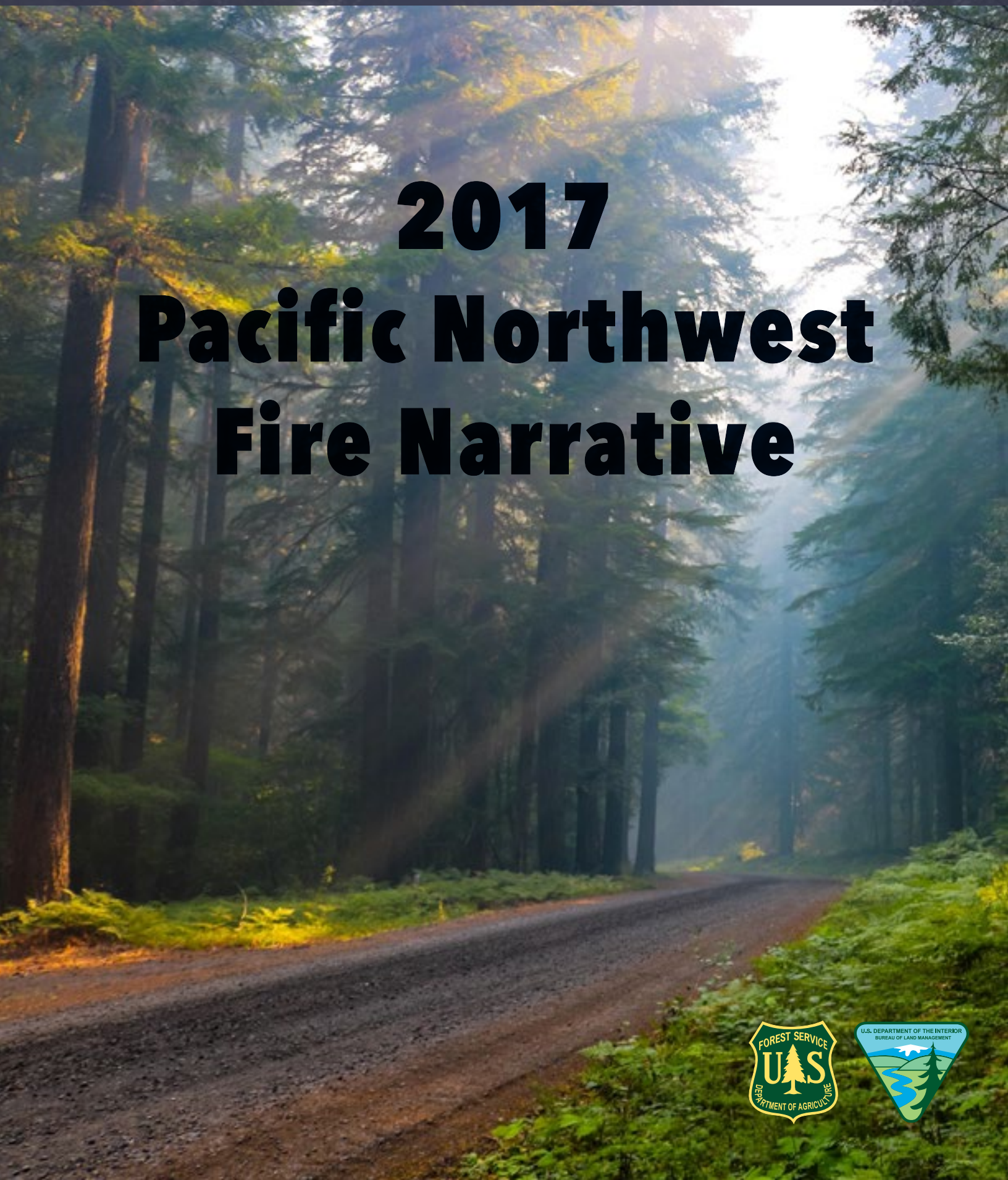
USDA Forest Service and DOI Bureau of Land Management



2017 Pacific Northwest Fire Narrative

Background: Night operations High Cascades Complex

The 2017 Fire Season Narrative is dedicated to the memory of Ray Rubio, a Redmond smokejumper who died on December 19, 2016 from injuries sustained in a fall after a late season assignment to the Southeast. An Army veteran from the 82nd Airborne, Ray worked for the federal government for 25 years, 22 years as a smokejumper.

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Background: Fuels burn during the Milli Fire in Deschutes National Forest near Sisters, OR, August 24, 2017

Executive Summary

The 2017 Pacific Northwest fire season was as memorable as it was long and arduous. The season was characterized by extreme fire behavior on multiple large long-duration fires, as well as high visibility wildland-urban-interface incidents. Compounding the effect were the August 21 Total Solar Eclipse, other national incidents and natural disasters straining the capacity of firefighting resources during times of high fire activity nationwide. The geographic area was in Preparedness Level 5 for a record 40 days. Many incident management teams and firefighters had assignments that extended beyond the typical 14 days. Despite the challenging season and ensuing fatigue, the region maintained a solid safety record.

The long season started for many in late fall of 2016, when around 800 fire personnel from the Pacific Northwest traveled to the southeastern United States after a string of arsonists across multiple states ignited late season fires. Drought and high winds combined with the human-caused starts, resulting in unusually large and rapidly spreading fires for that part of the country.

In the Pacific Northwest, planning for the August 21 Solar Eclipse began in earnest in January. Fire managers across multiple jurisdictions coordinated with partners and cooperators statewide to prepare for the anticipated 1 million additional visitors across the 70-mile wide path of totality during the peak of Oregon's wildfire season. Early season efforts focused on addressing concerns and mitigating threats through prevention and information campaigns. The logistical complexity of hosting the anticipated number of visitors was difficult to quantify and fire managers prepared for worst-case scenarios. Emergency services personnel expressed concerns about potential ignitions and fast-moving fires in areas with high numbers of eclipse visitors, and roads with limited access and transportation issues.

Lightning ignited several fires in late June prompting the mobilization of a Type 2 IMT to Sutherland Canyon and Straight Hollow Fires in Washington. At the end of June, the region had seven existing large fires. At the same time, the Malheur National Forest prepared for the July 4 Rainbow Family Gathering following the abrupt location announcement on June 20. The rural communities of eastern Oregon were still recovering from the occupation of the Malheur National Wildlife Refuge in 2016 and braced for the large crowds both the gathering and the eclipse would bring. An incident management team (IMT) was deployed and established unified command with local and regional fire and law enforcement leaders. With an anticipated 25,000 visitors, the region was experiencing high fire danger indices and red flag conditions. While Eastern Oregon saw no increased fire activity due to the Rainbow Family Gathering in July at the time, many of those visitors were expected to stay in Oregon to await the eclipse, increasing the concern about human-caused ignitions.

July temperatures were well above average for much of the western US. The month was characterized by heavy lightning activity that sparked multiple long-duration fires. A Type 1 IMT was ordered for the Silver Dollar Fire that ignited near the Hanford Nuclear Site in Washington State at the beginning of July. In mid-July, the region went to Preparedness Level 3 in anticipation of lightning storms in eastern Oregon. Heavy initial attack activity was under way with almost 1,000 lightning strikes recorded on July 14, igniting three large fires in Washington.

During late July, multiple lightning-caused fires ignited in steep and difficult terrain that prompted fire managers to use indirect fire suppression tactics. Several fires were reported that would become long-duration fires including Indian Creek (which merged with Eagle Creek in September), Noisy Creek, Chetco Bar, and Whitewater. Abundant lightning events from July 24 through 26 produced more than 3,000 strikes igniting what would become several complexes in the central and southern Oregon Cascades. The month concluded with fire managers bracing for record heat in the PNW and multiple red flag warnings issued.

The month of August proved to be the warmest on record for a number of climate zones in Oregon and Washington. All-time record (since 1990) values of regional energy release components (ERCs) were reached around August 1 and again in late August due to the continuing hot, dry weather.

During this month, the region experienced extreme temperatures, dry weather, poor nighttime humidity recovery, and unstable atmospheric conditions. Additionally, the entire region was impacted by smoky conditions from fires burning in Canada and California. Along with the hazardous smoke conditions, wildfires made headlines frequently. Governor Kate Brown declared a State of Emergency on August 2 to address statewide fire activity. This enabled the mobilization of the Oregon National Guard to support firefighting efforts. On August 3, the region moved to Preparedness Level 4 for nine days. On August 12, the Pacific Northwest region transitioned to a Preparedness Level 5 and remained there for a record 40 consecutive days.

Lightning storms moved through the area again, igniting several fires in Oregon and Washington. Many of these fires continued to grow into project fires, with residents and visitors heavily impacted by smoke, highway closures, and evacuations. At this time, smoke was presenting health hazards and limiting visibility in many parts of the region. In southern Oregon, the Chetco Bar Fire quadrupled in size in mid-August, making a six-mile run one day towards the coastal town of Brookings. The Whitewater Complex closed miles of trails along the eclipse path of totality in the Mount Jefferson Wilderness, including 30 miles of Pacific Crest Trail and hundreds of acres of forest and wilderness, potentially pushing more visitors to central and eastern Oregon each time the area and road closures increased.

In the days prior to the eclipse, many parts of central and eastern Oregon experienced gas shortages and severe traffic congestion. However, during and after the event, no worst-case scenarios emerged. Extensive multi-agency cooperation as well as the deployment of four Fire Prevention Education Teams under a consolidated fire prevention campaign resulted in having no known human-caused fires evolving into any fires of significance.

Early in the season, the eclipse looked to be 'the story' of the 2017 fire season. However, in the days prior to the eclipse, multiple large fires emerged across the country and in the region. In the days following, the Chetco Bar Fire became classified as a megafire, with 100,000+ acres burned. Governor Brown invoked the Emergency Conflagration Act four times in 2017 to make additional state resources available to firefighters and

local first responders. This allowed the Oregon State Fire Marshal to mobilize resources to assist local resources in managing the imminent threat to life, safety, and property that exceeds local firefighting capabilities. The Conflagration Act was invoked for the Flounce, Milli, and Chetco Bar fires in the month of August.

On August 25, Hurricane Harvey made landfall in Texas, further stressing the amount of resources available to fight ongoing fires in the Pacific Northwest. During this month, it was not uncommon to have a long list of orders in Unable to Fill (UTF) status. In addition to fires occurring nationwide, local units began making their firefighters available only after the eclipse. In late August, air quality in the Pacific Northwest continued to be poor, and fire personnel saw no relief in sight.

While many resources where still attached to active incidents in the region, the Columbia River Gorge was experiencing historic energy release components leading up to the Labor Day weekend. The Eagle Creek Fire ignited on September 2. The Conflagration Act was invoked once more, mobilizing the Oregon State Fire Marshal teams to the most high profile fire in the region that quickly became the national priority. Fires across the region experienced explosive fire behavior with multiple fires growing significantly in size from September 2 through the 6.

On September 11, the Department of Defense authorized the 23rd Brigade Engineer Battalion and 1-23 Infantry Battalion from Fort Lewis in Washington State to provide 245 active duty military personnel. The Unit was sent to the Umpqua North Complex in southern Oregon, but also worked several nearby fires until September 26.

Hurricane Irma made landfall in Florida in early September, and Hurricane Maria devastated Puerto Rico in mid-September. As the northwest experienced a cooling trend in mid-September, firefighters and a Pacific Northwest incident management team was deployed to support in these disaster relief efforts. As fire season appeared to slow in the Pacific Northwest in October, Northern California saw a string of devastating fires in Wine Country. Fire personnel from the Pacific Northwest supported firefighting efforts in Sonoma County and the Southern California fires into the month of December.

According to the national fire summary produced by the National Interagency Coordination Center, 2.87 million acres of National Forest System lands and 2.71 million acres of lands managed by the Bureau of Land Management were affected by fire nationally in 2017. Within the Northwest geographic area, Oregon had 2,058 fires for 717,219 acres, while Washington had 1,346 fires for 404,223 acres. Of those 1,254 lightning-caused fires burned an estimated 655,578 acres, mostly on National Forest System lands in Oregon. An estimated 465,864 acres burned in the Northwest from 2,150 human-caused fires. Humans caused 91 percent of the fires in Washington and 45 percent of the fires in Oregon.

Persistent fire activity nationwide, as well as large fires in wildland-urban interface, brought wildland fire into the public consciousness in 2017. It is no stretch to say that it was an exceptionally long and arduous season for the Pacific Northwest community and for fire and emergency services personnel.

Despite the high amount of fire activity in extremely difficult terrain, the region faced no fire-related fatalities. This may be the most significant marker of success for the Pacific Northwest fire programs in 2017.

Background: Eagle Creek Fire, September 5

2017 Fire Season Milestones

Significant Numbers

Type 1 and Type 2 incident management teams (IMTs) deployed 42 times through the 2017 season in the Northwest geographic area (for comparison, NW IMTs were mobilized 17 times in 2016 and 56 in 2015).

The Pacific Northwest spent 40 consecutive days at Preparedness Level 5. By comparison, the Pacific Northwest was at Preparedness Level 5 for 23 days in 2015 (Aug. 13-Sept. 4).

During peak activity, more than 10,358 firefighters and support personnel were working on Pacific Northwest fires, (for comparison, the number was 4,200 in 2016).

Fire Behavior

The west side, with more humid climate and wetter conditions than the east side, had an unusual amount of the fires this year.

The thousand hour fuels (logs 3 to 8 inches in diameter) did not recover from the drought, leading to high elevation fires much earlier than predicted. In addition, the unusually warm and dry conditions resulted in rapid snowmelt and very low live fuel moistures.

Historic Energy Release Components (ERCs) in some areas led to extreme fire behavior:

- The Chetco Bar Fire made a 6-mile run in one burn period, and was igniting spot fires 1 1/2 to 4 miles ahead of the flame front.

- The Diamond Creek Fire in Washington experienced nearly 95,000 acre growth in a 24-hour period.

- The Eagle Creek Fire in the Columbia River Gorge National Scenic Area spread 13 miles in 16 hours, much of that overnight. Around 2 a.m., the fire spotted across the Columbia River into Washington State and ignited the Archer Mountain Fire.

By the end of the fire season, the Pacific Northwest had about 3,404 fires reported for 1,121,442 acres.

126 fires met large fire criteria, (for comparison, 68 in 2016).

A total of 35,833 lightning strikes were recorded, the highest number of strikes in one day occurred on 6/26 with 5,756 (22,197 in 2016 / 2,257 on 6/7/16 for comparison)

National Fire Activity/Natural Disasters

Wildfire activity occurred consistently throughout the year, beginning with the Fall Fire Siege in the Southeast in late 2016 and continuing in the Southwest and West in the spring and summer.

In addition to fire activity, other natural disasters stressed the amount of resources that would normally respond to fires. Agency firefighters, Type 1 IMTs and fire vendors responded to hurricanes in Texas, Florida, Puerto Rico, and the US Virgin Islands in September.

In late fall 2017, Northern California experienced devastating fires in the Wine Country, where 42 civilians and 1 firefighter were killed and more than 8,500 structures burned.

During the peak of fire season, resources orders were often returned as Unable to Fill (UTF), including orders for five IMTs, 60 crews, 403 engines, 6,171 overhead and 23 helicopters.

Successes

While the number of fires and acres were high this year, we had no fire-related fatalities and a much lower number of structures burned than in 2014 or 2015.

Oregon was the first state to be affected by the Total Solar Eclipse on August 21. More than a million visitors were expected to visit Oregon. Due to smoke from active large fires, the actual number was lower than expected. Well-planned and coordinated prevention efforts across multiple agencies and partners resulted in no known human caused ignitions that evolved into any fires of significance.

