MMA boundaries which would be defensible,
- values to be protected (on the Forest and adjacent to the Forest),
- potential management actions which would have high likelihood of success,
- identification of problem scenarios and contingency actions which could address the problems,
- detailed fire information plans
- identification of thresholds that trigger ordering necessary support (including Fire Management Team) before fire behavior becomes threatening to values to be protected.

Develop an ongoing strategic fuel treatment program in concert with WFU implementation to reduce risk from all unplanned ignitions.

Annually:

- Assess pre-season conditions and severity. Conduct pre-planning efforts that may identify potential defensible maximum management areas (MMA) and document the initial assessment of values to be protected.

- Conduct pre-season sand table exercise (practicing stage 1 and 2) for Line Officers, fire use managers, and resource specialists. Use the Bridge Creek experience for enhancing wildland fire use program delivery

Decision Support

The line officers had a good understanding of the Decision Support tools, specifically FS Pro in terms of its limitations in that it is only one of many tools to aid in decision making. Additionally, the Agency Administrators recognized that local subject matter expert input was vital in making an informed decision.

How we could do it better in the future?

> Prior to making decision to proceed with WFU, ensure all elements of management are in place, including external and internal education,. Select initial learning opportunities that allow program to gain experience and creditability before tackling more complex/difficult fires.
>
> Identify ERC levels associated with historic problem fire events (large, rapid fire runs). Label ERC charts to help line officers evaluate risk. May need to evaluate multiple fuel models for best fit for various areas on the Forest.

Decision Making

The decision processes employed on the Bridge Creek Wildland Fire Use Fire, led directly to an informed decision which acknowledged the risk of potential impact to private land. This impact was not taken lightly and is characterized as an undesirable outcome. The Line Officers and Fire Leadership were engaged, mindful, and bold in terms of doing what needed to be done, from beginning to end. The rationale to allow natural processes is sound and critical in sustaining fire dependent ecosystems.

The Decision Criteria Checklist was used effectively to address considerations of threat to life and property; firefighter and public safety; effect on cultural and natural resources; and other fire activity. Relative Risk Assessment was utilized to assess the values to protect, probability of success, and the hazards. The periodic fire assessment reviewed the decision criteria checklist, relative risk assessment, planning needs, i.e. if a Stage 1, 2, or 3 is appropriate, and the type of Fire Use Manager. This was reviewed when appropriate and signed off by the line officer. Notes on rationale for relative risk assessment determinations were very well done.

Craig Letz, Deputy Fire Staff Officer summed up the COFMS lessons for future WFU success best by stating, *"We used the best information and the most experienced people to develop our strategy, yet we were unprepared for the unexpected. We must be prepared for the unexpected next time!"*

How we could do it better in the future:

Review Relative Risk Assessment and consider further customizing the values, hazard and probabilities for WFU areas on the Ochoco NF. This may provide an improved Risk Assessment.

Have a preseason dry run on a desired WFIP for the various WFU areas, involving Line officers, fire leadership, resource specialists and possibly partners. Include these sessions and discussions in preparedness reviews.

Develop additional Fire Use Managers and Long Term Analysts skills that are necessary to manage the WFU program.

Communications

The Forest Supervisor and District Ranger communicated clear leader's intent and provided vital support to local fire managers. This resulted in cohesive leadership and a commitment to insure communication between line and fire management on the Ochoco NF and the Lookout Mountain Ranger District. The Forest worked hard to provide timely and accurate information to all parties that were affected by this fire.

How could we do it better in the future?

Outreach the WFU plan with the public and cooperators, specifically Oregon Department of Forestry and consider them a partner. In addition ensure all agency employees understand the benefits of the program.

Keep Central Oregon Interagency Dispatch Center well informed on strategy, situation, and needs.

Line and Resource staff attendance at S-580 Advanced Wildland Fire Use Applications could increase understanding and operational effectiveness of WFU program. Attend National course and/or share delivering a course with Region 1.

Implementation

The challenge of managing several Wildland fire use candidates simultaneously where fire behavior and activity is individually variable requires constant communication and coordination between the host administrative unit and the fire use manager or fire management team organization.

The Ochoco National Forest is a relatively small forest and wildland fire use management may require complex operational tactics. Decision space is highly dependent upon seasonal severity, deliberate focus on defensible management area boundaries, and early acknowledgement of any and all contingencies available to mitigate fire risk to private land and other identified values.

How could we do a better job of implementing WFU operations in the future?

Use pre-season conditions and severity assessment to discuss potential validation thresholds for number of simultaneous wildland fire use candidates or a multitude of opportunities that might overwhelm capacity.

When simultaneous opportunities for wildland fire use occur, dedicate the time and attention necessary to mindfully select the BEST opportunity rather than several lesser opportunities.

Provide clear leader's intent through the delegation of authority and augment with periodic follow up commensurate with fire activity and progression.

Ochoco National Forest fire managers attempted collateral duties of duty officer and fire use manager. This does not allow required focus and presence for the oversight and management of multiple fire use incidents that are evolving simultaneously.

Ochoco National Forest Supervisor, Jeff Walter, said it well, *"I will consider being more operational and tactical to mitigate the risk when it increases by having the right resources in the right place at the right time. The proximity to private land will continue to have a substantial influence on how we actively manage fires in the future."*

Prearrange for needed support leadership that will preclude collateral duty of local wildland fire use manager and enhance fire leadership oversight of the entire fire management program.

Acknowledge fire potential and risk of individual fire candidates by immediately addressing proximity to any and all values that need be protected; regardless of historic footprint of fire and current benign fire behavior or activity. Acknowledge fire threat to values from all directions by documenting all necessary mitigation measures and timeframes needed to complete adequate mitigation.

Give full consideration for timely, appropriate, and preemptive actions based on weather predictions (i.e. forecasted high Haines).

Avoid strategies that require air support to secure success.

Acknowledge and employ active fire management tactics that have the highest probability of success. Give clear leader's intent early and often in support of prudent preemptive operational behavior.

Develop threshold criteria for ordering Fire Management Team support and identify management configurations for pre-planned wildland fire use scenarios.

The decision to order the Northwest Fire Use Management Team was deliberately delayed due to initial low fire complexity and fire activity. Typical incident management team response ordering occurs following recognition of needs beyond local fire management capability. However, successful WFU management requires the ordering of oversight and leadership well in advance of exceeding the local fire management capability.

How could we do it better in the future?

Order appropriate configuration of Fire Management Team with high consideration for anticipated operational and planning needs early to insure immediate operational engagement and elevate probability of successful outcomes.

Do not allow any Fire Management Team to respond with less than a fully qualified roster to engage immediately in anticipated operations and support needs.

Ensure that all command and general staff are present for Agency Administrator's In-Briefing.

Fire Weather/Fire Behavior

Fire Weather

The storm that started the Bridge Creek fire also produced 0.78 inches of rain at Slide RAWS and 0.24 inches at Brer Rabbit RAWS. From August 7 through August 11, the Forest and District based management decisions on the general fire weather forecast for zone 630 produced by the National Weather Service Office in Pendleton, OR. A spot forecast was obtained for August 12. The general forecast was used August 13 through 15, although spot forecasts were obtained for the Black Canyon/Wolf wildland fire use incidents. At some point in this period, Black Canyon and Wolf fires burned together. Separate spot forecasts were obtained on August 16 and 17 for both fires.
None of the available forecasts indicated other than relatively standard August fire weather from August 7 through August 13. August 8 and 9 were cooler with higher relative humidity than typical. A warming and drying trend began August 10 with a jump in fire weather conditions on August 14. The forecasted Haines Index varied between 2 and 4 August 8 through 14, increasing to 5 for August 15 and 16 and 6 on August 17. The afternoon general fire weather forecast for August 13 noted a possible Haines Index of 5 on Saturday and thunderstorms on Sunday through Monday, although no fire weather watch was issued. No general forecasts or spot forecasts specific to Bridge Creek were available to review for August 14, 15 or the morning of August 16. The spot forecasts issued the afternoon of August 16 and 17 included a red flag warning, but no specific reason for the warnings were included. The spot forecast for August 16 for Black Canyon was for a Haines Index 5 while the general forecast was for a Haines Index of 6.

Spot forecasts on August 12 and 15 were obtained through Central Oregon Interagency Dispatch Center; it is not known whether any feedback was provided on the quality of the spot forecasts. The spot forecasts for Bridge Creek on August 16 and 17 did not specify the reason for the red flag warnings. The spot forecast of August 17 was 10% too high for the minimum relative humidity and 3-5° too low for maximum temperature. Very few weather observations were available for Bridge Creek Fire since the fire was largely in monitor status with few or no personnel assigned to the fire for the entire burn period prior to August 15.

Recommendations

- Obtain spot forecasts on a periodic to daily basis even on inactive fires in order to be proactive towards possible weather events that may not be included in the general forecast. Use the general forecast and weather observations to help determine the appropriate period on which to ask for spot forecasts. Spot forecasts may not be needed on a daily basis during a cooling period but are generally warranted during a warming and drying trend, particularly when there is a large jump in the maximum temperatures and minimum relative humidity.

- Provide feedback on the quality of the forecast noting which forecast elements were more-or-less correct and which were not. The spot forecast must state the reason for a fire weather watch or red flag warning.
- In order to be more proactive, afternoon spot forecasts should focus more on the next day, next evening and following day and less on the remainder of the current day. Ask for particular elements that are not normally included as needed to have sufficient information to plan tactics more than one day in advance.
- Consider ordering an IMET to support management of Wildland Fire use incidents.

Fire Behavior

Between August 7 and August 14, the fire was monitored remotely by Stephenson Lookout and fire personnel looking up from the 450 spur road. The observed fire behavior from Stephenson Lookout on August 8 was a "small white puff, not much volume to it." On August 14, the fire use team began monitoring fire behavior directly by walking into the fire and taking observations. By August 14, the fire was only 0.25 acres in size. Although the fuel loading was rather heavy (30+ tons/acre) the observed fire behavior was smoldering with only two small areas of open flame. Estimated flame lengths were only 0.5 ft. At this point, the fire had been burning for 7 days with an estimated daily spread rate of 10-20 ft.

Figure 3. Photo by Bill Aney at about 1700 hours on August 14. This is one of two places along the perimeter with open flame. Flame length is 6 inches. Note the plentiful fuel in the ¼ to 1 inch size class, with very little fine fuel.

Fire activity on August 15 was still low with little smoke. Fire monitors reported group tree torching with an estimated spotted distance of 25 ft and spread rate of 5-10 chains per hour at 1500 hours. By 1200 on August 16, estimated fire size was 5 acres with open flame on 5-10% of the perimeter. The smoke was drawing into the center of the fire, likely due to the unstable atmosphere. Single tree torching was occurring at an estimated rate of one tree per five minutes but the entire crown sometimes required two torching

events to completely consume. Embers were carried into the center of the fire. Onsite weather at 1300 was 84°, 21% relative humidity and light and variable eye level winds. By 1330 hours, fire activity increased with open flame on 40 to 50% of the perimeter and estimated flame lengths of 4 ft in concentrations of fuel. The fire was backing in all directions with the flames tilted into the center. The rate of single-tree torching increased and group torching began. Although the smoke and flames were drawing into the center, embers were falling outside with a spotting distance of 10-66 ft and a high proportion

starting spot fires within 5 minutes. The estimated total spread rate was about two chains per hour through the remainder of day.

Photo taken about 1325 hours on the east flank. The near ground shows typical surface fuels. Lots of fuel in the ¼ inch to 3 inch diameter size classes. There is relatively little fuel less than ¼ inch in size. The conifer needles and other fine fuels are on the ground surface as litter. Far left and right of the photo is a creeping fire without flame. The center of the photo shows fire intensity associated with a jackpot of fuel burning. Fire is climbing the bole of some trees.

Photo taken about 1340 hours along the east flank. Very typical fuel load and arrangement, there is very little fine fuel above the ground surface. Almost all the fuel loading is in the large fuel size classes. I estimate the flame length at one foot.
August 16 about 1430 hours, from the lookout spot. The photo shows the volume of smoke being produced.

At 1530, the smoke volume was similar to that at 1430, but by 1730 fire behavior had increased rapidly. The smoke column was now visible from Prineville. The fire was reported to be moving south and had spotted above the east-west rim into timber stringers that were interspersed with scab areas south of Road 2630. The fire spread rate and direction posed an imminent threat to Mt. Pisgah Lookout. By 2000 hours, the fire had changed direction and was moving west. Fire spread moderated around 2200 hours and operations personnel believed at that

time that the fire would not cross the 450 spur road. However, fire activity increased dramatically between 2300 and 2330, spotting across the 450 spur road and now moving north. On August 17, the weather continued to be hot, dry and unstable with poor humidity recovery at night. However, additional fire spread was relatively minimal. On August 13, the Forest's fire planner conducted a 14-day FSPro run to evaluate the fire potential. No fire behavior forecasts were prepared prior to the arrival of the fire use team.

Recommendations

- Prepare and document fire behavior forecasts on a periodic basis when the fire is inactive, but daily as conditions warm and dry or weather events that could promote fire growth are forecast.
- When safe to do so, periodically monitor small fires on-site, not just remotely, in order to ensure that fire activity is consistent with remote monitoring results and to track changes in fire size and fire activity and verify fire behavior. It may be especially important to note spotting distances and crowning activity when in a warming and drying trend.
- Use a wider array of fire behavior tools to predict fire potential, especially where timing of tactical operations is important.

Conclusions and Recommendations

Historically, fire was an essential process in the development and maintenance of ecosystems comprising the Ochoco National Forest. In recent years, prescribed fire and mechanical thinning have been used to reduce fire hazard and insect and disease problems associated with overly dense stands. However, planned management activities have not been keeping up with vegetation growth and other fuel accumulations. Wildland fire use has been proven to be a cost-effective, ecologically sound method for reducing wildfire hazards while restoring and maintaining ecosystems.

The Bridge Creek Wildland Fire Use provided an opportunity for Ochoco National Forest managers to reduce wildfire hazard while adhering to wilderness management principles. Fire managers evaluated topography, fuels and weather along with potential confinement areas and tactics and concluded that the fire could be kept within forest boundaries. Several days of very mild fire behavior reinforced the initial assessment. Warming and drying weather was exacerbated by a thermal trough which caused a sudden increase in rate of spread and intensity resulting in a several thousand acre crown fire run.

Ochoco National Forest managers deeply regret the fire damage to private property. They are committed to correcting plans and procedures so that wildland fire risk to private property and natural resources will be reduced. Ochoco National Forest land management and fire management plans identify firefighter and public safety as the highest priorities with natural resources and private property as secondary priorities. After action reviews have identified lessons learned and actions that can be undertaken to strengthen fire plans and implementation procedures to better achieve these fire management priorities.

Key points for improving management of wildland fire:

The Forest and any incident management teams need to be mentally prepared to take pre-emptive tactical actions when fire weather forecasts indicate likelihood of increased fire behavior. Waiting for the fire to make the first move is not a good strategy when private lands or sensitive resources are in close proximity to WFUs (even when the WFU is very small in size).

The forest needs to develop a strategic plan for implementing fuel treatments which can be used as confinement locations for wildland fires. There are many open prairies and rocky outcrops scattered across the forest which could be linked together under a network of fuel treatments. These will be useful for fires managed aggressively under suppression objectives as well as WFUs.

The forest should develop preplanned Maximum Manageable Areas with specific Management Action Points which could be implemented readily when managing wildland fires with suppression objectives or WFUs.

Key Points for consideration of Wildland Fire use in the future

When implemented carefully over a long period of time (decades) Wildland Fire Use has proven to be a cost effective tool for

- reducing fire risk to public and private lands,
- restoring and maintaining ecosystems,
- reducing smoke impacts from wildfire
- reducing cost of managing wildfire and
- enhancing firefighter safety

The Ochoco National Forest comprises over 600,000 acres of forest and range that historically burned every 5-15 years (an average of about 60,000 acres burned annually). Most of this historic fire was low intensity surface fire which enhanced herbaceous vegetation, thinned understory trees and shrubs and killed very few large old trees. Current fuel treatments coupled with wildfires have been treating only about 15,000 to 17,000 acres per year. This has led to an enormous buildup of overly dense vegetation, forest litter and other wildland fuels. Most of the wildfires that escape initial attack are burning at high intensity killing most of the above ground vegetation including large old trees. When implemented carefully, WFU can be managed to limit overstory mortality while reducing understory vegetation and other wildland fuels. The Black Canyon, Wolf and Whistler WFUs which were managed at the same time as Bridge Creek demonstrate that these desired condition objectives can be met even under relatively severe weather conditions.

Climate change appears to be affecting the ability of landscapes to support vegetation at densities associated with historic range of variability (HRV). The climate that supported historic stand structure, species composition and density has been described as the "Little Ice Age" (ca. 1300-1900). This time period was more moist and cooler than the present. Climate change models indicate that t next several decades will be much warmer and drier than the last several decades. This forecast should lead us to manage forest stands at even lower densities than historic (which were much less dense than those found today). As climate warms and dries, overly dense stands will become much more vulnerable to insect, disease and wildfire. WFU can be an important tool in reducing stand densities so that forest will be more resilient to insect, disease and wildfire.