Preseason: January through May

- Predictive Services issued forecasts and compared past forecasts with actual conditions for snowpack, temperature, and precipitation.
- Each local Forest and BLM District conducted training and preseason meetings, often with cooperators, to prepare for the upcoming fire season. Many Oregon units focused on the preparations for the August 21 Total Solar Eclipse and broadened tabletop exercises and simulations to include non-traditional partners, such as county emergency management and local hospitals, to ensure coordination during the eclipse.
- The national and regional training centers offered a number of courses to train the fire community for various positions in operations, plans, finance, logistics, fire information, and resource advisor.
- Earnest planning for the August eclipse began in January, however for the State and Regional Office and most units, initial plans began more than a year in advance.
- Hiring of new and returning seasonal firefighters began.
- Predictive Services continued to issue forecasts and seasonal outlooks for the upcoming fire season. Based on April 1 snowpack and other indicators, it appeared that the upcoming season would be relatively mild.
- In April, the Pacific Northwest Coordination Group conducted an Executive Simulation building upon high-volume fire activity and other incidents causing a draw on critical resources. The simulation exercise engaged Pacific Northwest Region executives and Pacific Northwest Wildfire Coordinating Group representatives in a realistic multi-agency coordination training that replicated fire conditions over and above what was experienced during the 2015 fire season. With new leadership in place in both states and some federal agencies, the simulation's goal was to build relationships, improve communications and decision making on incident prioritization, as well as interagency coordination and cooperation. The final stage of the exercise added the August 21 Total Solar Eclipse scenario modeling the one million expected visitors traveling to Oregon. Executives discussed concerns, challenges, and opportunities that could potentially arise with an event of that magnitude during the peak of fire season. The simulation helped model the high-stress environment when extreme burning conditions and critical resource shortages simultaneously exist over a prolonged period.
- The Forest Service Chief's Letter of Intent for the 2017 Fire Season was sent to fire managers and other leaders in May.
- Preparedness reviews occurred on all National Forest and BLM Districts to assure that firefighters, equipment, and fire caches were ready. In June, Oregon and Washington BLM underwent a National Preparedness Review, which is conducted every four years, to establish standardization and ensure all BLM fire programs are following policy. Review teams include up to 22 checklists to cover everything from Agency Administrator's knowledge, involvement, and qualifications of their fire programs down to the training and readiness of new firefighters. The checklists are the most effective way to maintain consistency from year-to-year and to track trends.

Leaders Intent:

Date: March 20, 2017

Subject: Chief's Letter of Intent for Wildland Fire - 2017

To: Regional Foresters, Station Directors, IITF Director, Deputy Chiefs and WO Directors

Responding to fire continues to be among our highest risk and exposure work. As in 2016, our expectation continues to be for all of us involved in fire response to focus our efforts intently on the decisions we make as agency administrators, incident managers and individual responders.

"This year, we must strengthen our commitment to implement strategies and tactics that commit responders only to operations where and when they can be successful, and under conditions where important values actually at risk are protected with the least exposure necessary while maintaining relationships with the people we serve. We expect that during such periods protecting lives of responders is the objective-we don't expect and we won't allow responders to risk their lives attempting the improbable," Chief Thomas Tidwell.

Each of us must remain committed to "stop, think and talk" before "acting" in any circumstance that feels like it may represent unnecessary exposure. I appreciate your support and commitment working toward those goals, openness to talk about the issues that impede us and your help to resolve those issues that keep us from making the best informed decisions to minimize risk and exposure. I expect us to continue to be aggressive implementing tactics that are necessary and have a high probability of success; to accept when all we can do is point protection, until the fuels or weather change. I also expect us to be aggressive recognizing when tactics are unnecessary or will have no effect and only increase the exposure of our fire responders and pilots.

Thank you for making the most of the Life First engagement sessions last year. Some themes that emerged from these discussions included communication both on and off the fireline, driving to and from fire and all work assignments, fire mop up and the use of aircraft, especially in response to fire. We have room for improvement in these four areas and this year

I'm asking you to focus efforts toward addressing these concerns. It takes all of us to learn together as we significantly increase the odds that everyone goes home safely each day. I invite you to watch this video to learn more about what we learned from the Life First sessions last year: https://youtu.be/YAoR2bCEEBY Our Safety Journey continues this year combining Life First and safety journey efforts to strengthen collaboration within our agency, with our partners and local communities. The intent is to build on our previous work and continue to learn more about what will improve our wildland fire systems, and work environment and bring everyone home safely every day.

/s/Thomas L. Tidwell

Thomas L. Tidwell

Chief

USDA Forest Service

Background: Field of purple lupine

Fire Season Key Elements

Introduction

Weather and climate, as well as successful interagency coordination played a role in how the 2017 fire season progressed and in the outcomes of the wildfires. Significant weather and climate events shaped the 2017 season like early snowpack, flash drought, and lightning and wind events. Non-traditional events like the Rainbow Family Gathering and the August Total Solar Eclipse required cooperation and coordination in the region during fire season. Despite the large crowds that gathered on forests and grasslands for these events, successful interagency coordination resulted in no human-caused fires developing into fires of significance. Lastly, the section addresses Multi-Agency Coordination (MAC) group and the process they use to address multiple fires and complexes during the peak of fire season.

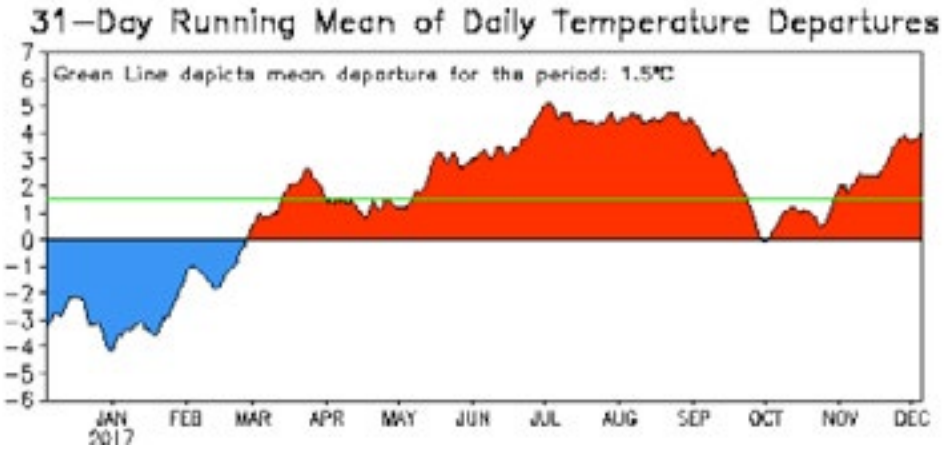


Figure 1-2. Departure from average temperatures in Yakima, WA for 2017. Red indicates warmer than average temperatures, blue indicates cooler than average, green line indicates the mean departure from average for the year. One degree C equals 1.8 degrees F. Source: NOAA.

Weather and Climate

Pre-fire Season

Winter and spring of 2016-2017 brought cold temperatures and continuous heavy accumulation of precipitation to the Pacific Northwest and the Northern Rockies. As late as May, precipitation totals revealed that Oregon and Washington had received well above average rain or snow for the prior six months. Some climate zones were well above average accumulation and by April, regional reservoir storage was reported as reaching full capacity.

As of May 1, 2017, Snow Telemetry (SNOTEL) reporting sites were reporting greater than typical accumulation of snow (Figure 1-1). Timberline Lodge in Oregon had tabulated more than 520 inches total snowfall. The cold, wet winter was attributed to La Niña conditions, which typically bring such conditions to the Pacific Northwest.

However, temperatures across the Northwest geographic area began warming above average in spring of 2017 even as precipitation continued across much of the area. Precipitation declined significantly after mid-June but temperatures continued to climb to above average across the geographic area. For example, Yakima, WA warmed to above average temperatures in March and remained above average until October, with well above average temperatures in June through mid-September (Figure 1-2).

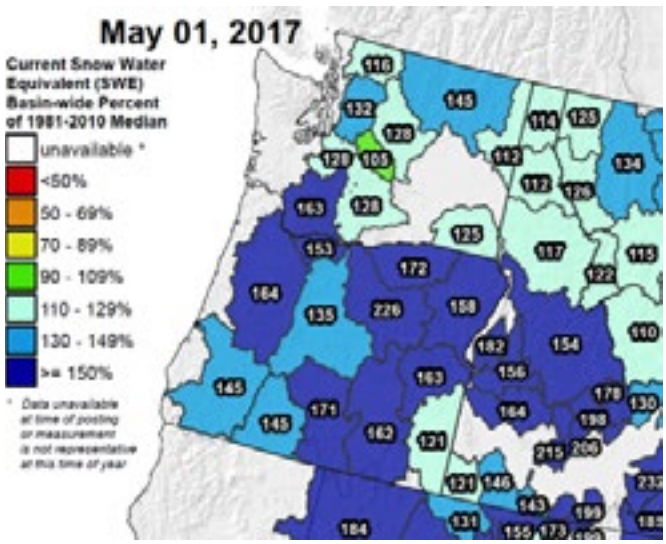


Figure 1-1. Snow water equivalent as of May 1 indicated a snowpack well above average across most of the Northwest, particularly in Oregon.

Source: Natural Resources Conservation Service.

Fire Season Temperatures

Temperatures continued to warm through July and peaked in August. July temperatures were well above average for much of the western US while August of 2017 proved to be the warmest August on record for a number of climate zones in Oregon, Washington, and northern California (Figure 1-3). Multiple records were set for consistent warm temperatures.

A look at a time series of August temperatures for Oregon, Washington, and Idaho stretching back to 1950 reveals that August of 2017 was the warmest ever recorded (Figure 1-4). August temperatures for this region appear to be on an upward trend since about 1995. Only four Augusts since 1995 have had average or below average temperature.

The three-month period (June, July, and August of 2017) proved to be the warmest on record for the significant portion of the western United States.

Temperatures returned to normal or below in mid-September when a wet cold front brought a major weather change to the region. Cold, moist air lingered over the region bringing rainfall sub-

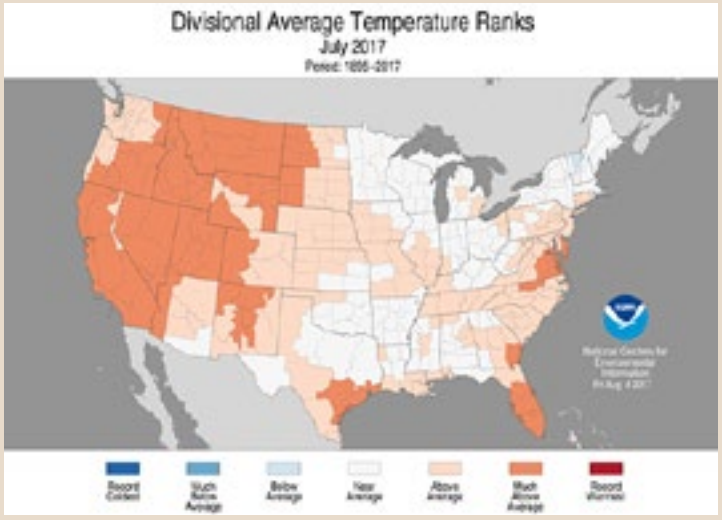


Figure 1-3. Time series of average temperature in August for Oregon, Washington, and Idaho combined. Source: NOAA

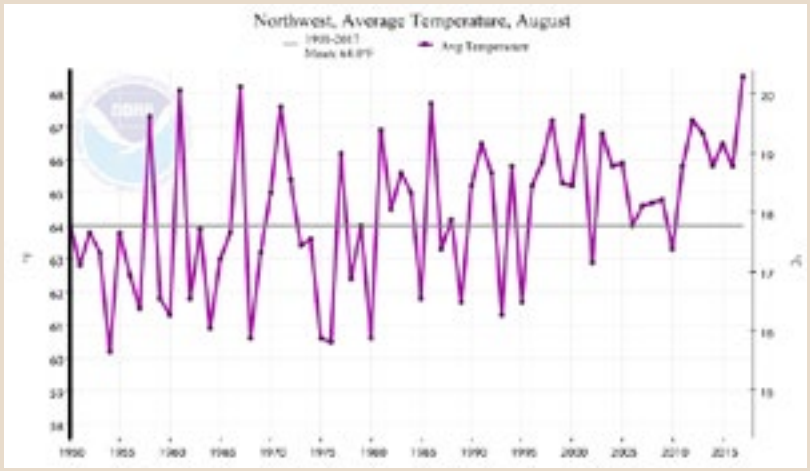


Figure 1-4. Departure from average temperatures for meteorological summer (June-August) 2017 by climate division. Source: NOAA

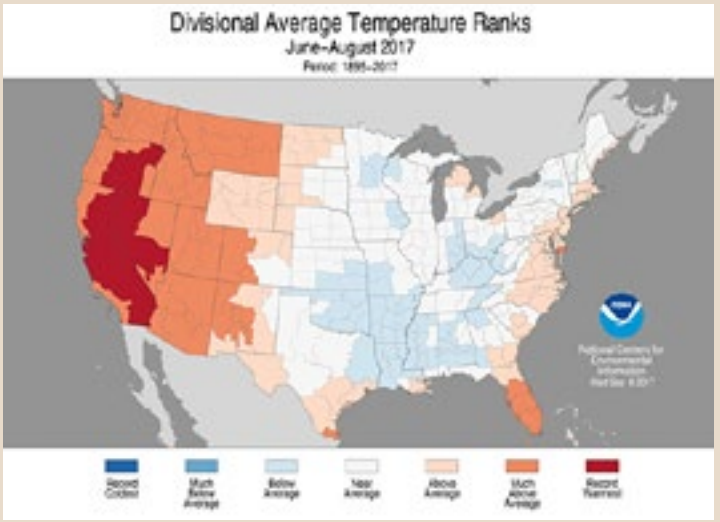


Figure 1-5. Departure from average temperatures for July and August 2017 by climate division. Source: NOAA.

stantial enough to put a stop to new large fire outbreaks and halt the growth of existing large fires. Fire season was effectively ended by this event.

Fire Season Precipitation

Precipitation continued to accumulate over the Northwest geographic area in the spring of 2017, even as temperatures began rebounding back above normal. However, periodic frontal systems stopped arriving in mid-June and a lengthy dry spell followed. Cities such as Portland and Seattle went over 50 days before rain returned, briefly and sparsely, in early August. Another dry spell lasting more than month followed on its heels.

Overall, the three-month period June through August of 2017 was drier than typical for most of the northwest geographic area but was not the driest on record. However, the high temperatures over the same period resulted in much drier conditions than would otherwise be expected based on precipitation alone.

Flash Drought Development

The rapid change in temperature followed by the lack of precipitation in June created a flash drought potential. Flash droughts develop very quickly with little or no warning that a drought is developing. The wet winter and spring combined with the warm temperatures resulted in significant plant growth. However, as the precipitation dwindled and temperatures began to climb, the atmospheric demand for water resulted in very high evapotranspiration rates, leading to rapid curing of grasses, rapid loss of moisture from dead woody fuels, and rapid development of drought stress in live fuels such as trees and shrubs. Over the three-month period between when the rains ended in mid-June and when they restarted in mid-September, the equivalent of extreme drought developed over the forests of the Northwest.