Appendices

Appendix A Fire Weather/Fire Behavior

The spot forecast obtained at 1737 on August 12 called for a weak front to move through the area that evening with high pressure rebuilding over the next few days. Maximum temperatures for Wednesday, August 13 were expected to be in the upper 70s with minimum relative humidity in the low 20s. The Haines Index was forecast to be 3 (very low). Smoke dispersion likely would have been good in the afternoon with smoke being carried to the southeast.
The spot forecast for August 16, obtained at 1558, included a red flag warning until 2100, although the reason for the red flag warning was not specifically stated. The discussion called for very warm and dry conditions, increasing atmospheric instability Sunday night into Monday and an increasing chance of thunderstorms on Monday. The Haines Index was forecast as 6 (high) for Saturday night and Sunday. Maximum temperatures for Sunday, August 17, were expected to be in the upper 80s with minimum relative humidity in the upper teens.
The spot forecast for August 17, obtained at 1710, included red flag warnings for Sunday evening and Monday, although the reasons were not specifically stated. The discussion called for the strong high pressure that had been over the area to move eastward and a Pacific cold front to move into the area on Monday, bringing scattered showers and thunderstorms. Scattered dry thunderstorms were forecasted for Sunday evening along with a Haines Index 5 (moderate). Monday was expected to be cooler and moister with a Haines Index 3 (very low).

The Black Canyon spot forecast for August 15 included a fire weather watch from Saturday morning through Sunday evening, although the reason is not specified; the forecasted Haines Index was 5 with a minimum relative humidity of 12%. The Black Canyon spot forecast for August 16 included a red flag warning from midnight to 2100 for high Haines and low relative humidity. The Black Canyon spot forecast for August 16-17 continued the red flag warning for high Haines and low relative humidity until 2100 on August 17.
The general forecasts for August 7-17 were also reviewed to determine when the Forest might have known of the potential for severe weather. The morning and afternoon forecasts for August 7 and 8 included red flag warnings for abundant lightning over dry fuels. The afternoon forecast for Wednesday, August 13 began with noting a possible Haines of 5 by Saturday with thunderstorms expected Saturday through Monday, but did not include either a fire weather watch or red flag warning. This forecast is the first indication of potential fire weather problems. The general forecasts for August 14 and 15 and the morning forecast for August 16 were not available. The afternoon general forecast for August 16 included a red flag warning for high Haines and low relative humidity on August 17 from midnight to 2100.

Haines Index Forecast August 7-17, 2008; asterisk indicates a forecast from the general zone fire weather forecast.

Thu 8/7	Fri 8/8	Sat 8/9	Sun 8/10	Mon 8/11	Tue 8/12	Wed 8/13	Thu 8/14	Fri 8/15	Sat 8/16	Sun 8/17
3*	3*	2-3*	2-3*	3-4*	4-3*	3 3*	4*	5	5 6*	6 6*

Forecasted verses observed weather conditions August 17

	Spot Forecast	**Observed: Slide RAWS**	**Observed: Brer Rabbit RAWS**
Maximum Temperature	88-90°	93°	93°
Minimum RH	17-19%	7%	8%

Slide RAWS is the closest station to the fire. Observations for maximum temperature, relative humidity and winds indicate an initial cooling period with warming and drying beginning on Monday August 11. By Thursday, August 14, the maximum temperatures were in the upper 80s and minimum relative humidity in the upper teens; these observations represent a 7° increase in temperature and 9% decrease in relative humidity in a 24-hour period. Winds were generally light through the entire period and the fire was largely sheltered from the wind.

Daily weather summary from Slide RAWS for August 8-17.

Date	**Maximum Temperature**	**Minimum RH**	**10-minute Average Wind Speed**
Friday 8/8	80°	20%	0-6 mph
Saturday 8/9	70°	28%	0-7 mph
Sunday 8/10	67°	34%	0-5 mph
Monday 8/11	74°	33%	0-5 mph
Tuesday 8/12	78°	27%	0-7 mph
Wednesday 8/13	79°	27%	0-5 mph
Thursday 8/14	86°	18%	0-5 mph
Friday 8/15	88°	15%	0-5 mph
Saturday 8/16	92°	9%	0-5 mph
Sunday 8/17	93°	7%	0-6 mph

Decision Support Tools Used

The Ochoco WFU plan lists the following decision criteria:

- Current and forecasted ERC
- Current and forecasted Haines Index
- Geographic area preparedness level
- Local preparedness level
- Expected smoke conditions

Brer Rabbit RAWS, the warmest and driest station on the forest, was used to evaluate the current and forecasted ERCs. Energy Release Component values typically peak in early August and then decline, on average. The actual ERC on the day of the start was below the 90th percentile value. The forecasted Haines Index was 2 to 3 for August 8 through 10.

In addition to these criteria, the Forest conducted a 14-day FSPro run and a relative risk rating from the interagency WFU Implementation Procedures Reference Guide, consulted the fire history for the area and examined the trend in 1000-hour and 100-hour time lag fuel moistures as calculated in NFDRS. The relative risk rating was redone on August 12 and 14 and the fuel moistures monitored once a week.

No FARSITE runs were completed for the Bridge Creek Fire prior to August 16, 2008. Several FARSITE runs were completed after August 16.

The Ochoco WFU plan states they would consult with the Northwest Coordination Center meteorologist to obtain a smoke management forecast. This step was not taken due to the low volume of smoke produced by the fire between August 7 and August 16.

The WFU plan includes some customization of the relative risk rating criteria based on proximity to the Forest boundary or private lands, ERC ranges, time of season, and a measure of seasonal severity. These elements were incorporated into the relative risk ratings completed.
Although not included in the WFU plan, the Forest did conduct FlamMap analyses of potential flame length under 75th, 90th and 97th percentile weather conditions. The FlamMap products were not specifically consulted to help determine if the expected fire behavior would meet some aspects of the resource objectives. Resource specialists were consulted, although the focus was on values to protect given that all the wildland fire use incidents were in wilderness areas.

Recommendations

- Continue use of current decision support tools, including use of Brer Rabbit RAWS as a "conservative" tool for evaluating fire potential when making GO/NO GO decisions.
- Use 7-day FSPro run with 3-day forecast to determine whether fire has much potential.
- Use 14- to 30-day FSPro run with 3-7 day forecast to evaluate longer-term fire potential in the absence of holding actions. Length of run needed to be based on time of year, seasonal severity, and other factors important to longer-range planning.
- Use FARSITE to estimate when and where fire is likely to reach point or area of concern and to evaluate potential effectiveness of any natural or created barriers. Spotting should be enabled to test barriers.

- Use FlamMap to evaluate likelihood of obtaining appropriate fire behavior needed to meet resource objectives initially and as needed when fire activity or behavior changes substantially.
- Use FlamMap – minimum travel time module to highlight potential weak spots in barriers and fastest travel pathways when significant weather event forecast. Recommend using gridded winds to evaluate wind-related events.
- Use NDVI-Departure from Greenness to evaluate presence or absence of drought stress in plants.
- Use the 7-day Fire Potential tool and predicted ERC charts to evaluate fire potential beyond the detailed fire weather forecast period.
- If possible, plot the large fire growth days for previous fires on the ERC chart to highlight the ERC values associated with large fire growth.
- For actively growing fires, use BlueSky or BlueSkyRAINS to identify areas potentially impacted by smoke at the surface on a daily basis.
- Review the products available through the Predictive Services section of the NWCC website to determine whether any of the many products and links provided will enhance decision-making initially or as a wildland fire use event(s) progresses.

Appendix B

Suitability of Decision Tools

Numerous tools are available on which to base decisions. The trick is selecting the appropriate tool for the appropriate consideration. Potential fire behavior can be assessed using Behave Plus, FARSITE, FlamMap, and FSPro. Each tool is best used to answer certain questions concerning fire behavior and may not be the best tool for answering others and no tool can answer all potential questions.

Behave Plus is non-spatial in nature and intended to assess potential fire behavior under a relatively small set of conditions. It is most commonly used to estimate fire behavior during the hottest, driest part of the day over the current or next burning period. The most commonly used and useful outputs are flame length, rate-of-spread, crowning potential, crown fire spread rate, spotting distance, and probability of ignition.

FSPro is a new spatial tool now being widely used to estimate the probability of a particular area or location burning or the probability of a fire reaching a given location within a set time period. The most common runs are 7-day and 14-day, although 21-day and 30-day runs have also been done. The outputs include a map of probability areas and a histogram of potential fire size. FSPro cannot estimate when the fire may reach a critical location, fire size or fire shape. Thus, a fire may have a 60-80% probability of reaching a key road or other management action point within a 14-day period, but it could do so at any time within that time period, at various locations, and over a variable front. The fire could reach the critical point early in the assessment period and then stop moving or late in the assessment period. FSPro is best used for strategic planning and re-evaluation and to indicate whether more specific analysis is needed for tactical planning.