Unusually warm temperatures in July and August likely led to the flash drought. Energy Release Component (ERC) values, a measure of fire danger and seasonal drought, also ran well above average across Oregon and Washington

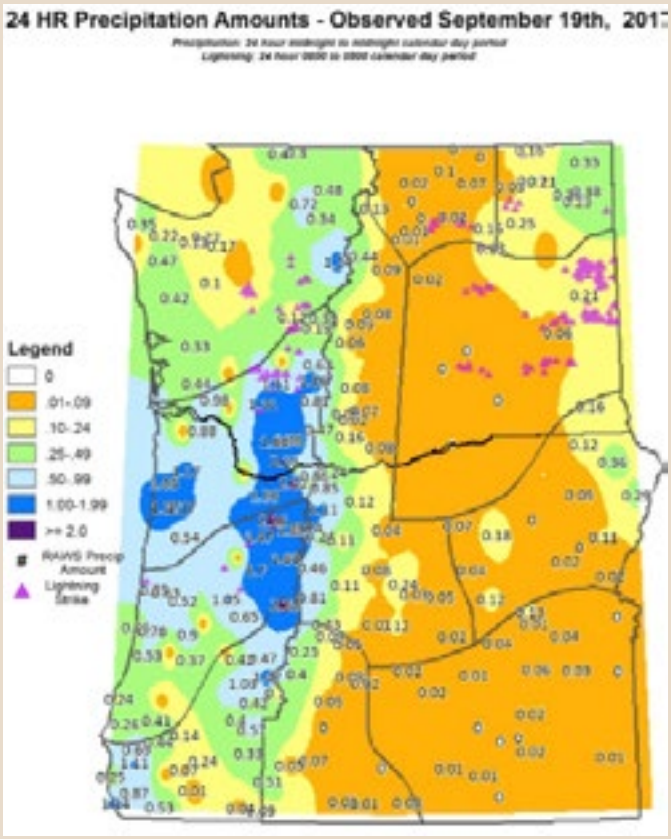


Figure 1-6. 24-hour rainfall amounts for September 19, 2017 in Oregon and Washington. Source: NOAA

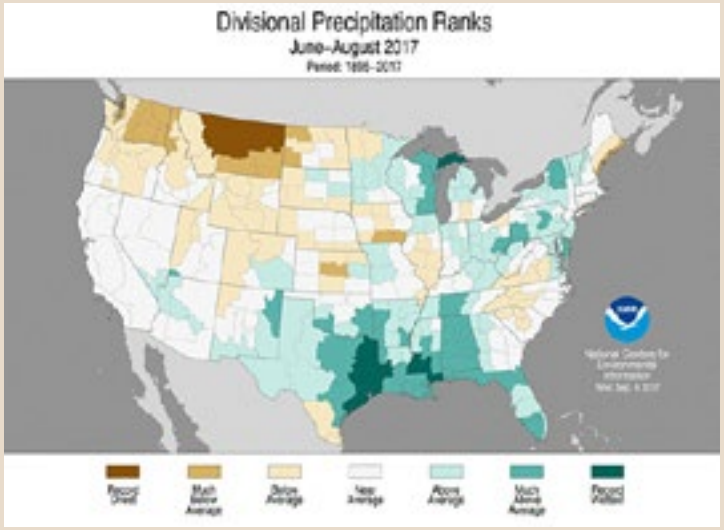


Figure 1-7. Departure from average precipitation amounts for meteorological summer (June-August) 2017 by climate division. Source: NOAA

In mid-September, a strong frontal system brought several days of sustained rainfall to the region. Rainfall totals were over 5 inches in selected Westside locations between September 15 and 20; September 19 was particularly wet in much of western Oregon and Washington (Figure 1-6).

The accumulation of rain through September 20 was sufficient to halt ignitions of new large fires and significantly reduce growth for ongoing large fires. The wet spell effectively ended fire season for 2017.

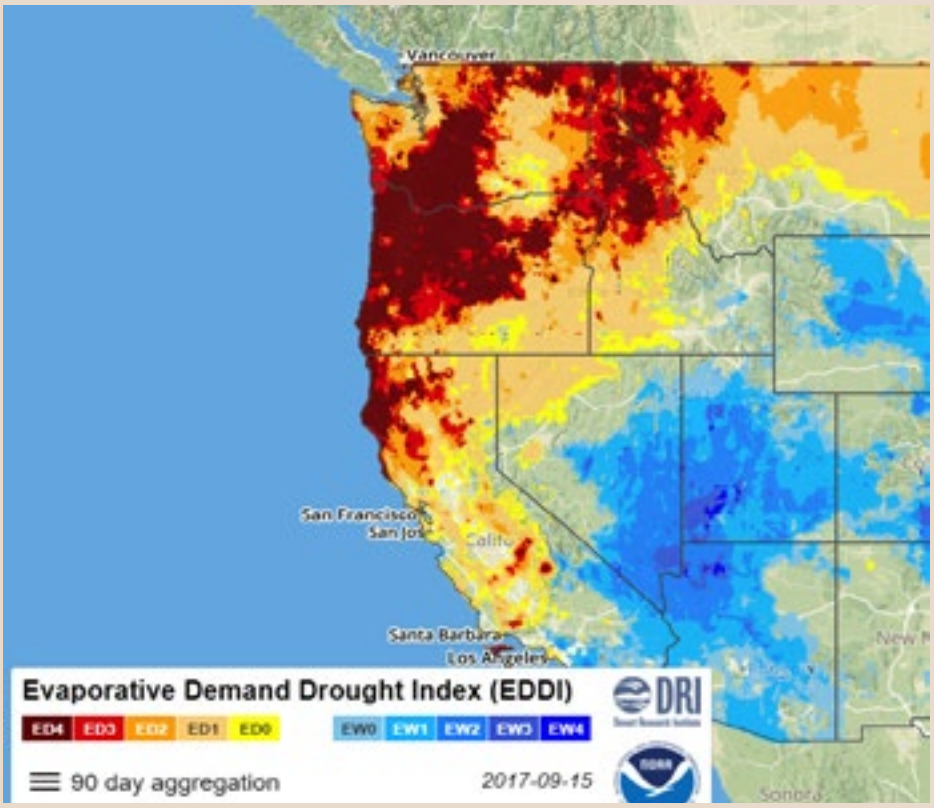


Figure 1-8. Evaporative Demand Drought Index for the July 15 through September 15 period. Sources: Desert Research Institute and NOAA

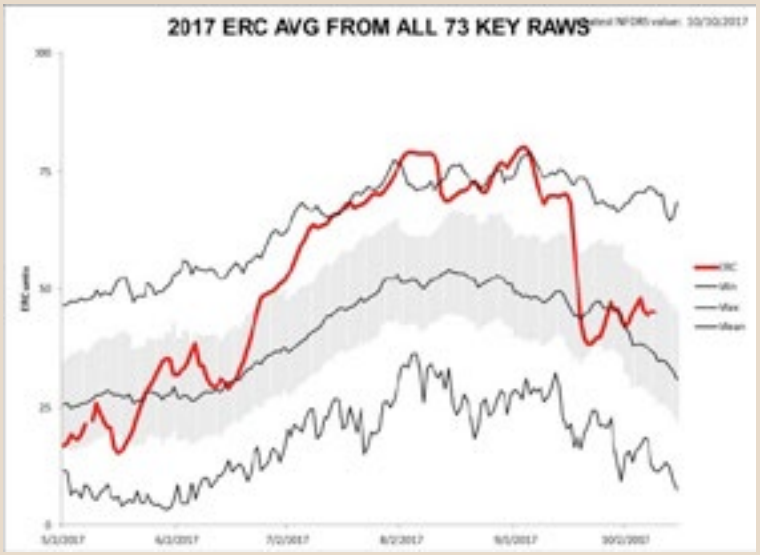
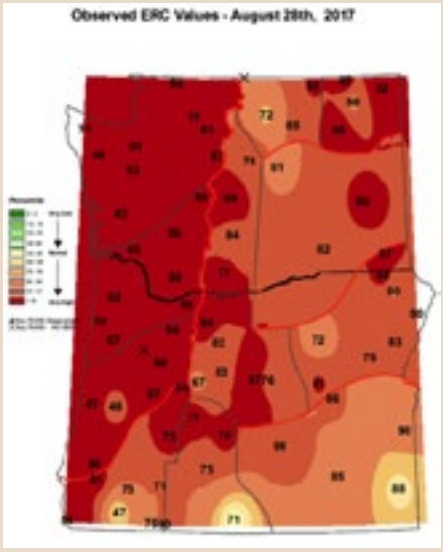


Fig 1-9: Regional Trends in ERC 2017



Peak ERC values late August

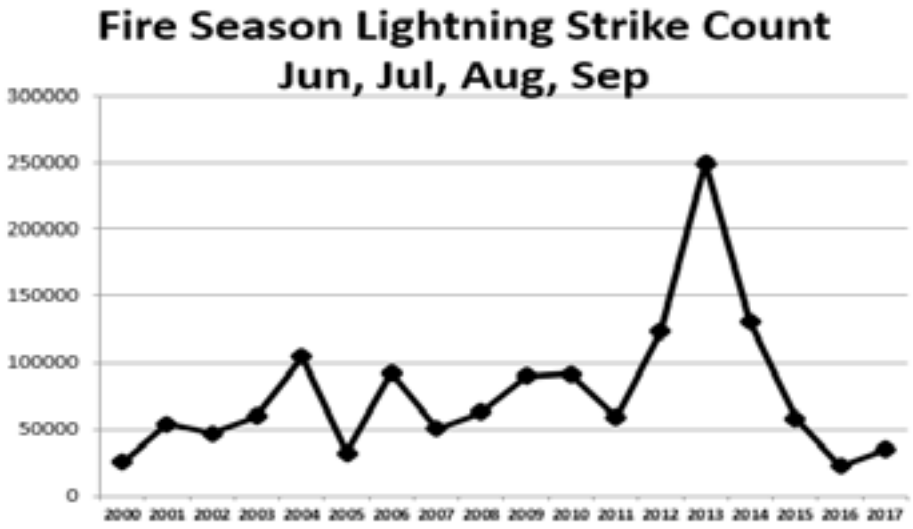


Figure 1-10. Annual lightning strike counts over the last 17 years during June through September show that. 2017 was not a particularly active lightning year.

from June through mid-September. All time record ERC values were equaled in July and repeatedly exceeded during August and early September.

Trends in Fire Danger

In contrast to fire season 2016, the ERCs show less variation during 2017. After precipitation ceased and temperature rose in mid-June fire danger began a steady upward climb. Regional ERC values were already a standard deviation or more above normal by early July and continued to climb. All-time record (since 1990) values of regional ERC were achieved around August 1 and again in late August due to the continuing hot, dry weather. Only a brief decline was evident during a short spell of light rain in early August.

2017 Lightning Statistics

From June 1 through September 30, 34,883 strikes were recorded over Oregon and Washington in 2017. This is the fourth lowest total for a fire season since the year 2000. The average for fire seasons 2000-2017 was 77,155 strikes.

Despite the below-average number of lightning strikes, fire activity was high due to the bulk of fire starts from strikes occurring at periods of hot, dry weather, in July and again in August. In addition, drought conditions helped to make both live and dead fuels highly susceptible to burning. The strikes were distributed more evenly spatially during fire season 2017 than in the 2016 season. Noteworthy fire starting events occurred at peaks of fire danger in July and the second week of August.

Wind Events

The foehn winds are a phenomenon in which winds that are forced to cross over mountains, become compressed and gain velocity as they drop quickly in the leeside valleys. In the Pacific Northwest, the foehn winds are dry winds that come from the east side, over the Cascade Range, and dry out the normally temperate west side forests. The foehn winds are also known as gravity winds because of how quickly they drop after they pass over the mountains. Two foehn wind events played a major role in the 2017 fire season. The most notable were the 'Chetco Effect' winds experienced on the Chetco Bar Fire, where the fire made a 6-mile run toward the coastal town of Brookings on August 20 and the east winds on Eagle Creek Fire that generated 13-mile run to the west between September 4-5.

With the Chetco Effect, the high pressure to the northeast and the low pressure to the southwest combine to funnel winds down and out to sea, gaining velocity as it funneled down the Chetco River drainage. August 18-20 were very windy days in southwest Oregon. Residents recalled a "howling" wind and described hearing the sound of dry rustling leaves, an unusual and unfamiliar sound in the temperate coastal town of Brookings.

In the Columbia River Gorge, high pressure in the Columbia Basin combined with low pressure offshore to pull the warm, dry air to the west. These winds funneled through passes and down the Columbia River Gorge gaining momen-

tum and drying the typically wetter vegetation on the west side of the gorge.

Thermal trough-related east winds that impacted fires occurred on August 18-20 and September 2-4.

Thermal Troughs

Thermal troughs are areas of low-pressure that can spur strong and gusty winds as it equalizes with high-pressure areas. In its early stages, thermal troughs can produce wind-driven fire behavior. However, as pressure equalizes and winds die down, thermal troughs can bring heat, a drying trend, and atmospheric instability. This can result in a shift from wind-driven fire behavior, to 'plume dominated' fire behavior. Plume dominated fire behavior is a loosely defined term that can be characterized by atmospheric instability. It is fire activity and spread that is not commensurate with surface winds on the landscape that can cause fire pulsing and spotting, resulting sometimes in impressive fire spread even though winds are light. The problems presented by thermal troughs are that fire spread can be erratic and unpredictable. Whereas wind-driven fire behavior can be predicted (at least in terms of spread direction), with instability-driven fire behavior, the spread is more variable.

Thermal troughs affected several fires in western Oregon and the large fires in eastern Washington. Southwest Oregon in particular experienced several thermal trough passages, resulting in significant growth on fires in the Miller, Umpqua North, and High Cascades complexes. A strong thermal trough pushed the Diamond Creek Fire into Canada. Strong thermal trough-related west winds affected central Oregon and central Washington on June 12, July 15, and August 13, 16, and 30.

Successful Interagency Coordination & Cooperation

In addition to severe weather events, the region had two significant events that activated increased inter- and intra-agency coordination to prepare for the potential increased human-caused fires.

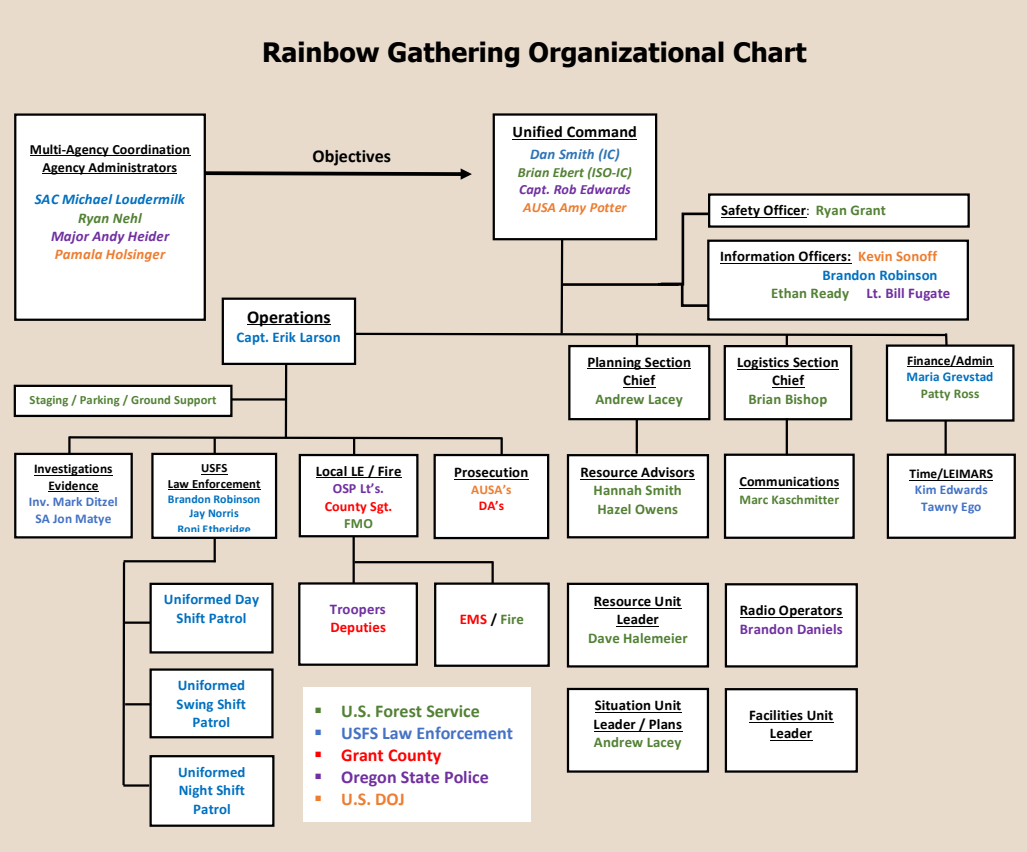
July 4 Rainbow Family Gathering

The Rainbow Family of Living Light (RFLL) is a loose-knit group of people without leadership or organization who travel across the country to participate in a national gathering once a year. Since 1972, the event has taken place on a different national forest during a two-week period surrounding the Fourth of July holiday. This event draws people from all over the United States and can bring crowds of 10- 30,000 people. Every spring, a council convenes to choose a location for the gathering. The spring counsel was held on the Umatilla National Forest on the North Fork John Day Ranger District. On June 20, the council announced the location for the 2018 gathering as the Malheur National Forest near the communities of John Day and Seneca, Oregon from July 1-7. The event was expected to bring approximately 13,120 people to the Malheur National Forest.

This unplanned event in the midst of an abnormally busy fire season occurred during a time when the forest was in critical fire conditions. This event was also in front of the solar eclipse that would also have large impacts on the community of John Day. With less than a month to prepare for the influx of visitors, the Forest Service collaborated with multiple agencies to address and mitigate potential fire hazards and law enforcement issues. Following the announcement, the Forest Service established an incident management team consisting of fire managers, natural resource specialists, law enforcement officers, health and safety coordinators, and community liaisons. The IMT coordinated closely with county officials and law enforcement officers to provide for public safety and resource protection. The Forest then worked with RFLL attendees to develop a Resource Design Criteria that outlined expectations for the agency and gathering participants to provide for the welfare and safety of all forest users, the surrounding community, and protection of natural and cultural resources.

The IMT assembled in John Day by June 19. The IMT was a unified command effort consisting of two incident commanders, one law enforcement agent, and one fire manager. The law enforcement commander would oversee the 30-40 officers that would provide 24/7 coverage of the gathering. The fire command would oversee the natural resource staff and the rest of the team comprised of safety officers, information officers, finance officers, and GIS specialists. The RFLL members began arriving to the area to build makeshift infrastructure (slit trenches, kitchens etc.) before the gathering began.

This event presented fire risks to the event gatherers and the public and pre-



Aerial view of parking lot on the Malheur National Forest on June 29, 2017. The Rainbow Gathering officially began on July 4, but participants gathered earlier to prepare the site.

sented challenges with law violations as well. To address the first concern, the IMT deployed education and prevention efforts to inform the people unfamiliar with fire dangers of the western U.S. of the specific fire potential in that area. The concerns ranged from campfires and makeshift ovens to fireworks, tobacco and drug use, vehicles parking on dry grasses. The Forest held several cooperator meetings to address the concerns of the community members of John Day. The John Day Police, Grant County Sheriff's Department, Grant County Roads Department, Oregon State Police, Burns Paiute Tribe, Harney County Sheriff's Department, Blue Mountain Hospital, Oregon Department of Forestry, Department of Human Services, Oregon Department of Transportation, and Oregon Water Resource Department all came together to discuss and plan for the impact on their individual agencies.

Among the successful management tactics, the Forest Service and the Department of Justice held a remote mobile court to process violations that happened at the event. At least 15 arrests were made on the national forest, and 117 violation notices were issued. About a quarter of the arrests were felonies and about half of the violations were related to traffic or vehicle offenses. About a quarter were related to drugs. Other violations were related to alcohol, officer interference, fires, and forest roads and trails. Two fatalities occurred at the event and there was approximately $100,000 in medical services provided.

The IMT was in place until July 7, when a local Type 3 team took over management of the event clean-up efforts. Those efforts were the responsibility of the Rainbow Family. Natural resource specialists would reenter the site July 10 and begin assessing impacts to the site. This effort is still under way and will be for several years. The cost to manage the event was nearly half a million dollars.

The design of the IMT was unique and was pulled together quickly. It was a successful collaboration across multiple agencies and jurisdictions in a sensitive time when the local community that was still recovering from the occupation of the Malheur National Wildlife Refuge. Many of the visitors were expected to remain in Oregon for the solar eclipse the following month. Another wave of planning for that event had been ongoing since the previous year.

August 21 Solar Eclipse

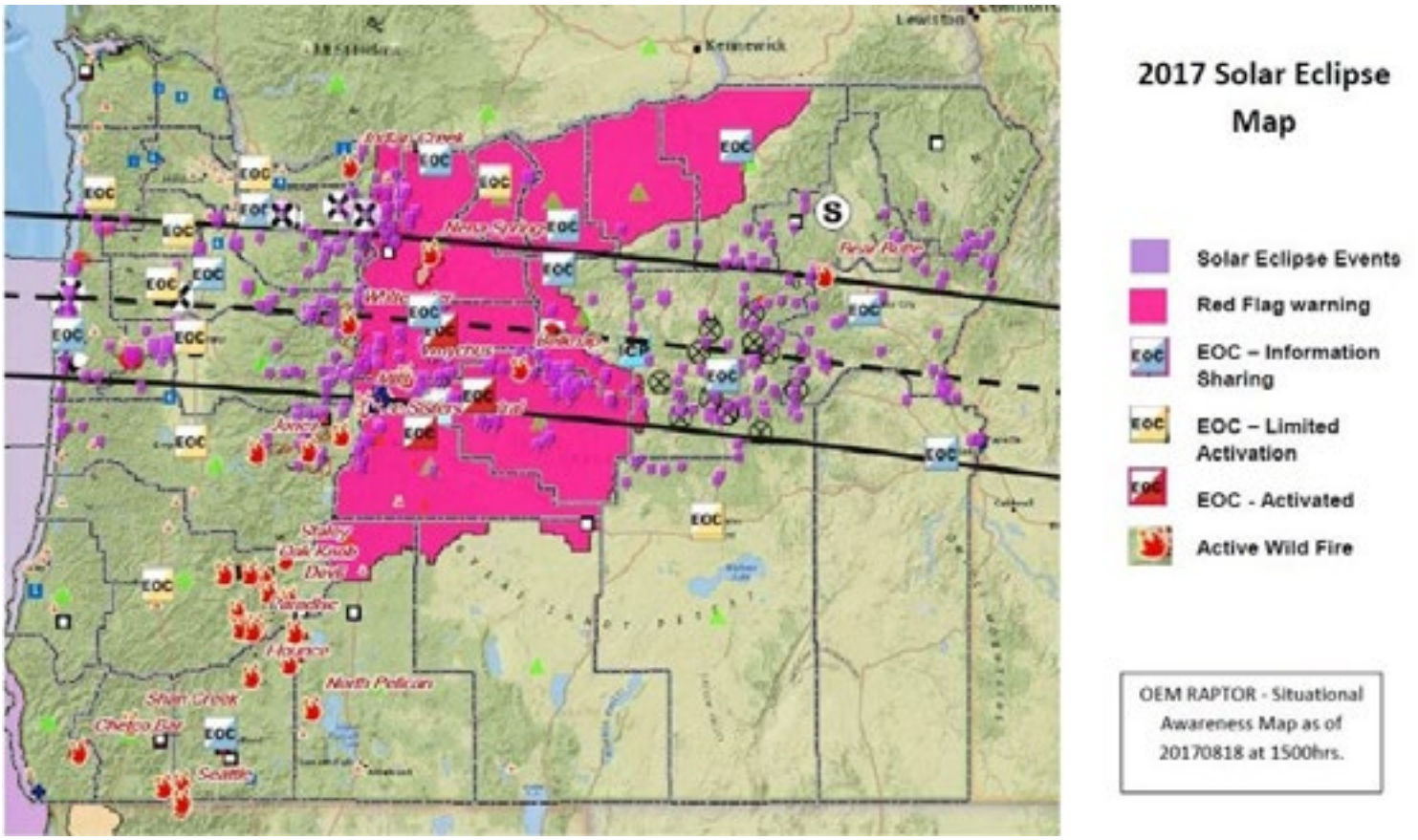
In July 2016, the Pacific Northwest region began preparing for the August 21, 2017 total solar eclipse, the first such event visible from the contiguous United States since February 1979, with the Oregon Coast being the first easily accessible place where the eclipse was visible. Central and eastern Oregon were publicized as the best sites in the nation to view totality due to dry weather, clear skies, and limited light pollution. The path of totality stretched across Oregon, crossing multiple public lands, including the Siuslaw National Forest, Willamette National Forest, Mt. Hood National Forest, Deschutes National Forest, Ochoco National Forest and Crooked River National Grassland, Umatilla National Forest, Malheur National Forest, Wallowa-Whitman National Forest, Northwest Oregon BLM District, Prineville BLM District, and Vale BLM District.

The Oregon Office of Emergency Management estimated 750,000 to one million people would come to Oregon to witness the eclipse. The numbers were based on the amount of hotel rooms and reservation campsites that were booked, often more than a year ahead of the event. Many visitors were expected to view the eclipse from public lands. Leadership in the BLM and Forest Service formed planning teams to address the strain on local units, and stress on highways, backcountry roads, campgrounds, communities, infrastructure, airports, and airspace. Adding to the complexity was that the eclipse occurred during the peak of fire season.

The Forest Service and BLM were involved in planning efforts for over a year across Oregon, at the local, sub-regional, and statewide levels. The eclipse provided a unique opportunity for the Forest Service and BLM at the local unit and regional office to reach out to non-traditional cooperators and partners, such as county and state emergency management officials, hospitals, law enforcement at all levels, and county government. For example, the Central Oregon Fire Management Service conducted a day-long simulation that included various partners and cooperators from five counties. The Forest Service Regional Office and BLM State Office planning efforts included objectives focused on public and employee safety, customer service, fire protection, and resource protection.

The Pacific Northwest Wildfire Coordinating Group (PNWCG) had the eclipse as a standing agenda item to discuss ways to coordinate public use restrictions, resource availability, and planning efforts. The PNWCG Executive Simulation included the complexities surrounding simultaneous multiple large fires and the solar eclipse.

The Oregon Office of Emergency (OEM) Management Planning Group (including representation from the Forest Service and BLM) coordinated public safety planning and response among local, state, federal, and tribal stakeholders, including the areas of resource management, mutual aid assignments, common staging areas, Emergency Operations Center (EOC) activity and declarations of emergency, as well as applicable Emergency



Oregon State Office of Emergency Management map showing the path of totality, active wildfires, areas with red flag warnings & planned events.

Service Functions. The OEM activated the state EOC, Emergency Coordination Center, and Air Operations Center. The OEM Joint Information Center (JIC) (with representation from the Forest Service and BLM) was responsible for coordinating public safety and information messages through a communication strategy that includes a social media calendar with unified messages and activated the OEM JIC. Multiple county and local EOCs and JICs were also activated.

During the immediate timeframe around the eclipse, many units had prepositioned resources and were prepared for the influx of visitors. Fire restrictions were in place across the state, with no campfires allowed. High recreation areas were closed due to fire activity, such as the Mount Jefferson Wilderness Area. After more than a year of planning and simulation exercises with a multitude of cooperators, the Eclipse and events surrounding it came off without any additional incidents.

Fire Prevention and Education

Also of significance during the 2017 season was the fire prevention and education efforts.

Accomplishment includes the successful deployment of National Fire Prevention Education Teams across the path of totality in Oregon during August's Solar Eclipse. This was the largest scale anticipated single event in the history of organized fire prevention efforts, and resulted in no significant human-caused fires.

In 2017, Oregon and Washington BLM dedicated close to 1.1 million dollars through 12 assistance agreements to working with over 87 communities to help protect themselves from wildfire. Projects range from Community Wildfire Protection Plan (CWPP) maintenance, Rural Fire Protection Association (RFPA) education, Washington Fire Adapted Communities Fire Learning Network's fire adaptation-themed video project, and sage-grouse habitat protection projects.

An application that offers an easily accessible platform for display and analysis of interagency fire occurrence data in Oregon and Washington is being developed. The data source is the Research Data Archive, based on available information from the authoritative systems of record. It is intended as an educational tool for wildfire prevention and mitigation.

MAC Group Adjustment of Priorities

During periods with high fire activity and a high demand for resources, the Pacific Northwest Region will put together a group that aids with the distribution and reallocation of resources to the fires with the highest need. The Northwest Multi-Agency Coordinating Group (NW MAC) works to provide adequate firefighting resources to meet current and anticipated needs, and decides where to allocate resources most effectively during periods of shortages. The MAC is responsible for:

- Prioritizing incidents
- Allocating or reallocating firefighting personnel and equipment
- Facilitating federal and state disaster response
- Keeping agency leaders and media informed
- Identifying and resolving issues across agencies

The NW MAC is activated anytime the Pacific Northwest goes into a prepared-

ness level 4. When the region went into PL 4, fires outside of Oregon and Washington had already limited the amount and type of national and international resources the Northwest could obtain. Montana also had a record fire season with critical resource needs set as higher priority nationally than the Northwest during parts of August and September. Three major hurricanes (Harvey, Irma, and Maria) made landfall in the southeastern U.S., Puerto Rico, and U.S. Virgin Islands during the middle of the western fire season, with firefighting resources from across the nation providing disaster assistance to the affected areas. British Columbia saw its worst fire season in history and used nearly all the resources from the international partnerships with Mexico, Australia, and New Zealand. As a result, much of this assistance was not available to the United States, although the Northwest was able to make use of two airtankers through the international agreement.

The 2017 Pacific Northwest fire season saw a high need for resources due to the number and size of the existing fires that were occurring as well as substantial amount of initial attack. This made coordination between IMTs, dispatch centers, fire managers, and the NW MAC extremely important. This resource shortage would result in the rapid shifting of fire prioritization, affect the distribution of critical resources across the region and in some cases, determine the length of time long-duration incidents would be able to utilize those resources.

Resource allocations at the NW MAC level are based on many factors including the types of values at risk, and the urgency of the threat. The NW MAC also considers the immediate threat to people, homes, cities, businesses, critical infrastructure, private timberlands, socioeconomic reasons, or political factors. Size and fire behavior are not necessarily the driving factors of resource allocation.

The Chetco Bar Fire was the priority fire in the nation from August 21 through September 1, after making a significant run towards the town of Brookings and prompting large evacuations in its path. Prior to that run, it was a lower priority due to its remote location, and the low-level threat to people and property. Immediately after the fire run, resources were reallocated from long-term indirect management strategy fires to support a new fire strategy that sought to immediately mitigate threats to values at risk and achieve incident short-term objectives.

The Northwest would remain as the region of national priority from August 13 until September 1. Priority fires within the Northwest changed several times as fires across the region progressed over time and reacted to weather events. The Milli Fire on the Deschutes National Forest became the priority fire in the Pacific Northwest in anticipation of the August solar eclipse and the drastic increase in the amount of visitors to central Oregon. As the solar eclipse event ended the prioritization of resources moved from the Milli Fire, back to the Chetco Bar Fire.

On September 2, the Eagle Creek Fire ignited in the Columbia River Gorge National Scenic Area. The fast moving fire burned over the trail, requiring 153 people to shelter in place overnight. The fire grew rapidly, closing off three major transportation passageways including the complete halt of commercial river traffic on the Columbia River, the railroad, Interstate 84 and Highway 30, and a flight restriction over the fire. All of this was in addition to evacuations in multiple communities. The Eagle Creek Fire remained the highest priority fire in the Northwest and nation for the remainder of September.

Background: View from above Whitewater Fire

Fire Season Timeline

Sheep Springs Fire

JUNE

Given the winter snowpack and other indicators used by Predictive Services, the general consensus was that fire season would be fairly mild. May was warmer than average across the Northwest and drier than average east of the Cascades in Oregon, less so in Washington. On June 1, none of Oregon and Washington was considered abnormally dry, much less in any level of drought, and drought was not expected to develop over the summer. Early June snowpack was still near or above average across the Northwest and most stream flows were above average. In southwest Oregon, snowpack was still 174 percent of average. June was forecast to be warmer than average across the Northwest and drier than average in the Cascades and west of the Cascades. Regional ERC values were below average in May and somewhat above average in early June, but still within the normal range of variability. Annual grasses in rangelands began to cure, although the timing and rate of curing was deemed typical for June. Unusual levels of significant fire activity were not expected for the summer.

Lightning storms moved through the region in late June. June 26 saw more than 3,750 strikes, the most recorded lightning strikes in one day for the season. The storms ignited several fires, some of which, like Chetco Bar, were not detected until July.


Sutherland Canyon Fire

SHEEP SPRINGS

On the morning of June 26, a lightning strike ignited the Sheep Springs Fire. This area had previously burned in the 2003 B&B Complex and fire was spreading slowly but steadily through the B&B fire scar. Due to the hot and dry conditions, increasing winds, abundance of snags, and high safety risks posed to firefighters, the initial attack incident commander initiated an indirect strategy to contain the fire.

On June 28, a Type 3 IMT took command of the fire, and continued and planned additional burn out operations. By July 2, burn out operations were complete and mop-up began.

Fire management transferred back to the local Ranger District on July 3, who continued to mop-up and patrol the fire perimeter. Fire was fully contained by July 31.

See more on this fire in Appendix C

SUTHERLAND CANYON

The Sutherland Canyon and Straight Hollow Fires were a grouping of several lightning starts that ignited on June 26 around Wenatchee, WA. Due to severe conditions, impacts to sage-grouse habitat, and inaccessible terrain, a Type 2 IMT took command on June 28 of these fires and the Spartan Fire. These fires spread rapidly in grass-dominated fuels under high winds, which led to multiple evacuation orders and one abandoned structure being destroyed. Full containment was reached on the fires by July 2.