FARSITE is a spatial model used to simulate fire spread under either forecasted weather or a specific weather stream. Due to increasing uncertainty in forecasts and compounding errors, FARSITE runs beyond 7 days are not recommended, with most runs suggested to be only 3-5 days. FARSITE is best used to estimate potential fire size and shape, help determine the role spotting may play in fire spread, and to determine whether and when fire may reach a given point of concern, such as a road or MMA boundary, within the analysis period. It can also provide an indication of how wide the fire front may be when it reaches the point of concern. Barriers to fire spread, such as constructed firelines and burnout operations can be incorporated to assess whether the given barrier would hold or not under the forecasted conditions. As such, FARSITE is best used for tactical planning over the next 3-7 days.

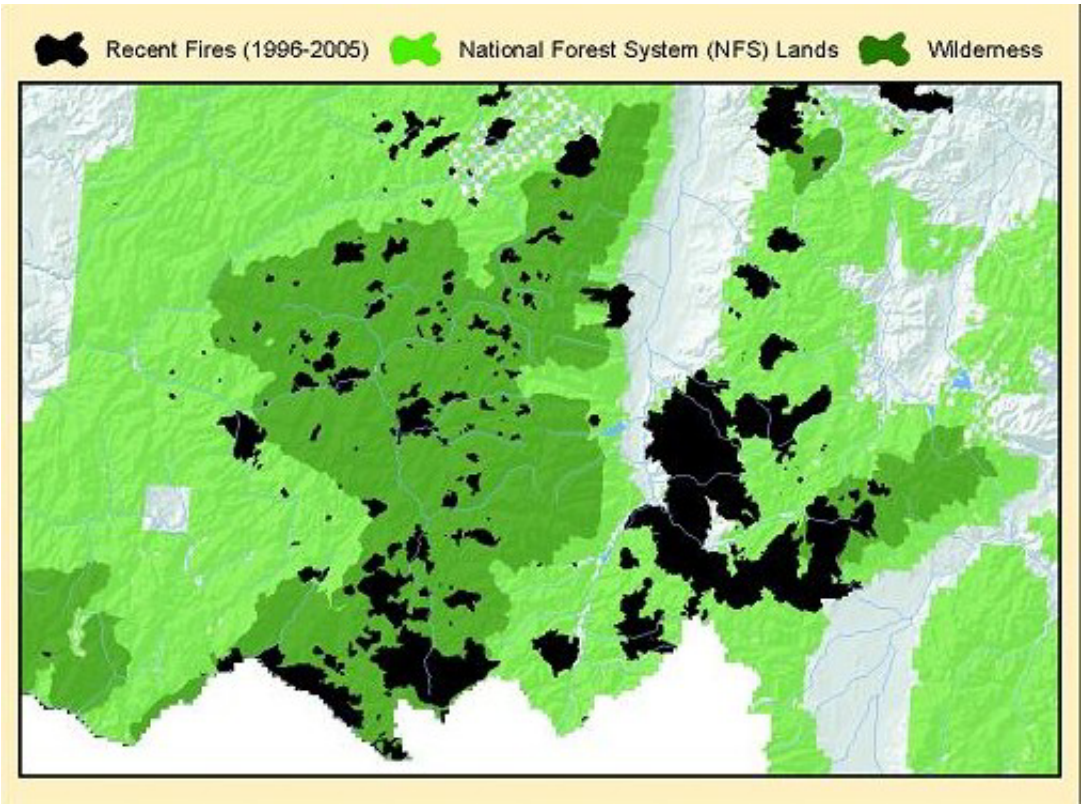
FlamMap is a spatial model used to estimate potential fire behavior over the entire landscape at once under a single set of weather conditions. It can also be used to highlight potential routes of more rapid spread under a specific weather and wind scenario. When used to estimate potential fire behavior, FlamMap can help determine whether a wildland fire use event would meet the stated resource objectives. When used to estimate the minimum travel time, FlamMap can highlight vulnerable areas under specific wind and weather scenarios and weak spots in natural barriers and MMA boundaries. In the first case, FlamMap is best used preseason to refine decision criteria and during the fire to estimate potential fire behavior over the landscape as a whole and when knowing where the fire may actually go is not important to the decisions being made or question asked. In the second case, FlamMap is best used as part of either

strategic or tactical planning in connection with a specific weather scenario, such as dry cold front passage. In this second case, the best results are obtained when using gridded winds, such as those produced using Wind Ninja or Wind Wizard.

A variety of other tools are available through links in the Predictive Services section of the Northwest Coordination Center website. The weather page includes links to several products such as the daily Haines Index map from the Wildland Fire Assessment System at the Missoula Fire Sciences Laboratory, a 10-day projection for maximum temperature and minimum relative humidity at key RAWS in each PSA, and various tools that address climatology and drought. The Fuels and Fire Danger page includes the weekly map of NDVI – Departure from Average Greenness with 1000-hour fuel moistures noted from key RAWS and a 7-day projection of ERC and 1000-hour fuel moisture for each PSA. The Outlooks page includes a monthly and seasonal outlook for the fire season and the 7-day significant fire potential graphic. These pages, links and products have been around some time. The FBAN/LTAN page is new in 2008 and contains useful links and products to support decisions and fire behavior modeling. Among these is a link to obtain FARSITE wind and weather files using the digital forecast database and information specific to each PSA. While there is not much posted into this section as yet, it does contain a season end estimate for each PSA based on the 7-day significant fire potential product. These products are of coarser scale than locally developed products, but can provide additional information not readily available on a more local basis as well as provide some context to the season across the PSA and the geographic area as a whole.

Appendix C

Selway Example of Reduced Fire Size due to History of Wildland Fire Use



The map displayed above depicts fire sizes inside the Selway Wilderness and outside the wilderness from 1996 to 2005. Wildland Fire Use (also known as Prescribed Natural Fire before 1989) was used extensively within the wilderness starting in 1972. The patch size during the decade displayed above is much smaller inside than outside the wilderness. The WFU program has resulted in a reduced risk of catastrophic wildfire risk to communities east of the wilderness while adhering to wilderness principles of allowing natural processes to work.

APPENDIX D

Bridge Creek Fire Chronology - August 14-17, 2008

Northwest Fire Use Incident Management Team

The Bridge Creek fire started from lightning on August 7, on the Lookout Mountain Ranger District, Ochoco National Forest. The Bridge Creek fire was incident number 510 by the unit. The fire started in the Bridge Creek Wilderness, and was managed under the guidance of the Ochoco Wildland Fire Use Guide. The ignition point was ¼ mile west from the Maxwell Fire, which burned in 2006 and covered ~7,000 acres in the Bridge Creek Wilderness; it is the third largest fire in recent history for the Forest.

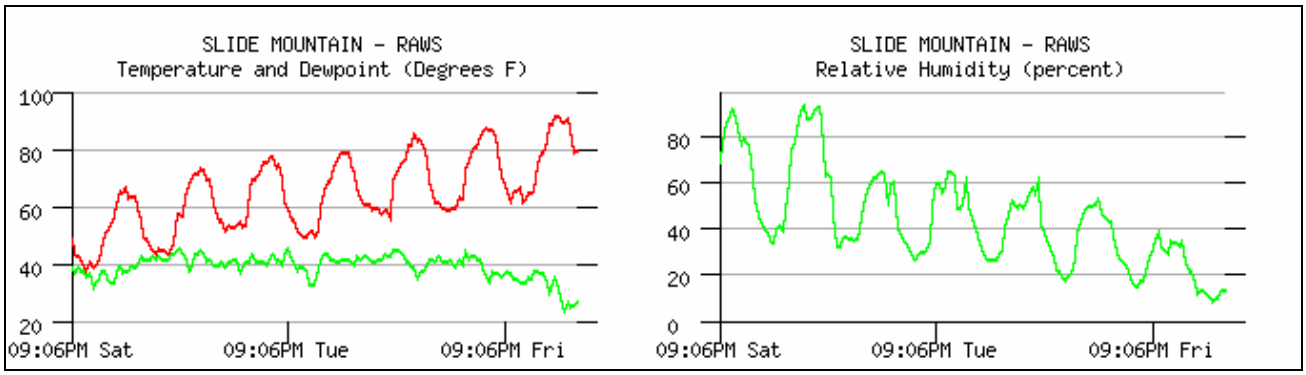
Topography

The Ochoco National Forest (NF) is in the Blue Mountain physiographic providence which provides diverse topography. Slopes are gentle to moderate. National Forest elevations range from 2000 to 7000 feet, the fire was burning between 5000 and 6000 foot elevation.