Approximately 4,900 acres of greater sage-grouse habitat burned.

See more on these fires in Appendix G

Ana Fire

JULY

By early July, conditions were notably warmer and drier than typical, suggesting that the fire season would be more active than anticipated just one month earlier. June had been warmer and drier than average, although precipitation had been near average along the coast. The US Drought Monitor at the end of June still did not show any of the Northwest in any level of drought and the 90-day outlook still did not anticipate drought development. Fire danger and large dead fuel moisture levels at the beginning of July were near typical seasonal values. On a regional basis, however, ERC values were well above average by the end of June. July was forecast to be warmer than average, but only Washington was expected to be drier than average. The 90-day forecast through October was for warmer than average temperatures, but no anomalies expected for precipitation. Large fire activity was expected to be near normal in July, except in rangelands where above normal activity was expected. Normal levels of large fire activity was expected in August and September.

INDIAN CREEK

The Indian Creek Fire started on July 4 deep in a canyon near 7 1/2 Mile Camp on the Mt. Hood National Forest. Lack of access by ground or air and steep terrain, including a number of cliffs, resulted in a determination that it was unsafe for firefighters to work directly on the fire. In addition, the initial responders determined that the potential for fire spread was low, although smoke from the fire was visible from various points in the Scenic Area. Instead, water drops were used to cool the fire and reduce the rate of spread in order to keep the fire within the Mark O. Hatfield Wilderness. Fire spread was minimal for the first two weeks, but began to pick up by late July. On July 28, a NIMO team took over management of the fire due to the increased potential for fire spread after nearly six weeks with no measurable rain and warmer than average conditions. Water drops were used to cool the fire and reduce the rate of spread. The water drops—sometimes over 100,000 gallons in a day—raised the humidity and fuel moisture in the fire area. The fire held at 83 acres for much of August.

A spell of warmer, drier weather caused the fire to become more active. By September 2, the fire had grown to 373 acres. That day aircraft and crews were diverted to the new Eagle Creek Fire. They helped search for hikers and campers near the fires, and dropped water to try to slow the spread of the Eagle Creek Fire. On September 4, a Type 2 Incident Command Team assumed command of the Indian Creek and Eagle Creek fires. On September 5, the fires merged and were managed as the Eagle Creek Fire.

See more on this fire in Appendix E

Kalmiopsis Wilderness Panorama

ANA

The Ana Fire started on July 7 on private land north of Summer Lake and quickly spread. The fire threatened approximately 25 homes, 10 commercial buildings, and 10 other structures along with sage-grouse habitat, Highway 31, the transmission line that roughly parallels Highway 31, and cultural resources towards the north of the fire.

A Type 2 IMT took command on July 10 by which time the fire had grown to 6,000 acres resulting in the closure of Highway 31 and Level 2 evacuation orders for some local residences. Crews continued to make good progress despite difficult conditions.

The Oregon Department of Transportation was able to re-open Highway 31 on July 11 with a pilot car. Actual GPS mapping estimated the fire at 5,833 acres. With smoldering fire behavior, all evacuation orders were lifted on July 14 and traffic resumed on Highway 31. The IMT transferred command of the fire back to the Lakeview BLM District on July 15.

See more on this fire in Appendix D

CHETCO BAR

A commercial airline pilot first reported the Chetco Bar Fire on the afternoon of July 12, 2017. The fire was burning mid-slope along the Chetco River. It was a suspected holdover fire from lightning storms on June 24 and 25. A crew of four heli-rappellers were dispatched to the fire, which was burning within the footprint of the 1987 Silver Fire and the 2002 Biscuit Fire. Three helicopters made 54-bucket drops totaling 17,280 gallons of water on the fire during the first operational period.

By the next day, the fire was 10 acres, burning in heavy brush with dead and down materials. Additional resources were requested, including more aircraft. The incident commander hiked to the fire and began putting in cup trenches but stopped when he saw they were ineffective at catching the rollout. Air Attack requested two single engine airtankers with retardant, recommending the additional hand crews not engage before the fire spread was slowed by retardant. With fire behavior increasing in the late afternoon and increasingly unsafe conditions for firefighters, the incident commander elevated the fire to a Type 3 incident and requested helicopters to retrieve the firefighters off the hill.

Over the next several days, firefighters cleared a helispot and constructed direct and indirect fireline while keeping the fire in the wilderness. By July 24, 80 firefighters were constructing and improving containment lines. Two Hotshot Crews were assigned and analyzed options for containment lines closer to the fire. The fire had an east wind event that increased the fire behavior to about 100 acres a day in growth, but the Chetco River was checking spread to the south and west.

On July 29, a NIMO team took command of the fire at 2,181 acres with 131 personnel assigned. The team met with local cooperators, discussing evacuation plans, should they be needed and identified residences in the potential fire path. Crews continued to construct contingency lines.

On August 15 at 7 p.m., with the fire at 5,442 acres, the Chetco Effect winds developed. These winds pushed the fire northeast and increased the surrounding air temperature by up to 40

Oregon Army National Guard Sgt. Joe Ford, a crew chief with 1st Battalion, 168th Aviation Regiment, monitors systems during the run-up, or start, of a CH-47 Chinook helicopter at Davis helibase, near Gates, Oregon, on August 7, 2017. The unit, from Pendleton, Oregon, was called upon to support firefighting efforts on the Whitewater Fire in the Mount Jefferson Wilderness Area following Governor Kate Brown's emergency declaration on August 2, 2017.

An Oregon Army National Guard CH-47 Chinook helicopter with 1st Battalion, 168th Aviation Regiment dips a 2,000 gallon capacity Bambi Bucket in the Mt. Jefferson Wilderness Area in order to support firefighting efforts on the Whitewater Fire on August 5, 2017.

degrees. The Chetco Effect winds persisted over the next several days prompting numerous evacuations.

By August 19, the fire was estimated at 48,825 acres and 23 structures had been damaged. The Conflagration Act was invoked by Oregon Governor Brown, allowing for the deployment of Oregon State Fire Marshal (OSFM) resources to support the fire. Between August 17 and August 21, the Chetco winds had driven fire growth from around 6,000 acres to almost 100,000. The fire was 97,758 acres with 788 resources assigned.

From August 16-22, temperatures, relative humidity and winds were more typical of extreme conditions seen in the dry forests of eastern Oregon, not the coastal forests of western Oregon. Instead of nighttime humidity recovery to or near 100 percent, maximum humidity reached only into the mid-40s and daytime relative humidity dropped below 30 percent. Daytime temperatures peaked into the low 90s on August 16-19 and into the 80s on August 20 and 21. Nighttime low temperatures dropped only into the low 70s. The combination of above average temperatures and below average relative humidity recovery at night meant burning conditions did not moderate, allowing for increased fire behavior earlier the next day and active burning for 24 hours each day. Over this same period, peak wind gusts ranged from 30 to 40 mph. High wind gusts caused ember showers and prolific spotting into a much wider area ahead of the fire to receive embers and start spot fires, causing the fire to spread by jumping long distances. The speed and frequency of the gusts made it unsafe for aircraft to operate at the low altitudes needed to fight fire, especially in mountainous terrain. The surging spread behavior also made it unsafe for ground crews to operate, greatly increasing the risk of entrapment and burnover.

A Level 1 evacuation notice was issued for Brookings on August 24, while airtankers dropped 46,892 gallons of retardant. A Type 1 IMT took command on August 26. The National Weather Service issued a high heat warning contributing to increased fire activity, including a smoke column developing to a height of 23,000 feet on September 3 and a Level 3 evacuation of areas within the forest boundary.

On September 4, an excessive heat warning remained in effect with temperatures above 100 degrees, creating critical burning conditions and numerous spot fires. A Level 1 evacuation order was issued for residents in the Illinois Valley and Level 3 evacuation order for the Illinois River Road within the forest boundary.

In mid-September, the temperatures cooled and rain began to fall. The Curry County Sheriff lifted all evacuation orders on September 18 and the fire transitioned to a Type 4 organization.

Blanket Fire night operations/ High Cascades Complex

A Burned Area Emergency Response (BAER) Team arrived in early October to conduct post fire hazard mitigation. Weather continued to moderate fire behavior and spots of heat decreased significantly.

On November 2, the fire was reported as 100 percent contained.

See more on this fire in Appendix B

WHITEWATER

The Whitewater Fire, originally located in the Mount Jefferson Wilderness, is attributed to a lightning strike from June and was first reported on July 23. Initial crews had to hike thee miles to begin suppression efforts. With full suppression under way, the fire was 85 percent contained by July 27, with the remaining 15 percent being inaccessible rocky cliff bands.

Fire managers developed contingency plans and ordered additional resource, including a Type 2 IMT. Base camp was set up at Hoodoo Ski Area and by July 31, 11 miles of the Pacific Crest Trail and numerous access points into Jefferson Park were closed. By August 2, the fire was estimated at 4,479 acres.

A thunderstorm moved through on August 10, igniting additional fires in the area. A Type 1 IMT took over the Whitewater Fire and supported an additional five smaller fires. On August 22, the team took over another four small fires. Due to unavailable resources, the team also took over the Horse Creek Complex, on August 23.

On August 27, a new Type 1 IMT assumed command of Whitewater, Little Devil, and Rebel fires and the Horse Creek Complex. Over the next several days, additional fires were detected, all while under a red flag warning for dry and unstable conditions. During this time, crews continued to employ indirect tactics, but used direct attack when burning conditions and fire behavior permitted. Dense smoke hampered firefighting efforts on many days and affected air quality in communities to the west.

Fire spread halted on September 19 when the area saw heavy rain and snow at higher elevations. On September 27, the complex was transferred to the local Type 3 command.

The Whitewater Fire ignited in an area located within the 2017 solar eclipse path of totality. The fire prompted an extensive area closure in a large stretch of public lands in a prime viewing location for hundreds of thousands of visitors. The smoke from the Whitewater Fire along with multiple fires burning in the region at the same time affected the quality of life of many people, the recreation of thousands of visitors, and affected the local economy in communities near Detroit Ranger District.

See more on this fire in Appendix C

DIAMOND CREEK

The Diamond Creek Fire was reported on July 23, later determined to be caused by an unattended campfire. The fire was half an acre in the Pasayten Wilderness on initial report but quickly grew in heavy and dead fuels. By the end of the day, the fire was estimated at 30 to 35 acres and a Type 3 IMT was ordered.

Over the next five days, hand crews and smokejumpers were brought in and began full suppression efforts. However, hot and dry weather with above average wind speeds caused the fire to continue to make runs and spot up to a mile ahead of the main fire.

On July 29, a Type 1 IMT took command. The team's strategy was to keep the fire contained to the Wilderness and protect structures potentially in the fire's path. Several cabins were wrapped in fire resistant material and trails were closed.

Throughout August, the fire continued to grow but stayed contained to the Wilderness, as different IMTs took command. By late August, the fire had burned around 50,000 acres. On September 4, it made a significant run, growing to approximately 95,000 acres in one burn period, resulting in evacuation orders for three communities. The fire crossed the international border and burned more than 30,000 acres in Canada. On September 15, a NIMO team took command of the incident. By September 20, weather conditions had moderated and crews had reached 65 percent of containment objectives. The NIMO team transferred command back to a type 3 IMT on September 27. The fire was contained on October 15.

See more on this fire in Appendix G

HIGH CASCADES COMPLEX

A series of lightning storms started upwards of 40 ignitions dispersed through the Rogue River-Siskiyou National Forest, the Umpqua National Forest and Crater Lake National Park on July 26. The fires would become the High Cascades Complex. Initial attack resources were unable to contain all of the fires due to the sheer number reported, difficult access, heavy volume of recent initial attack activity by local resources, and general shortage of regional resources. Most of the initial attack efforts were effective with the exception of nine fires, the largest of which were the Blanket Creek and Spruce Lake fires. The Blanket Creek Fire began on July 26 and was managed by a Type 2 IMT based out of Prospect, Oregon. On July 31, that team also assumed command of the Spruce Lake Fire.

The timeline of the High Cascades Complex is indeed complex. Fires in the surrounding area were being managed separately, then grouped into complexes, and then moved from one complex to another throughout the duration of the incidents.

By mid-September the Blanket, Spruce Lake, Broken Lookout, Pup, and North Pelican Fires combined reached approximately 80,000 acres.

The week of September 18, the region was hit with a significant weather event that brought abundant rain to the fire area. Most work efforts were then redirected to suppression repair and stabilization. The fire was split between two Type 3 IMTs, dividing the workload between jurisdictions on the Rogue River-Siskiyou National Forest and the Umpqua National Forest. The fire was called controlled on October 31.

See more on this fire in Appendix B

HAWK

Lightning started the Hawk Fire on July 27 in previously unburned sagebrush within the Cow Lakes Priority Areas for Conservation (PAC), which tripped a hard trigger due to loss of sagebrush cover and declining sage-grouse population. Jordan Valley Rangeland Fire Protection Association (RFPA) was one of the responding units, with five Type 4 engines and three water tenders. Responding resources from the BLM included one helicopter, five type 4 engines, one type 6 engine, two dozers, and one water tender while the Forest Service also sent a type 6 engine. Several airtankers supported the incident as well. The rapid response resulted in full containment of the fire on July 28 at 1,432 acres.

See more on this fire in Appendix D

AUGUST

By August, it was becoming clear that the 2017 fire season was not going to be a mild one. At the beginning of August, the US Drought Monitor indicated abnormally dry conditions had developed in eastern Oregon and Washington and the northern Oregon and Washington Cascades, but not Southwest Oregon or the Oregon Coast. By the end of August, abnormally dry conditions had spread across most of both states, but there was still no indication of drought. In contrast, the Evaporative Demand Drought Index (EDDI) indicated developing drought conditions in most of the forests with some coastal areas displaying very high to extreme conditions. July had been much warmer than average with no precipitation. ERC values continued to rise to well above average values and some areas were setting new high values. The number of lightning fire starts and fire behavior, even in high elevation forests, did not appear to reflect the snowpack levels and precipitation received between fall of 2016 and spring of 2017 or the drought conditions indicated in the US Drought Monitor. In addition, concerns were high over the potential interaction between all the expected solar eclipse viewers and fire behavior on any new fires and existing fires.

CINDER BUTTE

Human activity along U.S. Highway 20 near Glass Butte started the Cinder Butte Fire on August 2 and it spread rapidly to the southeast. The fire initially ran an estimated 15 miles through tall grass, sagebrush, and scattered pockets of western juniper trees under temperatures in excess of 100 degrees, single digit relative humidity, 30 mph winds, and a very unstable atmosphere (Haines Index 6). Eight people were evacuated and Oregon Department of Transportation closed five miles of U.S. Highway 20, the main route between Bend and Burns. The fire also affected the 12-Mile PAC and general habitat for sage-grouse, residences, powerlines, and local livestock and was threatening the Eastern Oregon Agricultural Experiment Station and the community of Wagontire.

Under severe burning condition, a Type 2 IMT took command on August 3 and utilized a variety of aircraft to protect threatened resource values.

With cooler temperatures and moderating fire behavior, the team transferred command to a Type 3 IMT on August 8.

On August 17, the fire was declared 100 percent contained. Along with destroying four minor structures, causing the evacuation of eight people, damaging powerlines, disrupting traffic on Highways 20 and 395, and burning in four grazing allotments, the fire affected approximately 1,062 acres of the 12 Mile PAC (priority habitat) and 50,984 acres of general habitat for greater sage-grouse.

See more on this fire in Appendix D

BEAR BUTTE

The Bear Butte Fire was reported on the afternoon of August 4. Due to the fire's quick spread and intensity, a Type 2 IMT took command on August 5. Fire behavior was observed as short

Background: firefighter on the fireline, Happy Dog Fire, North Umpqua Complex 09/01/17

Jolly Mountain Fire as seen from the Incident Command Post

crown runs with long ranged spotting and group torching. A full suppression strategy was implemented as the fire was in close proximity to Anthony Lakes Ski Resort, summer cabins, campgrounds, and powerlines. Evacuation orders were issued immediately for approximately 50 people and the surrounding campgrounds.