Weather

The climate of the Ochoco NF is relatively arid, is in the "rain shadow" created by the Cascade Mountains, and is often referred to as high desert. Annual precipitation can reach 30" at the higher elevations. Annual drying starts in early spring, with the peak of fire season in the last week of July and first week of August, and season ends in fall. Typical fire season variables are temperatures 80 to low 90's, relative humidity in the mid 20's, and average wind speed 9 mph.

The fire is in fire weather forecast zone 630 (Ochoco Mountains), in the Pendleton, Oregon forecast area. The Slide Ridge RAWS (SLFO3), 5682' elevation, latitude 44.4622, longitude -120.2944 is 2 miles from the perimeter.



The relative humidity trace on the right shows that daily minimum and daily maximum steadily declining over seven days. Night time humidity recovery less than 40% in considered "poor humidity recovery". On both Friday, 8/15 and Saturday 8/16, nights records show poor humidity recovery. This worsening relative humidity trend and the two consecutive nights of poor RH recovery contributed to increased fire activity.

Fuels

Conifer forests cover 80% of the Ochoco Mountains, with scablands or grass-shrubs covering the remaining 20%. The conifer vegetation in the fire vicinity is mostly moist and dry grand fir plant associations. There are inclusions of drier plant associations with lower volumes of fuel, particularly at the lower elevations.

Moist and dry grand fir associations could be represented as fire behavior fuel models 8 or 10. The fire behavior analyst used these models for site specific fire projections. Low quantities of surface fuel with low spread rates are fuel model 8, and are also represented by TL3 (183 moderate load conifer litter) or TL1 (181 low load conifer litter). Higher quantities of fuel including herbaceous or live woody fuels are fuel model 10. The timber with understory are TU1 (161) low load dry climate timber-grass-shrub or TU5 (165) very high load dry climate timber shrub models. These two plant associations have shown low surface spread under most weather conditions, but provide abundant fine aerial fuels (moss and lichen) that induce trees to torch or crown. In fact the torch and spot fire spread mechanism accounts for most of the forward fire spread that has been observed to date.

At lower elevations ponderosa pine is present and long needle timber litter (fuel model 9) or grass understory (fuel model 2) would be the best fit.

Chronology

Thursday 8/7/08 and Friday 8/8/08

The WFIP, Stage I (strategic size up) references an attachment for the current weather was completed by the Forest. The Stage I Risk Assessment indicates low fire behavior, small fire size, and moderate seasonal severity. Slide Mountain RAWS recorded .78 inch of precipitation on the 7th. The observed fire behavior from Stephenson Lookout was, "small white puff, not much volume to it."

8/13/08 Stage II was completed by the Forest earlier in the week and the NW Fire Use team was ordered on Wednesday August 13th. A delegation of authority was presented to Incident Commander, Matt Reidy on Thursday 8/14/08. This delegation included the Bridge Creek (#510) fire.

8/14/08, Thursday Bill Aney (Long Term Fire Analyst) and Steve Harbert (Fire Behavior Analyst) visited the fire site at about 1700 hours. The following observations were recorded – fire size was about 0.25 acre. The fire was located on a north aspect with less than 30% slope, the elevation is 6040 feet. The vegetation was a moist grand fir plant association, and there were plentiful snags. The fuel model would be 10 (timber) which includes both timber litter and understory contributing to the fine fuel load. The fuel bed also included an additional 30 tons per acre of downed logs. The observed fire behavior was smoldering, the fire had two small areas of open flame about 6" tall.

Photo by Bill Aney at approx. 1700 hours. This is one of two places along the perimeter with open flame. Flame length is 6 inches. Note the plentiful fuel in the ¼ to 1 inch size class, with very little fine fuel.

The interpretation and conclusions by Steve Harbert were:

- The fire had been burning for seven days, and we estimated the daily spread rate at 10 to 20 feet per day.
- The Bridge Creek Fire had the lowest fire intensity of the three fires we visited on the 14th. Both Wolf and Black Canyon fires showed more potential.
- Harbert advised day Operation Chief Singley that if operational resources were limited that this fire could be checked every other day or every third day without risk.

8/14/08 Thursday The Central Oregon Fire Management Service (COMFS) had previously been monitoring the fire and gave the NW FUMT Operations Chiefs Robb and Singley along with Safety Officer Trimble an overview of the four incidents. The group went on a vehicle tour to view the four fires in the Ochoco Fire Use Complex. The Whistler fire was the first fire to be observed.

As the group drove towards the Bridge Creek fire, we were diverted to the Black Canyon fire. Resources on scene at Black Canyon and the Wolf lookout tower stated they needed assistance in structure protection of the historic tower due to increase fire activity on the Black Canyon/Wolf fires. The group then proceeded to Wolf Ridge and observed the fires without going to the Bridge Creek fire. COMFS personnel advised that Bridge Creek was not active.

8/**15/08 Friday 0800** A four person squad of the Wallow-Whitman (W-W) fire use module was assigned to the Bridge Creek Fire. They began monitoring and scouting the fire with COFMS employee Jim Valentine and personnel from two COMFS engine crews.

1030 All four of the wildland Fire Use fires were flown by Incident Commander Reidy, Operations Robb and Singley and District Ranger Bill Queen. The Whistler fire showed no active smoke or flame. The Bridge Creek Fire showed some growth from the previous day, with a size estimated at 2 to 3 acres by the IC. There was open flame visible from the air showing a low volume of smoke at this time. The group assessed the fire relative to the proposed MMA boundary.

During the Bridge Creek fire recon, verbal Management Action Points (MAP) were discussed during the flight. These included the ridge/bench line to the south, the meadows/ridge openings to the north and the old Maxwell burn to the east. There were contiguous fuels and opportunities for the fire to spread to the west.

Three options were discussed for the Bridge Creek fire:

1. Allow the fire to burn freely in all directions
2. Extinguish the fire at it's present size
3. Construct a "horseshoe" shaped fire line on the N, W and S ends of the fire. This would leave the east flank, towards the Maxwell fire to burn freely.

Option #3 was agreed upon with everyone in the aircraft (IC Reidy, District Ranger Queen, Operations Singley and Robb). The fire use module was given permission to use chain saws in the Wilderness and instructed to construct the "horseshoe" line. The intent was to limit fire growth until the IC and Forest could further assess objectives for continued management of the fire that afternoon.

After the flight, the District Ranger expressed his desire that a Stage III Assessment should be completed for the Bridge Creek Fire before the other fire use events, because of the proximity of private land. This was a change in priorities, from the Black Canyon fire to the Bridge Creek fire. The plan for a long term assessment was relayed to the team by the Incident Commander.

1300 hrs, the IC and Operations discussed the MMA boundary and the actions alternatives for fire. This included the discussion of the private property on the MMA boundary approximately 1 mile to the west from the active fire's edge.

1430 hrs The IC met with Chris Hoff, Bill Queen, Bryan Scholz, Craig Letz, Dave Owens, Kevin Donham to discuss the three alternatives for the management of the fire. At this meeting, the risks were discussed and the alternates presented.

1500 hrs The fire use module specialists observed group tree torching. They reported the spotting distance as 25 feet with a northeast wind direction (upslope). The fire use module specialists also reported fire spread rates in the 5 to 10 chains per hour. The contingency line, they were asked to build was completed.

1530 hrs The Acting Forest Supervisor and COFMS staff met and then informed IC Reidy that the Unit had decided the objectives for the Bridge Creek fire was to continue to manage the fire as "free burning".

1600 hrs The Fire Use module noticed that fire behavior had picked up and it had jumped over the contingency line. A request was placed through dispatch to contact the team to ask about the possibility of putting in another contingency line to hold the fire. This was denied since the Forest was now going to allow it to burn. Fire behavior was moderate/high at this time.

1645 hrs Air Attack from Redmond flew the fire and the W-W fire use module made contact. There were group torching of eight trees and the fire was creeping toward a scabby area to the East/South East. The fire use module informed the air attack that they were concerned about long range spotting due to the abundance of fuels and the possibility of extreme fire behavior tomorrow. Fire behavior on the ground was minimal at this time.

1800 hrs An IMT planning meeting was held for the following operational period. The team had been informed that the 450 road (MMA boundary) would need to be snagged before crews could work on preparing the road as a holding line. The district mentioned that only a small portion of the 450 road had been prepared during the past Maxwell fire.

Three hand crews were available in Redmond. However, only one crew (NW Regulars) and fallers were ordered, due to safety concerns with the number of snags. The other two crews were going to be ordered after the hazardous trees were mitigated. COFMS local engines were also available. Both the Stevenson and Pisgah lookout towers were staffed and monitoring the fire.