Firefighters constructed direct line with the use of dozers and hand crews. The fire was 100 percent contained on August 24. The Bear Butte Fire was the only large fire to be assigned an IMT in Northeast Oregon during the 2017 fire season. During a busy fire year in the region and with a shortage of resources regionally and nationally, this fire was held at a minimal size while threatening valuable resources.

See more on this fire in Appendix F

SHAN CREEK

The lightning-ignited Shan Creek Fire was reported August 10, burning about 10 miles west of Grants Pass, Oregon, on the Rogue River-Siskiyou National Forest. Initial attack fire crews responded on August 11 and made progress on the fire. Due to the its potential and multiple fires in Southwest Oregon, the Multi-agency Coordination (MAC) group made the decision to redirect an out-of-area type 2 IMT, Rocky Mountain Team Black, which had been ordered to pre-position in Central Washington for upcoming weather events. Team Black assumed command of the Shan Creek Fire, which was estimated at 400 acres, on August 17.

Fire crews had already successfully contained all but the west flank of the fire by the time the Rocky Mountain team arrived. The team mapped the Shan Creek Fire at 156 acres, had firefighters install a hose lay around the perimeter and had the fire 85 percent contained by August 19, when they transferred command back to a Type 3 team. Since the Chetco Bar Fire had made a significant push toward Brookings, Oregon, the MAC group reassigned Rocky Mountain Team Black to support the NIMO team on that fire.

See more on this fire in Appendix B

UMPQUA NORTH COMPLEX

Between August 11 and 13, approximately 34 fires were reported from a thunderstorm that pushed through the North Umpqua Ranger District. A Type 1 IMT was assigned to the Umpqua North Complex on August 13. A level 3 evacuation was ordered for the Dry Creek community, a level 2 evacuation order was issued for another area. In addition, several campgrounds, and trailheads were closed. By August 20, fires had begun to combine, resulting in additional evacuation orders to be given. Sections of Highway 38 were closed on August 22 due to thick smoke and falling debris. With hotter and dryer weather, fire activity increased on August 27; spot fires and additional new fires were discovered and added to the complex.

Fire activity on September 1 prompted additional evacuations the same day a new Type 1 IMT assumed command. The new IMT used an unmanned aerial system to map and develop a management strategy for the Rattlesnake Fire.

On September 4, an air quality alert was issued for the area; dense smoke was affecting fire behavior and the ability to use aircraft; and some evacuation orders were reduced. By September 7, cooler, moister conditions and some rain moved over the complex area, allowing firefighters to begin using direct attack tactics on portions of the complex.

On September 9, soldiers from Joint Base Lewis-McChord completed their first day of training on the fireline. The following day, they began working on the Devil, Brokentooth, and Ragged Ridge fires. Additional rain on September 9 aided suppression efforts. The Fall Creek Fire was contained on September 10.

A public meeting was held on September 11 and crews began making significant progress in containing the more active fires across the complex. Dense smoke returned on September 12 as conditions dried and fire activity began to pick up.

The complex transferred to a Type 2 IMT on September 16. As heavy rains moved in on September 18 firefighters continued mop-up and patrol, while most restrictions were lifted by September 23. September 24 was the last day on the fireline for the soldiers of Joint Base Lewis-McChord, who handled multiple fire suppression and repair assignments on not only the Umpqua North Complex but also High Cascades Complex and Elephant Fire.

See more on this fire in Appendix C

MILLI

The Milli Fire started on August 11 from a lightning strike in the 2006 Black Crater Fire scar within the Three Sisters Wilderness Area, administered by the Deschutes National Forest. Due to difficult access and numerous snags associated with the past fire, the team chose an indirect suppression strategy in the initial management of the incident. During the first shift, the initial attack forces were pulled back from the fire and crews began working to prepare indirect lines along roads east of the fire. The objective was to prevent fire spread into residential areas located to the east of the fire near Sisters, Oregon. The fire, however, increased in intensity and made several major runs to the east and southeast from August 16 through 20. The speed and intensity of this activity prompted the evacuation of homes and subdivisions on the western and southern sides of Sisters. It also prompted a change in tactics to a combination of direct and indirect attack with the support of aerial resources. Night operations proved successful with a combination of direct attack dozer lines supplemented by hand lines in less accessible areas.

Most of the fire growth was in unburned fuel north of the 2012 Pole Creek Fire and south of the 2006 Black Crater Fire. The southern and western portions of the fire remained in the wilderness and were monitored by air and from the ground using lookouts. Once fire growth was in check using direct attack along the northeast flank and eastern head, a plan was developed to employ indirect tactics burning along a series of Forest Service roads tied to lava flows north of the fire. Night burning operations were used to moderate fire intensity and to try to minimize fire severity. Operations associated with the Tri-County MAC Group primarily involved contingency planning in the event of emergencies and wildfire starts associated with increased tourist activities anticipated with the Total Solar Eclipse.

Firefighters were successful in preventing further spread east into private lands and communities, largely due to several years of aggressive and strategically placed hazardous fuels projects.

The Milli Fire and other prior events gave the Forest Service, agency partners, Deschutes Collaborative, Deschutes National Forest, Central Oregon Fire Management (COFMS), and Cascade Division multiple opportunities to discuss forest restoration and fuels management, fire management/suppression efforts both locally and nationally, and funding to support these activities with multiple partners.

See more on this fire in Appendix C

NORSE PEAK

The August 11 lightning storm started nine fires in the Norse Peak Wilderness with the Norse Peak Fire being the largest at 500 acres and rapidly growing to 1,200 acres. Due to the thick high elevation forest with heavy dead and down timber, firefighters began constructing indirect fireline. Closures and evacuation orders were quickly issued due to the extreme fire behavior.

A Type 2 IMT took command on August 18 but due to national and regional demands for resources, many needs were left unfilled, including Hotshot crews. By August 27, the fire had grown to 2,173 acres. With high temperatures, low humidity, and 15-20 mph winds the fire grew to 17,000 acres by September 1, crossing the Pacific Crest Trail and threatening Crystal Mountain Ski Area and communication buildings at Raven Roost.

The fire would double in size on September 5 to 43,500 acres due to another storm front moving in bringing 35 mph wind gusts. Additional evacuation orders were issued and the Army National Guard and Air National Guard joined firefighting efforts. Over the next two weeks, firefighters continued direct and indirect line, night operations, and structure protection.

A Type 1 IMT took command on September 19. That day also brought the first significant precipitation in 90 days to the area. By September 22, all evacuation orders were lifted and the focus moved from suppression to mop-up. The local unit managed the fire beginning September 28. By November 1, the fire was considered controlled.

See more on this fire in Appendix G

JOLLY MOUNTAIN

Along with other fires in the area, the Jolly Mountain Fire was started by lightning on the Okanogan-Wenatchee National Forest when scattered thunderstorms moved over Oregon and Washington on August 11. The Cle Elum District initially responded with an engine crew, hand crew, and dozer, which was used to reopen the road to the original trailhead. Two of the more experienced firefighters hiked about two miles into the fire area and reported the fire was too active for ground crews and there were no good anchor points to build fireline from. Much of the area had at least 90 percent standing dead from more than a decade of spruce budworm activity. No aircraft or aerially delivered firefighters (smokejumpers or rappellers/helitack) were available. As the fire did not meet the necessary criteria to make it a priority fire for resources, fire managers developed a confine/contain strategy.

The fire grew rapidly in steep and rugged terrain from 100 acres to 300 acres overnight. Over the next 10 days, the fire grew to an estimated 638 acres. By August 24, the fire had grown to 1,735 acres, prompting the team to establish night operations and the local Sheriff's Office to issue evacuation orders for local communities. Additional evacuation orders were issued by the Sheriff's Office on August 25 and the forest closed Upper Cle Elem Valley to public access.

A Type 2 IMT took command of the fire on August 26. On August 27, as the fire continued to spread actively under hot, dry conditions, The Nature Conservancy closed its lands on Cle Elem Ridge to public access and the Washington Department of Natural Resources closed state lands around the fire. The fire was estimated at 8,000 acres on August 30 but

almost doubled in size by the next day. After the fire made a three-mile run, the Sheriff's Office issued new and increased evacuation levels throughout Teanaway River.

The first week of September brought more and expanded evacuation notices, and more extreme fire behavior. The Seattle Times ran several stories about the fire, including "Ash Falls like Snow in Seattle." A Type 1 IMT took command on September 4 when the fire was at 20,975 acres. The town of Cle Elum was under a level 1 evacuation starting September 5.

Burning conditions and the extreme weather began to ease on September 7, leading to a reduction of evacuation orders on September 11. By September 28, all evacuation orders had been lifted.

The Jolly Mountain fire burned in a part of the Okanogan-Wenatchee National Forest that had not had a major wildfire for several decades. Much of the fire was in inaccessible terrain and resulted in numerous evacuations.

See more on this fire in Appendix G

MILLER COMPLEX

A series of thunder and lightning storms moved across the Rogue River-Siskyou National Forest on August 14 igniting 25 wildfires that spanned across two separate National Forests, two Geographic Areas, two states, and three counties. The series of fires were managed as the Miller Complex. All fires within the complex were terrain and fuel driven, and in the early stages fire growth was primarily a result of rollout and slope reversal. All IMTs that commanded this fire during its duration noted the jurisdictional complexities in managing an incident that was across state and regional boundaries.

When the fires first ignited, a local Type 3 organization was already in place managing earlier ignitions and assumed responsibility for some of the new fire starts. A Type 2 IMT took command of the fire on August 16 to address the increased complexity due to safety concerns, external political factors and resource constraints. A contain and control strategy was already being utilized due to the hazards presented to firefighters by the steep terrain and numerous snags. The team took on an incident that had multi-jurisdictional boundaries with challenging collaborative missions, and had low priority status for resource allocation. On August 18, smoke became a significant issue over the complex. Locally generated smoke was enhanced by considerable smoke from other area fires, most notably the Chetco Bar Fire. It remained hot and dry, but temperatures in the lower valleys were affected by smoke shading.

Smoky conditions and resource shortages persisted and as the incident progressed towards some containment, a Type 1 IMT took command of the incident. On August 25 when the Type 1 IMT took command, the fire was 46 percent contained.

Heat began to build again on August 31. The National Weather Service issued a red flag warning for poor nighttime humidity recoveries and gusty east winds for the night of August 31 and into the morning of September 1, when a red flag warning was issued for hot, dry, and unstable weather with a Haines index of 6. Dire conditions prompted a mandatory evacuation (Level 3) for 40 residences in the Applegate community.

During this hot spell, temperatures peaked at around 100 degrees on September 1 and humidities dropped to 12 percent over the peaks on September 3. Red flag warnings were issued for the potetial of lightning on very dry fuels for both September 6 and 7.

On September 8, evacuations were relaxed for all communities on the Oregon side of Miller Complex. On September 11, the Type 1 IMT transferred command of the fire to a Type Generally warmer conditions were observed September 15 and 16, but smoke returned and held surface temperatures down and humidities up in many locations.

Conditions began to change significantly on September 17. Clouds moved over the area as a cold front approached the coast, and a few showers were observed over the complex. Rain moved in overnight and into September 18 with as much as a half-inch of rain observed over the western portions of the incident and lighter amounts elsewhere.

A mid-October heat wave caused an increase in fire activity on the Abney Fire on the northeast flank where private property was still threatened. With a continued warming and drying trend in the forecast, the Rogue River-Siskiyou National Forest managers decided on October 14 to order a Type 2 IMT to assume command on October 16. The IMT was in place through October 20 when the area received significant rainfall and the fire was transferred back to the local unit.

The fire reached 100 percent containment on November 2.

Additional information on this incident is in Appendix B

HORSE PRAIRIE

The 16,436 acre Horse Prairie Fire started on private land mid-afternoon of August 26. Due to the values at risk, a large number of resources were assigned to this fire. With an unstable atmosphere, extreme fire behavior, steep terrain, and smoke hampering air operations, initial response resources used indirect suppression tactics. Two days later, evacuation orders were issued when smoke began to affect residents and transportation. On August 31, crews continued with burnout operations on the western side of the fire and mop-up elsewhere. Containment steadily grew, so that on September 18 the fire was 95 percent contained. Of the 16,436 acres within the fire perimeter, the Roseburg BLM managed 7,626 acres and private timber companies managed 8,810 acres.

See more on this fire in Appendix B

UNO PEAK

The Uno Peak Fire started August 30, 15 miles northwest of Mason, Washington on the Okanogan-Wenatchee National Forest. The fire was reported to be on the steep slopes on the northeast side of Lake Chelan near Uno Peak. The area was under critical fire conditions with live woody and herbaceous fuel moistures at critical levels and high temperatures and low relative humidities. The decision was made to order a load of smokejumpers early the next morning as well as an air attack to conduct reconnaissance.

The following morning, Air Attack arrived on scene and reported this incident as two separate fires. One was 10 acres and the other was estimated at 40 acres, approximately half a mile east of the Sawtooth Wilderness. The Air Attack also reported the smaller fire was most likely a spot fire from the larger fire and not two separate starts. The fire was threatening two recreational structures about a quarter mile away, one above the fire and one below near Lake Chelan. The air attack ordered scooper planes due to the fire's proximity to the lake. The load of smokejumpers was unable to staff the incident due to mechanical issues and had to return to Twisp. The majority of the orders for scoopers were diverted or not filled due to higher priority fires. The fire was mostly worked aerially by fire bombers, helicopters, and heli-tankers for most of the first shift. That afternoon a Type 2 IMT was ordered and by 5 p.m. the size of the incident was estimated at 90 acres. An area closure was also implemented.

By the morning of the September 1, the fire was still burning actively with short uphill crown runs, spotting, and creeping fire spread in all directions. The fire was now estimated at 400 acres. The initial management strategy was to utilize existing roads, construct new dozer lines and re-utilize past fire lines to complete an indirect line to the northeast, east, and southeast side of the fire. The northwest area of the fire was monitored as it spread into the Sawtooth Wilderness. The indirect strategy was chosen due to the fact the incident was burning in the Rex Creek burn scar from 2001 and had a large number of snags that presented safety issues to firefighters on the ground. The fire was now threatening the historic Crow Cabin, as well as the endangered White Bark Pine that was scattered throughout the higher elevations of the incident. The heavy existing fire load in Oregon and Washington meant air and ground resource availability was scarce and many orders for additional support were not filled.

At 6 a.m. September 2, a Type 2 IMT took command of the fire, which at this time was now estimated to be approximately 900 acres with 109 personnel assigned. Additionally a separate incident was reported two miles northwest of the Uno Peak Fire, the Ferry Fire was reported at 75 acres and was managed by the same IMT.

Under critical fire weather conditions (near record high temperatures, low relative humidity, and gusty winds), on September 3 the fire grew from approximately 900 acres to 2,151 acres. The fire spread across Safety Harbor Creek prompting Level 1 evacuations to structures and inholdings south and east of the fire. Also, during the run the historic Crow Cabin burned.

The next day, after crossing Safety Harbor Creek the fire had a wind and slope alignment that triggered an uphill/up-drainage run causing extreme fire behavior and spread in the Safety Harbor Creek drainage. The fire grew from approximately 2,400 acres to 6,000 acres in a single burn period. The spread was mainly to the north and west and prompted more Level 1 evacuations to the Llama Ranch and Canoe Creek areas, threatening an additional 13 residences and 22 other minor structures. The fire grew approximately within three miles of these residences. Despite the extreme fire behavior and rapid growth, the fire remained within the planned containment lines.

Between September 6 and 9, the heavy inversion of smoke from other fires in the northwest was still an influence and had grounded all aviation efforts due to poor visibility for the next three operational shifts. During this time, the fire continued to spread moderately in heavy fuel loads. The structure group completed structure preparations at Llama Ranch and had moved north to the structures at Canoe Creek to begin efforts there. The acreage with the addition of the Ferry Fire was 7,236 acres. On September 9, Air National Guard helicopters arrived and conducted bucket work on the east flank of the fire allowing ground crews to continue line preparation on Nelson Ridge.

By September 15, a significant change in the weather slowed burning conditions. Four days of precipitation were forecast with snow levels falling to around 5,000 feet. The weather change prompted the IMT to switch to monitoring the existing burn and begin backhaul and suppression repair efforts. By September 20, most of the fire above 5,000 feet had seen 1 to 4 inches of snow and below 5,000 feet significant rain stopped fire spread at approximately 8,750 acres. A Type 3 local team took over the fire September 20.