8/16/08 Saturday 0700 The fire use module and NW Regular crew were briefed and assigned to Bridge Creek fire. The assignment was to prepare FR 450 for holding or burnout actions and construct a safety route into and out of the fire area.

1045 Fire Behavior Analyst, Steve Harbert and Safety Officer, Eric Trimble arrived at the Bridge Creek Fire in late morning. They were at the fire site by noon. They estimated the fire size as 5 acres after walking the entire perimeter. Due to the unstable atmosphere smoke along the entire perimeter was drawing into the center of the fire. Eye level winds were light and variable. At 1200 hours only 5 to 10% of the perimeter had active flame. Flame lengths were 1 to 2 feet.

1100 The fire use module arrived on scene. They received approval to cut out some of the down and dead on the way to the fire for a better escape route to their safety zone. Two fuels plots were established. The fire was under the influence of an unstable atmosphere, Haines Index 5, high temperatures, and low humidity.

The following excerpt was written by Steve Harbert, FBAN.
Single tree torching was occurring at a rate of about 1 tree every 5 minutes. The torching trees often did not consume the entire crown. Some trees torched twice in order to consume the entire crown. The embers typically were carried to the interior.

The on site weather at 1300 was dry bulb = 84, wet bulb = 59, relative humidity = 21, eye level wind east at 1 mph. I estimated the tree top wind as west at 1 to 2 mph. By 1330 hours the situation had changed; 40 to 50% of the perimeter was actively flaming with fuel concentrations producing flame lengths about 4 feet. There was no head to the fire, it appeared that the entire fire was flanking or backing fire. Single and group tree torching was more frequent. The surface smoke was still pulling in. The lofted embers were falling outside the perimeter. Most of the embers fell within 10 feet of the perimeter, but some traveled as far as one chain from the perimeter. Eye level winds were still light. A high percentage of the lofted fire brands initiated new fire within 5 minutes. We estimated that total spread rate would be a couple of chains per hour through the remainder of day.

Photo taken about 1325 hours on the east flank by Eric Trimble. The near ground shows typical surface fuels. Lots of fuel in the ¼ inch to 3 inch diameter size classes. There is relatively little fuel less than ¼ inch in size class. The conifer needles and other fine fuels are on the ground surface as litter. The far left and right of the photo shows creeping fire without flame. The center of the photo shows fire intensity associated with a jackpot of fuel burning. Fire is climbing the bole of some trees.

This photo was taken about 1340 hours along the east flank. Very typical fuel load and arrangement, there is very little fine fuel above the ground surface. Almost all the fuel loading is in the large fuel size classes. Harbert estimate the flame length at one foot.

Photo at about 1345 hours on Saturday, by Eric Trimble. A spruce tree had recently torched, showering the area in front with fire brands. The left side shows new fire initiating about 20 feet in front of the perimeter. The spruce trees were the most susceptible to torching, and they produced abundance fire brands. There is a tree torching at the left hand edge of the photo, approximately 100 feet from our position. A larger percentage of the fire edge was open flame. Most of the perimeter was still creeping fire behavior.

Saturday, August 16 about 1430 hours, from the lookout spot (south of fire). The photo shows the volume of smoke being produced.

Trimble and Harbert talked briefly with OSC(t) Singley about what they had observed and our assessment of expected fire spread. We estimated that the fire would be 20 acres by end of shift based on current rate of spread. They left the area about 1530 hours to

return to ICP for strategy meeting for the next operational period. Trimble and Harbert passed Bill Queen while driving back to ICP and we noted that the smoke volume was about the same (moderate smoke volume) as the hour before, which is what we expected.

8/16/08 Saturday 1400 hrs The fire use module was asked by the District to locate the historic North Point Tree. OSC Jeff Riepe arrives at ICP.

1500 hrs Bridge Creek fire is estimated at 5 acres.

1630 hrs Bridge Creek fire begins it's first crown run. A column was building with spots on slope below the main fire. Smoke pulling into the main column.

1650 hrs The fire column continues to build and going plume dominated. An ice cap formed above the plume. The fire was making multiple runs upslope to the North, pulses of smoke added into the column. The column and fire then moved to the South.

1700 hrs The Bridge Creek fire spotted at least a quarter mile ahead and up into the flat. The spot formed its own column and another spot started about a half a mile ahead of the main fire. It formed a column as well. Wind at North Point observation point/tower was taken by the fire use module at gusts up to 17 mph. The fire breached the ridge and moved south across the flat.

1715 hrs The fire use module and all resources returned to the trucks. Jim Valentine received a call from his staff in the field and relayed the fire situation to Day Operations Robb at the ICP. Robb informed the team that there was spotting below the Pisgah Lookout tower, but it was still within the Wilderness and MMA boundary. A cell phone call from Bart Singley, Kevin Donham to Matt Reidy and Bill Queen updated everyone on fire status. Singley and Donham felt comfortable with fire intensity and direction, the fire is still meeting fire use objectives.

1725 hrs OSC (t) Singley met with Kevin Donham, Bryan Scholz and Craig Letz on the 450 road near the fire. Everyone agreed that the fire was still within the MMA perimeter and meeting objectives.

1730 hrs The entire staff at the ICP became aware the fire behavior had increased rapidly and reports were coming in that the fire was spreading toward the Pisgah Lookout . The smoke column was visible from the ICP in Prineville. The fire was reported to be moving strongly to the south in the heavy fuel and vegetation. Fire had spotted above the east – west running rim into the timber stringers that are interspersed with scablands.

1745 hrs. The fire was established in stringers of timber south of the 2630 road about 1 mile northwest of Mt. Pisgah Lookout. Night Operation Section Singley and the COMFS engines engaged in actions to protect the Pisgah Lookout and contain the spread on the 2630 Road.

1800 hrs. The fire grew into sections 4 and 5 and OSC(t) Singley identified the large meadow below the Pisgah lookout as a safety zone. The fire is estimated at 1,000 acres and the unit (COMFS) is ok with it's growth. Crews were instructed to prevent the fire's spread to the south across the 2630 road.

1900 hrs. A FUMT strategy meeting was held and new objectives were set for tomorrow's shift, (hold the fire east of 450 road). Fireline resources were ordered for tomorrow day shift with additional aerial support of one Type I and III helicopters, and one air attack platform. The FUMT ordered the following resources, 6 Type 5/6 engines, 6 Type I crews, 3 falling bosses, 4 Type II crews, 4 water tenders, 8 dozers Type II, 3 DIVS, 3 TFLD, one staging manager, and one OSC2. Aircraft had been ordered early.

1915 hrs. The smoke began to drift along the surface with the main column still aloft, it drifted to the southeast. The fire was group-torching in pine stringers not far from the 2630 road there was still very active burning ash fall across the road.

1930 hrs. At this time the entire fire was in the shadow of the smoke column. There was occasional torching, but the activity was slacking off and the column was dissipating. Weather was taken by the fire use module = RH 20, dry bulb temp 79, with group torching when the fire hit a jackpot or preheated fuels on the right flank.

2000 hrs. The operational focus was shifting to the west at the 2630 and 450 road junction. The fire had changed direction and was now moving strongly to the west. Fire spread (westward run) had moderated after a couple of hours.

There was a FUMT C&G meeting with the Forest Unit to discuss the updated information on the Bridge fire. ODF, George Ponte was called and a message was left to call the IC back.

2005 hrs. There was a good possibility that the fire made it to the North Point Lookout tree and possibly consumed it. The fire continued to creep and torch on the steeper slope North of North Point. Air Attack reported a 2-3 chain flaming front as the right flank advances up and down that slope.

2030 hrs. Night Ops Singley called and stated that the fire was moving NW toward road 450 and he was anticipating it to cross at the junction of roads 430 and 2630 in three hours.

2045 hrs. IC Reidy spoke with Bill Queen and both concluded that the public should be notified and evacuated from the public/private lands surrounding the fire. The Forest LEI was asked to contact the Wheeler County Sheriff's department and inform them of the approaching fire situation. Local Forest and COMFS resources start sweeping the 2630 road system to advise public to move from the fire area for there safety.

2100 hrs IC Reidy talks with Bill Queen and Craig Letz and advises them that if they were not successful in meeting the new objective of holding the fire east of Road 450 and

if the fire crosses into private land the fire strategy would change from fire use to suppression.

2140 hrs. IC Reidy makes contact with Bob Husbeth, the Acting Sheriff for Wheeler Co. He will contact Mitchell Fire dept to help evacuate the public near section 31. This included the residence of White Butte ranch, Half Knife, and Mary Cannon.