The local unit continued with suppression repair and backhaul efforts for the next month. The fire had some growth within containment lines to its final footprint of 9,500 acres. The fire was called contained and controlled on October 24.

See more on this fire in Appendix G

SEPTEMBER

September continued the trend seen in July and August with conditions much warmer and drier than average. Although some spotty precipitation had fallen in August, the amount was too little to have any lasting effect on fire danger and fire behavior. By September 5, the US Drought Monitor depicted moderate drought conditions in western Washington and northwestern Oregon, but southwestern Oregon was still rated as abnormally dry. EDDI indicated more severe drought conditions were present in western Oregon and Washington and across the Cascades than the US Drought Monitor indicated.

EAGLE CREEK

The Eagle Creek Fire was reported on Saturday, September 2 at approximately 4 p.m. The two Columbia River Gorge National Scenic Area engines were dispatched soon thereafter to respond to an initial fire report at the Eagle Creek Trail. The reporting party, a Forest Service law enforcement officer, was attempting to make contact with a group of teens reported to have been setting off fireworks about a mile up Eagle Creek Trail.

Within half an hour, the fire had grown to 50 acres and aircraft, including medium helicopters, were diverted from the Indian Creek Fire to help with the new Eagle Creek Fire. They helped search for hikers and campers near the fires, and dropped water to try to slow the spread of the Eagle Creek Fire. The crews and security officers assigned to Indian Creek Fire helped locate hikers and campers near the Eagle Creek Fire.

Background: Eagle Creek Fire on September 17

Fire managers learned that there were about 150 people trapped at Punch Bowl Falls. Another group of three hikers were on Ruckel Ridge reported fire burning a quarter mile below them, making their rescue a priority. Hood River County requested a National Guard hoist-capable helicopter from Salem to rescue the three hikers, and the National Guard completed their rescue by about 7:30 p.m.

A division supervisor along with three members of the a fire crew joined three from a search and rescue crew to begin hiking about 10 miles in to the trapped people, hauling drinking water and food in their packs. A second group of about 20 hikers had left the Punch Bowl Falls area earlier in the evening and made it to Wahtum Lake around midnight. A waiting bus took them to their cars at the Eagle Creek Trailhead.

The Sheriff's department issued a Level 3 evacuation south of the interstate, Level 2 for everything south of Wa Na Pa Street, and Level 1 for the rest of Cascade Locks on September 3. Meanwhile, the rescue crew arrived at High Bridge at 3:20 a.m. They slept for a couple of hours before heading out at first light. At 5:30 a.m., the crew prepared stranded hikers for the long hike up to Wahtum Lake. In all, 144 hikers and 9 rescuers had spent the night near High Bridge. All hikers arrived at Wahtum Lake around midday.

A Type 2 IMT assumed command of the 3,200-acre Eagle Creek Fire and the 850-acre Indian Creek Fire on the morning of September 4. The IMT entered into unified command with the Oregon Department of Forestry and Oregon State Fire Marshal. The Multnomah County Sheriff's Office ordered Level 3 evacuations for the communities of Warrendale and Dodson, Level 2 evacuations for East Corbett, and Level 1 evacuations for Corbett, Latourell, and Bridal Veil. The Hood River County Sheriff's Office increased all Level 1 evacuations in Cascade Locks to Level 2.

The fire doubled in size on September 5 with 1,122 people evacuated. The fire then jumped the Columbia River near Multnomah Falls and ignited the Archer Mountain Fire on the Washington side. It was also reported that the fire was surrounding Multnomah Falls Lodge. During this burn period, the Indian Creek and Eagle Creek fires merged and were estimated to be around 20,000 acres.

Over the next week, the fire was quieter giving firefighters the opportunity to gain 11 percent containment.

Between September 12 and 18, westerly winds increased fire behavior on the east end of fire. The fire grew to 35,636 acres and crossed Herman Creek above Camp Creek. Fixed wing aircraft conducted reconnaissance over parts of the fire, but heavy smoke prevented water drops. Crews conducted burnout operations adjacent to Herman Creek and were successful in securing the utility corridor.

On September 18, the sheriff lifted all evacuation orders in Multnomah County, and Hood River County Sheriff downgraded evacuation levels for Hood River Valley. All evacuation levels for the fire along I-84 were lifted, but due to a flash flood advisory, exit 56 west to the county line remained on Level 1 notice.

Interstate 84 eastbound lanes reopened on September 23, with access limited to one lane near Shellrock Mountain.

The fire was declared 100 percent contained on November 30.

See more on this fire in Appendix E

SAWMILL CREEK

The Sawmill Creek Fire started September 4 on the Okanogan-Wenatchee National Forest. Local and state resources responded quickly to the fire but were hampered by steep rocky terrain, smoky conditions, and limited road access. Initial air and ground operations were hampered the first 48 hours of the fire due to heavy smoke. Responding agencies took a defensive stance for the first couple of days for firefighter safety due to the smoke, terrain difficulties, and fire activity.

A Type 2 IMT took command on September 9 and then on September 11 took command of the North Zone of the Norse Peak Fire as well. With moderate weather in the middle of September, the Type 1 IMT on the Norse Peak Fire also assumed command of the Sawmill Creek Fire. On September 20, the Sawmill Creek Fire was placed in monitor status and then returned to Washington Department of Natural Resources on September 23.

See more on this fire in Appendix G

DESOLATION

The Desolation Fire started September 9 in the Mill Creek Wilderness, about 20 miles northeast of Prineville, Oregon near the intersection of the East Fork of Mill Creek and Desolation Canyon. Due to safety concerns related to snags and steep terrain, no ground resources were initially assigned to the fire, and aircraft was used to drop water and check its growth, while obtaining better size estimates. On day three, strong wind gusts out of the northwest fanned the fire, pushing it south out of the wilderness toward private structures along Hwy 26, including the 53-acre site of the Ochoco Christian Conference Center (formerly Mount Bachelor Academy), and prompting Level 2 evacuation notices for another 27 residences in the Marks Creek area along Hwy 26 between mileposts 45-50. The fire was estimated at 2,000 acres.

On September 13, a Type 3 Central Oregon Incident Management Team took command of the fire, with a focus on a confine and contain strategy to keep the fire north of the highway. Five airtankers were utilized, supporting ground resources by slowing the fire's progress and cooling actively burning flanks. Challenges remained with heavy fuel, warm temperatures and afternoon winds. A structure protection group began working to secure private residences in the area, and 75 firefighters were on scene, with six additional 20-person crews arriving.

From September 14-16, the Desolation Fire stayed within planned containment lines through gusty winds as firefighters worked through the day and into the night to keep the fire north of Highway 26 and protect adjacent private residences. Crook County lowered the evacuation notice for homes in the Mark's Creek area to a Level 1 (Get Ready).

Firefighters continued prepping the northern containment line along Forest Road 27 with feller bunchers and other heavy equipment to form a "catcher's mitt" should the fire grow toward the northeast. Crews also removed fuels around Whistler Campground and Bingham Springs Trailhead and around private property near the highway. The fire was mainly a ground fire, burning through dead and down timber and shrubs within the 2000 Hash Rock Fire scar. On September 16, Central Oregon experienced wetting rain, with some snow falling on the Desolation fire, helping reduce fire activity and clear smoke from area wildfires.

See more on this fire in Appendix F

Background: Sawmill Creek Fire

Background: Diamond Creek Fire

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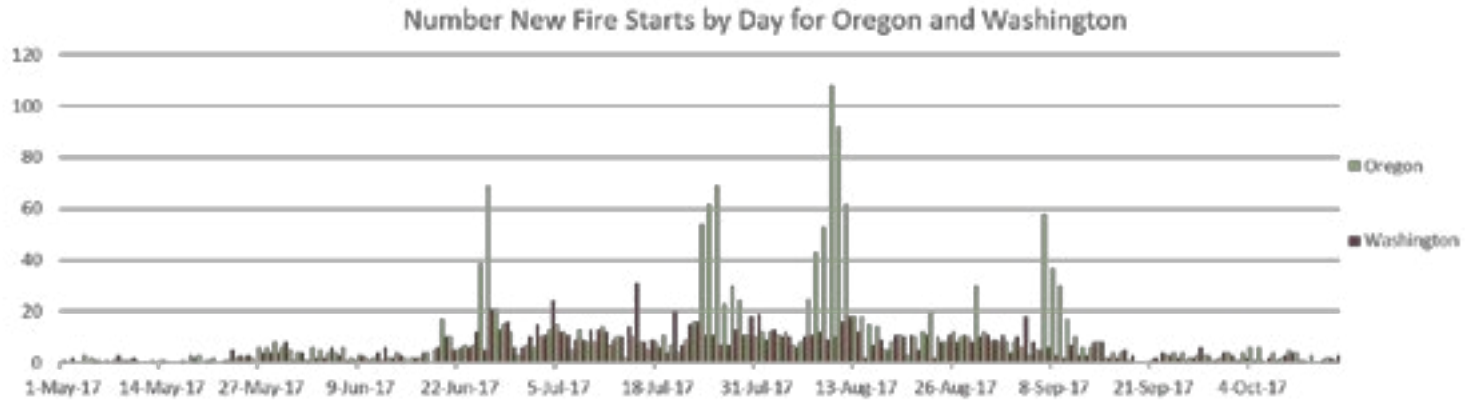
Appendices

Appendix A: Overview



Introduction

This report summarizes the 2017 fire season for Region 6 of the Forest Service and Oregon and Washington State Office of the Bureau of Land Management (BLM). It includes summary statistics for the fire season, preseason information, factors that affected the season, and a timeline of the 2017 fire season. Because of the difficulty in separating some data, some of the statistics apply to all jurisdictions in the Northwest where noted. The accompanying appendices provide more detail on specific fires by subgeographic area (Appendices B through G), post-fire stabilization and rehabilitation (Appendix H), fire prevention and education teams (Appendix I), August Eclipse Report (Appendix J), use of science and technology in managing wildfires (Appendix K), air quality and smoke management (Appendix L), and Spanish language documents provided during the fire season (Appendix M).

Basic Fire Statistics

In Oregon and Washington, 3,404 fires burned 1,121,442 acres this season across all jurisdictions. The BLM experienced 257 fires for 224,984 acres while the Forest Service saw 1,354 fires for 754,269 acres. This season ranked sixth highest in the last ten years in terms of number of large fires, and fourth in terms of acres burned for the Northwest. Across all jurisdictions, initial attack resources contained all but 126 of these fires for an initial attack success rate of 97 percent. Most of these large fires originated on National Forest System lands.

Based on acres burned, the fire season was more severe in Oregon than in Washington and more severe in both states for the National Forests than for the BLM. About 66 percent of the acres burned across the Pacific Northwest were on National Forest System lands.

Based on acres burned, the fire season was more severe in Oregon than in Washington and more severe in both states for the National Forests than for the BLM. The Forest Service had about 40 percent of the fires but 67 percent of the acres burned. The BLM had only 7.5 percent of the fires but 20 percent of the acres. The Forest Service had 16 percent of the fires and 65 percent of the acres. The BLM had only two percent of the fires but 19 percent of the acres.

Oregon had more lightning-caused fires while Washington had more human-caused fires. This same pattern was present for the BLM and Forest Service.

Lightning started about 65 percent of fires originating on BLM-managed in Oregon but only about 29 percent of fires in Washington. Similarly, lightning started 69 percent of fires originating on National Forest System lands in Oregon but only 20 percent of fires in Washington.

In Oregon, fire starts on all jurisdictions spiked during four periods – late June and July, and early August and September. The greatest number of fires ignited on August 10, with 86 (out of 108) fires caused by lightning. Washington State saw minor spikes in fire starts in late June, early July, and mid-July. In both states, the number of human-caused fires was relatively steady through the summer with an average of 10 per day across the region during the summer months.

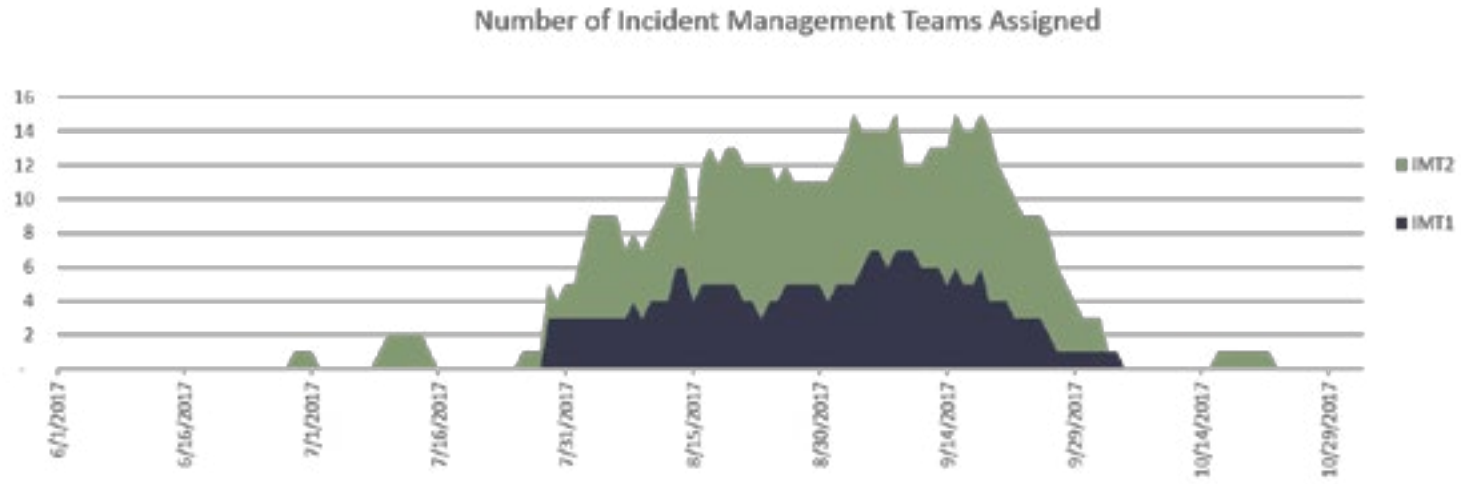
Large Fires

A large fire is one that burns at least 100 acres in forests or 300 acres in grass, shrubs, or shrub-steppe (often referred to as "rangelands"). There were one or two large fires as early as late May, and the number of large fires burning simultaneously began increasing in late June and increased rapidly in August. Large fire occurrences peaked at 38 large fires on September 11 and 12. By the end of October, 12 large fires were still active.

A long- duration rangeland fire typically lasts for about two weeks whereas a long duration forest fire typically lasts for several weeks to several months. The number of personnel assigned to large fires in the Northwest increased in August and peaked on September 4 with more than 10,000 people assigned.

Large fires use incident management teams (IMTs) to:

- Order and assign firefighting resources to specific locations on each fire in order to perform specific tasks (Operations),
- Develop daily plans for managing the fire, order and release firefighting resources (Plans),
- Track and report costs and claims (Finance), and
- Provide the infrastructure needed for the fire and the firefighters such as communications, food, sanitation, transportation to and from the fireline, showers, and other supplies (Logistics).
- In addition, IMT information officers gather, draft and publish fire updates and fire information for the media and the public.



As fire representatives, they are the primary source of fire information and updates. They work to disseminate information to the media and the affected communities through traditional print media, social media channels, face-to-face interactions in the community and during public meetings (Fire Information).

Incident management teams are categorized as Type 1 and Type 2. Type 1 IMTs usually handle the more strategically difficult fires, including "fire complexes," or multiple fires located in the same general area that become managed as one incident. Occasionally fires are large enough to require multiple incident management teams, such as on the Chetco Bar Fire. The number of Type 2 IMTs assigned to Northwest fires peaked at 10 teams on September 3 and 19 (Figure 1-4). The number of Type 1 IMTs peaked at 7 between September 5 and 10. The largest number of IMTs, both Type 1 and 2, assigned at any one time was 17 on August 15, with many of these teams managing complexes and multiple incidents. Many of the large fires on the Forest Service used both Type 1 and Type 2 IMTs, with multiple teams required over the duration of the fire. Most large fires that affected the BLM required only a single Type 2 IMT due to the generally short duration of rangeland fires.