2145 hrs. IC Reidy spoke with ODF, George Pone and updated him on the fire status. With concurrence from Bill Queen, at Type II IMT was ordered for tomorrow. Set up meeting with ODF 0600 tomorrow for further update.

2215 hrs. Field staff reported the fire was at the 450 road and one mile north of 2360 to Masterson Spring.

2300 hrs. Fire activity increases dramatically for an hour. The fire spotted across the 450 road and began to move strongly to the north. East winds begin to pushing across the fire and activity picked up. The column pushed hard to the Northwest.

2330 hrs. IC Reidy, with concurrence of OSC Reipe directed Night OSC Singley not to engage the fire unless he had LCES in place. Night OSC acknowledged and stated they would only attempt to extinguish spot fires across road 450 when it was safe to do so.

2330 hrs. East wind hits surface at meadow/ staging. The fire pushed across 450 road and was approximately ~10 acres and growing from Masterson Spring to the west. OSC Riepe re-contacted the sheriff's office.

8/17/08 midnight Sunday 0015 hrs. At Pisgah Lookout, south wind steady 5-8. Wind over the fire appears to be East to SE. Stevenson lookout reported 200' flame lengths around road 2330. IC Reidy contacted ODF and received information that a private land owner, Craig Woodward was constructing fireline with a dozer on the Simpson property. The fire was within 300 yards of the structure.

0030 hrs. The Stevenson lookout tower reported spotting

0120 hrs. Still active torching, steady SE wind. The module returned to safety zone below Pisgah lookout and went out of service until 0600 hours.

0130 hrs Bob Husbeth, the Acting Sheriff for Wheeler Co. contacts IC Reidy that the evacuation of the public near section 31, this included the residence of White Butte ranch, Half Knife, and Mary Cannon is complete.

0230 hrs. ODF, Ed Keith communicated with OSC Reipe from the north end of the fire, that he was staging for more ODF resources to assist with property protection.

600 hrs IC Reidy and Bill Queen met with ODF George Ponte and Cliff Ledke to update them on the fire situation. ODF resources include: Ed Keith and a strike team of engines,

a water tender, and three dozers were constructing line at Craig Woodward's land/property.

0700 hrs Briefing - Day Operations Robb briefed with Night OSC Singley at Slide Mountain near the fire. Fire behavior and the previous night operations were discussed. The west and north side of the fire were currently blanketed with smoke. Visibility was poor, except on the south end of the fire, (Pisgah lookout).

Night Ops Singley has been on the line with the W-W fire use module, two local engines and the NW Regular 20 person crew since yesterday (Saturday) and all through the night. They were unable to prevent the fire from crossing the 450 road to the west during the night. The fire had also burned to the north on to private lands near White Butte.

In contacting ODF commander, Ed Keith (9104), he stated that he was scouting the Gable Creek and White Butte area to the NW of the fire and planned to use dozers to stop it's spread. There was limited communications with ODF, even though both of us had Forest Service frequencies with cell phone contact being marginal. Day OSC Robb was able to concur with ODF Kieth's plan later in the morning.

The strategy for the day shift was to anchor and go direct as possible. The plan was to connect the line with the ODF staff who was working on the west flank. The junction of the 2360 and 450 roads was used as the anchor. LECS was stressed as the highest priority. One of the main objectives was to construct line from the 450 road starting at the Simpson's green gate to their house. The Simpson house had been prepared the night before and was being monitored. The fire was not within the 300 yards as reported early.

0900 hours Fire behavior included single tree torching, puffs of dark smoke and small columns in several locations on the southwest end of the fire. Air attack was contacted and flew the east side of the fire, reporting moderate rates of spread. Night Ops returned to the ICP to go off shift.

By mid morning, 4 Type II hand crews, 2 dozers and overhead arrived. There were not any engines available from base camp, though the local district engines remained at the Pisgah Lookout tower. These resources were assigned to prep the south end of the 450 road to slow the fire and a dozer was used to improve the single track road to the Simpson property.

1100 hrs Inbriefing for Central Oregon IMT in Prineville.

Throughout the day the weather was hot and unstable atmosphere, with a Haines Index 6. Nighttime relative humidity recovery had been poor and contributed to the increased fire behavior throughout the day.

Fixed wing retardant drops were utilized throughout the day on all flanks of the fires, including in the Wilderness. Coordination with air attack went well. Vigorous torching in the timber stringer just south of the Meadow/Camp continued to occur.

1200 hrs Fire line resources were notified that another Type II IMT team/Rapp would be managing this fire (Bridge) by tonight at 1800 hrs.

An aerial recon with the day shift, Division Supervisor, Day Ops Robb and one of the Central OR IMT division supervisors was completed. Everyone concurred that the fire behavior was too erratic to construct direct line on the south end. Aerial retardant drops kept the fire in check north of Thompson springs.

At the direction of the division supervisor, two dozers and one hand crew safety worked the spot fires on the west side of the 450 road towards the Simpson's property. Another crew and the fire use module were assigned to construct hand line in one of the stringer of trees in the SE end of the fire near the 2630 road. This was within the designated Wilderness area. Unfortunately, the crew drove over a scab land patch and parked approximately 600 feet into the wilderness, before hiking to the fire.

Fire behavior continued to be active through out the afternoon and numerous groups of trees continued to touch on the SW corner of the fire.

Day OSC (t) Robb briefed the night Division supervisor from the Central Oregon Type II team. The transfer of command to the Central Oregon Type II IMT team occurred at 1800 hours.

This document is a compilation of notes taken on August 24, 2008 with members of the Northwest Fire Use Team in a effort to capture the major events that occurred during the Bridge Creek fire. Those who contributed were: Matt Reidy, Elly Young, Lynn Roehm, Barney Lyons, Eric Trimble, Bill Aney, Steve Harbert, Jeff Riepe, Alison Robb, Bart Singley, and W-W Fire Use Module leader Jeremiah Marsh.

SLIDE MOUNTAIN SLFO3 Temperature

Temperature for 14 days // Aug 8, 2008 - Aug 21, 2008

Local Hour of Day	Aug 08	Aug 09	Aug 10	Aug 11	Aug 12	Aug 13	Aug 14	Aug 15	Aug 16	Aug 17	Aug 18	Aug 19	Aug 20	Aug 21
00	59° F	51° F	42° F	45° F	52° F	52° F	61° F	60° F	65° F	71° F	64° F	53° F	54° F	51° F
01	60° F	50° F	40° F	44° F	54° F	51° F	59° F	60° F	66° F	71° F	63° F	51° F	52° F	51° F
02	60° F	51° F	38° F	46° F	53° F	50° F	60° F	59° F	67° F	70° F	66° F	51° F	49° F	50° F
03	57° F	52° F	41° F	45° F	53° F	50° F	60° F	59° F	62° F	67° F	68° F	52° F	51° F	50° F
04	57° F	52° F	39° F	45° F	54° F	51° F	58° F	60° F	63° F	64° F	67° F	48° F	51° F	50° F
05	59° F	50° F	40° F	44° F	55° F	52° F	59° F	60° F	65° F	65° F	68° F	50° F	51° F	47° F
06	56° F	50° F	42° F	46° F	53° F	50° F	59° F	64° F	65° F	65° F	66° F	49° F	50° F	46° F
07	58° F	50° F	45° F	48° F	54° F	52° F	56° F	63° F	66° F	70° F	65° F	47° F	52° F	46° F
08	64° F	58° F	51° F	58° F	66° F	60° F	69° F	73° F	75° F	72° F	66° F	52° F	52° F	45° F
09	64° F	57° F	52° F	58° F	70° F	66° F	72° F	76° F	79° F	76° F	65° F	51° F	52° F	49° F
10	69° F	59° F	54° F	57° F	70° F	69° F	74° F	79° F	79° F	82° F	72° F	54° F	52° F	-
11	71° F	64° F	57° F	64° F	71° F	69° F	76° F	81° F	83° F	84° F	73° F	58° F	56° F	-
12	75° F	64° F	61° F	68° F	73° F	74° F	77° F	81° F	89° F	86° F	69° F	59° F	58° F	-
13	74° F	66° F	66° F	71° F	76° F	75° F	82° F	85° F	89° F	87° F	69° F	62° F	57° F	-
14	73° F	69° F	65° F	72° F	76° F	78° F	82° F	87° F	92° F	91° F	69° F	65° F	62° F	-
15	75° F	70° F	67° F	72° F	78° F	79° F	86° F	88° F	92° F	93° F	68° F	65° F	61° F	-
16	80° F	68° F	63° F	74° F	78° F	79° F	83° F	87° F	90° F	91° F	70° F	66° F	55° F	-
17	66° F	67° F	64° F	73° F	74° F	79° F	84° F	87° F	90° F	92° F	65° F	67° F	57° F	-
18	65° F	66° F	64° F	70° F	75° F	75° F	82° F	85° F	91° F	87° F	59° F	61° F	57° F	-
19	64° F	61° F	60° F	70° F	70° F	72° F	77° F	80° F	88° F	80° F	56° F	59° F	57° F	-
20	60°	54°	56°	61°	62°	67°	69°	71°	79°	75°	51°	58°	54°	-

	F	F	F	F	F	F	F	F	F	F	F	F	F	
21	58° F	49° F	50° F	59° F	60° F	63° F	65° F	68° F	80° F	74° F	52° F	54° F	54° F	-
22	56° F	44° F	49° F	55° F	56° F	61° F	62° F	66° F	80° F	70° F	50° F	53° F	52° F	-
23	54° F	43° F	46° F	56° F	56° F	61° F	62° F	62° F	77° F	65° F	55° F	52° F	53° F	-

SLIDE MOUNTAIN SLFO3 Relative Humidity

Relative Humidity for 14 days // Aug 7, 2008 - Aug 20, 2008

Local Hour of Day	Aug 07	Aug 08	Aug 09	Aug 10	Aug 11	Aug 12	Aug 13	Aug 14	Aug 15	Aug 16	Aug 17	Aug 18	Aug 19	Aug 20
00	49%	55%	91%	87%	91%	62%	58%	49%	50%	33%	22%	49%	64%	76%
01	42%	54%	79%	92%	94%	62%	65%	51%	50%	31%	20%	46%	71%	84%
02	50%	64%	82%	91%	88%	64%	65%	49%	51%	29%	22%	43%	74%	93%
03	49%	57%	77%	84%	88%	65%	63%	51%	53%	35%	26%	38%	71%	93%
04	53%	62%	77%	76%	89%	63%	49%	56%	47%	34%	25%	34%	86%	94%
05	51%	60%	90%	80%	92%	51%	49%	58%	46%	34%	24%	39%	85%	94%
06	51%	67%	88%	77%	93%	59%	51%	55%	44%	33%	27%	43%	89%	94%
07	57%	69%	81%	76%	87%	61%	62%	62%	43%	35%	25%	46%	91%	91%
08	45%	61%	58%	62%	63%	40%	50%	42%	37%	26%	26%	45%	83%	86%
09	46%	60%	50%	53%	64%	39%	45%	38%	30%	22%	26%	55%	85%	86%
10	40%	56%	51%	46%	62%	35%	40%	35%	28%	22%	16%	43%	76%	89%
11	49%	50%	49%	42%	47%	34%	37%	32%	26%	17%	12%	36%	61%	81%
12	37%	43%	46%	40%	33%	31%	32%	28%	25%	12%	11%	39%	51%	78%
13	32%	36%	41%	38%	33%	29%	29%	23%	22%	14%	11%	36%	47%	74%
14	72%	29%	36%	35%	36%	27%	27%	22%	17%	14%	10%	37%	40%	62%
15	73%	24%	32%	34%	37%	29%	27%	19%	16%	12%	8%	44%	36%	67%
16	69%	20%	30%	40%	36%	30%	27%	18%	15%	10%	7%	42%	32%	88%
17	93%	57%	28%	42%	36%	30%	27%	19%	18%	9%	7%	51%	34%	78%
18	83%	68%	33%	39%	35%	31%	29%	21%	18%	10%	8%	62%	41%	74%
19	68%	65%	47%	48%	36%	34%	31%	27%	21%	10%	15%	74%	47%	77%
20	80%	71%	60%	61%	45%	50%	41%	38%	28%	14%	25%	82%	55%	88%
21	94%	77%	69%	74%	50%	60%	46%	43%	32%	14%	28%	80%	73%	87%
22	85%	80%	77%	78%	57%	60%	52%	46%	35%	14%	33%	71%	69%	80%
23	64%	84%	86%	87%	58%	56%	51%	49%	39%	18%	43%	60%	75%	81%

Relative humidity was a critical variable proceeding and during the spread event. Beginning August 15th at 8am RH went below 40%, and did not go above 40% until 11 pm on August 17th.

SLIDE MOUNTAIN SLFO3 Wind Speed

Wind Speed in mph & Wind Direction for 14 days // Aug 7, 2008 - Aug 20, 2008

Local Hour of Day	Aug 07	Aug 08	Aug 09	Aug 10	Aug 11	Aug 12	Aug 13	Aug 14	Aug 15	Aug 16	Aug 17	Aug 18	Aug 19	Aug 20
00	4 mph	3 mph	0 mph	0 mph	0 mph	0 mph	0 mph	1 mph	0 mph	0 mph	0 mph	0 mph	0 mph	8 mph
01	4 mph	0 mph	0 mph	0 mph	0 mph	0 mph	0 mph	0 mph	0 mph	3 mph	0 mph	0 mph	1 mph	10 mph
02	1 mph	0 mph	0 mph	0 mph	0 mph	0 mph	0 mph	0 mph	0 mph	2 mph	2 mph	3 mph	3 mph	6 mph
03	0 mph	0 mph	0 mph	0 mph	0 mph	0 mph	0 mph	1 mph	0 mph	5 mph	1 mph	1 mph	2 mph	6 mph
04	2 mph	1 mph	0 mph	0 mph	0 mph	0 mph	0 mph	0 mph	0 mph	4 mph	3 mph	0 mph	4 mph	5 mph
05	0 mph	1 mph	0 mph	0 mph	0 mph	0 mph	0 mph	0 mph	0 mph	4 mph	3 mph	2 mph	4 mph	5 mph
06	5 mph	4 mph	0 mph	5 mph	0 mph	4 mph	0 mph	0 mph	0 mph	5 mph	1 mph	6 mph	6 mph	6 mph
07	2 mph	2 mph	4 mph	3 mph	0 mph	3 mph	0 mph	0 mph	0 mph	4 mph	1 mph	5 mph	6 mph	6 mph
08	3 mph	4 mph	2 mph	6 mph	0 mph	2 mph	1 mph	0 mph	0 mph	3 mph	0 mph	9 mph	6 mph	7 mph
09	0 mph	6 mph	6 mph	3 mph	4 mph	1 mph	0 mph	0 mph	0 mph	4 mph	1 mph	2 mph	6 mph	10 mph
10	0 mph	6 mph	5 mph	6 mph	2 mph	2 mph	2 mph	2 mph	1 mph	5 mph	3 mph	1 mph	4 mph	9 mph
11	0 mph	6 mph	5 mph	4 mph	5 mph	3 mph	4 mph	4 mph	3 mph	3 mph	6 mph	4 mph	8 mph	8 mph
12	4 mph	3 mph	5 mph	5 mph	3 mph	2 mph	3 mph	4 mph	4 mph	1 mph	5 mph	3 mph	6 mph	8 mph
13	3 mph	5 mph	6 mph	3 mph	1 mph	4 mph	2 mph	3 mph	4 mph	2 mph	5 mph	8 mph	7 mph	8 mph
14	0 mph	6 mph	7 mph	5 mph	3 mph	5 mph	2 mph	3 mph	3 mph	3 mph	3 mph	4 mph	6 mph	11 mph
15	3 mph	6 mph	3 mph	4 mph	4 mph	3 mph	4 mph	2 mph	3 mph	2 mph	3 mph	3 mph	8 mph	9 mph
16	5 mph	6 mph	7 mph	4 mph	4 mph	3 mph	4 mph	5 mph	4 mph	3 mph	3 mph	2 mph	7 mph	7 mph
17	0 mph	4 mph	3 mph	3 mph	5 mph	6 mph	3 mph	4 mph	5 mph	4 mph	4 mph	4 mph	6 mph	10 mph
18	0 mph	3 mph	4 mph	2 mph	4 mph	4 mph	5 mph	5 mph	5 mph	2 mph	2 mph	1 mph	4 mph	7 mph
19	4 mph	3 mph	4 mph	5 mph	2 mph	7 mph	4 mph	4 mph	5 mph	1 mph	5 mph	0 mph	1 mph	9 mph
20	4 mph	2 mph	3 mph	1 mph	0 mph	3 mph	0 mph	0 mph	1 mph	0 mph	0 mph	0 mph	5 mph	7 mph
21	4 mph	2 mph	0 mph	0 mph	0 mph	3 mph	0 mph	0 mph	0 mph	1 mph	3 mph	0 mph	5 mph	8 mph
22	4 mph	1 mph	0 mph	0 mph	0 mph	2 mph	0 mph	0 mph	0 mph	2 mph	4 mph	0 mph	7 mph	8 mph
23	4 mph	0 mph	0 mph	0 mph	0 mph	1 mph	1 mph	0 mph	0 mph	2 mph	0 mph	1 mph	6 mph	8 mph