Nationally, 2017 saw eight deployments of National Incident Management Organization (NIMO) teams, of which four were in the Northwest. NIMO teams were used in the early stages of Chetco Bar Fire, on Indian Creek Fire, and during the early and later stages of Diamond Creek Fire. A NIMO team also supported operations during the August 21 total solar eclipse.

Most often, fires that start early (May and June) or late in the season (mid-September and later) are relatively short duration while those that start in the middle of fire season (July, August, and early September) tend to last longer. In large part, these differences are due to the warmer and drier fuels and weather conditions, as well as the frequency of weather events that start and spread fires.

The Sutherland Canyon, Straight Hollow, Ana, Hawk, and Cinder Butte were all rangeland fires that started on lands managed by the BLM. The Hawk Fire depicts one extreme of large fire duration, lasting only three days. In contrast, the Indian Creek Fire was already a long-duration fire when it merged with Eagle Creek Fire. Some of the longest lasting fires were Abney, Ollalie Lookout, Milli, Norse Peak, Burnt Peak, Knox, Happy Dog, and Brokentooth, all of which were fires that started on National Forest System lands.

Aviation Program

In 2017, aircraft flew 10,867 flight hours on fire missions; 4,069 of those were in fixed wing aircraft (air attack platforms); 727 flight hours flown by airtankers (single engine airtankers and large tankers); and 6,070 hours of flight time flown by helicopters.

Region 6 Smokejumpers

The North Cascades Smokejumper Base and Redmond Smokejumper Base are the two active smokejumper programs in the Pacific Northwest. There were 72 smokejumpers in the region in 2017 that had 1,163 jumps (training and fire) to staff 61 different fires. Nationally, there were 287 Forest Service Smokejumpers located across seven bases. Nationally, there were six minor and four serious injuries reported in 2017. The 2017 injury rates are significantly lower than the 25-year average.

The Pacific Northwest smokejumper programs also provide miscellaneous overhead. In 2017 Redmond Smokejumpers filled 58 single resources assignments totaling 770 person days, which accounted for 53 percent of the Redmond Smokejumpers' fire suppression activities. The North Cascades Smokejumper Base provided assistance to incident management teams on 17 large fires through 29 single resource assignments and provided training opportunities in Safety Officer Type 2, Long Term Fire Analyst, Incident Commander Type 3, Division Supervisor, Task Force Leader, and Crew Boss positions.

Redmond Smokejumper Para-Cargo Program

Aircraft missions to supply and support remote wildfires is a standard operation within the smokejumper program. While self-sufficiency is a standard smokejumper fire expectation, requests for daily sustainability needs such as food and water, cache items, and unique supplies are often delivered for a variety of fire configurations, sizes, and agency jurisdiction. Due to the heavy smoke this year and the shortage of aircraft, para-cargo missions provided critical supplies to the firefighters on the ground on many fires.

In 2017, most of Redmond's para-car-

Researchers studying fire patterns during a prescribed fire at the Sycan Marsh on October 18, 2017

go missions were for various fires within the Miller Complex in SW Oregon. The cargo deliveries consisted of a total of 12,500 lbs. of food, water, pumps, hoses, saw gas, chainsaws, and structure wrap. This year's most unusual request was from Air Operations on the Miller Complex requesting para-cargo delivery of structure wrap and to supply two jumpers to install the wrap on a remote historic cabin (Grayback Cabin) and then hike out to the trailhead. The mission was a success and the more than 80-year-old cabin still stands today. In the future, both the FS and BLM are looking into GPS-guided cargo chutes, a system currently being tested with great success.

Region 6 Rappellers

The Pacific Northwest is home to five rappel programs. This year, the Sled Springs and Blue Mountain rappel programs were consolidated to create the Grande Ronde Rappellers, located in La Grande, OR. In total, the Pacific Northwest Rappellers staffed 136 initial attack fires, eight extended attack rappels (in remote locations) on large fires, and staffed 40 helitack fires where rappelling wasn't required. The rappel program flew 1,600 flight hours on large fire support (buckets, long line work, passenger transport) in support of 164 different fires. There were 1,687 rappels in 2017, 477 of which were operational.

Airtanker Bases

In 2017, airtankers delivered more than 8 million gallons of fire retardant chemicals and water from large airtanker bases and Single Engine Airtanker (SEAT) bases. Retardant from airtanker bases in Idaho and California also dropped on Northwest fires, and bases in the Northwest supported fires in California as well. An estimated 3,464,317 gallons of retardant were dropped on National Forest System and BLM-managed lands.

Large Airtanker Bases

The Northwest has Forest Service-managed large airtanker bases at Klamath Falls, La Grande, Medford, John Day, Redmond, and Moses Lake. Both large airtankers and SEATs fly from these bases.

Moses Lake, Medford, and Redmond airtanker bases delivered more than 1 million gallons of retardant each. Moses Lake delivered 1,062,594 gallons of retardant in 262 loads while Medford delivered 1,161,892 gallons of retardant. Redmond delivered a record 1,689,492 gallons in 691 loads, as compared to 726,833 gallons in 2015 and 400,072 gallons in 2016. Collectively, these three bases delivered about 3.9 million gallons of retardant to wildfires around the Northwest and in northern California. The Medford Airtanker Base is the only base in the Northwest that can support the DC-10 very large airtanker (VLAT), which was used on several Forest Service and BLM fires in the Northwest in 2017.

Flying from Klamath Falls, airtankers delivered 273 loads of retardant totaling 608,177 gallons. August 1 was the busiest day with 30 loads for 82,534 gallons to the July Complex and Devils Lake fires in California. Sixty-two percent of all retardant use went to California, primarily the Modoc National Forest.

The La Grande Airtanker Base supported 196 missions on 53 different fires delivering a total of 283,834 gallons of retardant. The two busiest days were July 29 when two heavy air tankers and two SEATs flew 12 loads for 25,845 gallons, and on August 4 when six heavy air tankers and two SEATs flew 47 loads for 73,243 gallons.

SEAT Bases

BLM maintains Single Engine Airtanker (SEAT) bases in Burns, Ontario, and Lakeview, Oregon. BLM's Lakeview SEAT base was the busiest, delivering 281,766 gallons of retardant in 411 loads followed by Burns SEAT base with 226,000 gallons in 327 loads. The Ontario SEAT base delivered 187,000 gallons of retardant in 263 loads. A temporary SEAT base in Paisley, Oregon flew 6,585 gallons of retardant in 10 loads on the Ana Fire.

Air Attack

The Redmond Airtanker Base was also the designated home from June 1 to September 30 for the Central Oregon Fire Management (COFMS) Air Attack platform. This aircraft, its pilot, and the Air Tactical Group Supervisor (ATGS), provided critical support to many fire and aviation operations. In 2017, it flew on 117 different fires and acquired 296 Flight Hours, well above the yearly average of 35 fires and 122 Flight Hours.

The C-130 large airtanker carries 4,000 gallons of retardant

Full Service Retardant Contract

In 2017, the crew pumped 691 loads, for 1,689,492 gallons of retardant, roughly 1 million gallons over the ten-year average of 700,000 gallons. The contract ran from June 1 to October 15. Of the 137 contract days, at least one load of retardant was pumped on 68 days.

La Grande Airtanker Base

The La Grande Airtanker Base supported 196 missions on 53 different fires delivering 283,834 gallons. The La Grande Airtanker Base supported fires with retardant with 129 SEAT loads and 67 Large Airtanker loads. The La Grande Airtanker Base experienced its busiest days on July 29 when two heavy airtankers and two SEATs flew 12 loads for 25,845 gallons, and on August 4 when six heavy airtankers and two SEATs flew 47 loads for 73,243 gallons.

Numbers for the Moses Lake Airtanker Base were not provided for this report.

UAS Program

The Bureau of Land Management's inaugural year for the Unmanned Aircraft Systems (UAS) program was 2017, with 70 pilots trained and 2,821 flights nationally. Ten of those newly trained operators are Oregon and Washington BLM employees who flew more than 60 hours. The UAS is a useful tool for strategic and tactical planning for a variety of tasks including large fire support, fire investigations, mapping, and reconnaissance. Nationwide there were 677 flights in support of fire operations.

Large Fire Costs

Out of the 3,404 wildfires the Northwest experienced, 126 large fires resulted in most of the costs. Based on data reported on ICS-209 forms and agency financial systems, the Forest Service and BLM collectively spent nearly 600 million dollars in direct suppression and emergency stabilization costs in 2017. That cost does not account for the direct costs between containment and control, indirect costs to the agencies for bringing in additional firefighting resources to fill in when the home unit resources were already committed to wildfires. Nor does it account for the costs to local, state, and county agencies or for costs to businesses and homeowners, or health-related expense caused by wildfires.

Based on data in ICS-209 forms, the Forest Service spent an estimated $497 million dollars with most of that spent on fires in Oregon (over $420 million). Based on data in the financial system as of September 27, 2017, the BLM spent an estimated $30 million with most of that spent on Oregon fires.

Preparedness Levels

Preparedness levels (PL) indicate the severity of fuel and weather conditions, level of fire activity, and the availability of firefighting resources. The Northwest Coordinating Group (NWCG) sets the PL for the Northwest while the National Multi-Agency Coordinating Group (NMAC) sets the national PL each day throughout the year. As the preparedness level increases, more federal and state employees become available to assist in firefighting efforts. In addition, resources from other parts of the country not experiencing wildfires are more likely to be ordered to regions where fires are actively burning. During the 2017 fire season, crews, IMTs, and other resources from the other parts of the United States came to Oregon and Washington. At higher PLs, the Department of Defense may make military resources available, such as helicopters, aircraft that can be fitted with temporary retardant tanks, and crews from the Army and National Guard.

On average, the Northwest slowly rises from PL1 to a peak at PL3 or PL4 in

mid-August, and then slowly falls back to PL1 by early October. The preparedness level in 2017 rose to PL2 in late June about two weeks earlier than usual and reached PL3 by mid-July, about one month earlier than is typical. The Northwest reached PL4 about the same time it normally reaches PL3 and only eight days later moved to PL5 on August 12, remaining there a record 40 days, until September 21. After that, the Northwest began dropping preparedness levels relatively quickly, returning to PL1 by October 21. For comparison, in 2015, the Northwest moved to PL5 on August 13, but remained there for only 23 days before dropping back to PL4 on September 5 and to PL1 by October 9.

Nationally, the preparedness level reached PL4 on July 9 and PL5 on August 10. The national level remained at PL5 for 39 days, dropping back to PL4 on September 18 and PL1 on October 31. In addition to high activity in the Northwest, the Northern Rockies, Northern California, and the Great Basin had high fire activity with a great demand for firefighting resources. For the Pacific Northwest, the most significant take away in 2017 is the record-breaking 40 days at PL 5. During the previous eventful year (2015), the Pacific Northwest was in PL 5 for 23 days.

Safety and Wellness

Fireline Injuries and Illnesses

The Pacific Northwest had a total of 199 reportable injuries and illnesses involving the Forest Service and BLM personnel associated with fire operations. Between May 1 and November, the BLM had 51 injuries or illnesses and the Forest Service had 148. Some of the injuries involve bees, ticks, and insect bites that required medical attention. Fireline injuries to the ankles, knees, and lower back were also common. Multiple eye injuries were recorded that involved ash, organic material, or insects. Exposure to poison oak and to chemicals and toxins in the wildland-urban interface were also notable. The Forest Service and BLM recorded only a handful of heat-related illnesses in 2017.

The numbers recorded above will differ from the numbers recorded in the Appendices for individual fires. The numbers above are for agency personnel while the numbers in the fire profiles appendices also account for injuries to other interagency or contract personnel that occurred on fires that were in the BLM or Forest Service jurisdictions.

Facilitated Learning Analysis

Facilitated Learning Analyses (FLA) are interagency reports developed and shared on the Wildland Fire Lessons Learned Center after an incident, accident, or near miss with the goal of developing and nurturing a high reliability organization through a learning culture. With a commitment to learning rather than blaming, the FLAs reinforce high reliability by taking a hard look at near misses within the wildland fire community. The intent of an FLA is to improve performance by capitalizing on the shared experiences of participants. A learning culture sees unintended outcomes as valued opportunities to learn, grow, and be better and more reliable tomorrow. An agency's response to an accident is extremely important. In 2017, the Wildland Fire Lessons Learned Center developed three FLAs for accidents and near misses in Oregon and Washington. The following list also notes some Rapid Lesson Sharing (RLS) reports produced quickly after an incident. All of the FLAs and RLSs can be accessed via the Wildland Fire Lessons Learned Center website.

FLAs

- July 16 - FLA for motor vehicle accident in Washington
- August 18 - FLA for entrapment near miss, Chetco Bar Fire
- August 27 - FLA for engine rollover with serious injury, Miller Complex

RLSs

- June 19 - USFS vehicle struck a power pole returning from a recently burned unit
- August 4 - RLS for heat related illness on Devils Lake Fire
- August 1- RLS for a tree strike, Devils Lake Fire
- August 30 - RLS Whitewater Fire heavy equipment strikes tree
- August 30 - RLS Whitewater Fire spider bites
- September 2 - RLS for tree strike, Jade Creek Fire
- September 3 - RLS for tree strike, Whitewater Fire
- September 6 - RLS for a dozer tip over, Avenue Fire
- September 6 - RLS for CPR success, Chetco Bar Fire
- September 26 - RLS for engine wheel stud malfunction

CISM Response

Critical Incident Stress Management (CISM) is a comprehensive, integrated, systematic, and multi-tactic crisis intervention approach to manage stress after traumatic events. CISM is a coordinated program of tactics designed to alleviate negative reactions to traumatic experiences.

Critical incidents are unusually challenging events that have the potential to create significant human distress and can overwhelm the usual coping mechanisms of an individual or group. They are typically sudden, powerful, traumatic events, which are outside the range of ordinary human experiences that initiate a crisis response. Personnel may experience a critical incident because of a line of duty death, off-duty death, or serious accident or injury. The effects of traumatic stress are best prevented and mitigated using Critical Incident Stress Management. The use of CISM increases health, morale, and productivity. It may decrease post-traumatic stress disorder, acute stress disorder, and other adverse effects.

In 2017, the Pacific Northwest responded to five CISM requests.

- Non-fire employee involved in motor vehicle accident that resulted in a public fatality
- Engine rollover with injuries on the Miller Complex
- Non-fire personnel assigned to the Miller Complex experienced the death of a family member
- Incident involving several fire personnel and local district personnel who were involved in the resuscitation attempts where a member of the public suffered a fatal heart attack
- Non-fire incident: bereavement after the loss of an off-duty fire employee.

Structures Lost

There were a number of structures lost in southern Oregon coast. This was an

Umpqua North Fire

unusual and notable occurrence during fire season in the Pacific Northwest, as those areas typically have high nighttime humidity recovery and a temperate coastal climate.

Based on data reported in ICS-209 forms, 112 structures were lost in the Northwest, 61 in Oregon and 51 in Washington. Of these, 26 were single residences, 83 were minor structures (sheds, barns, etc.), and three were either mixed residential/commercial or nonresidential commercial structures. Twenty-nine of the 126 large fires burned structures. In Oregon, the greatest losses happened on the Chetco Bar Fire (6 residences, 24 minor structures); in Washington, the greatest losses occurred on the Monument Hill Fire (three residences, 20 minor structures).

Structures burned on seven fires and two complexes that originated on National Forest System lands, with the greatest losses on the Chetco Bar Fire (30 structures); five of the structures burned in Washington and 38 in Oregon. Four fires originating on lands managed by the BLM resulted in structure losses with the greatest losses on Cinder Butte Fire (four structures); one structure was lost in Washington and eight in Oregon.

Evacuations

Based on daily incident reports (form ICS-209) 42 of the 126 large fires had some level of evacuation. Evacuation levels can be thought of as a variation of Ready, Set, GO!

Level 1: Get Ready- residents should be aware that danger exists in the area

Level 2: Get Set- residents must be prepared to leave at a moment's notice

Level 3: Go – residents should leave immediately

Six large fires reached only Level 1 evacuation notices and six reached Level 2. Thirty-six fires reached Level 3 evacuations and several fires had Level 2 evacuations in some areas and Level 3 in others. On seven of the fires that reached Level 3, the number of people evacuated was not recorded. On the remaining 29 fires, 8,858 people evacuated to friends or family, 512 sheltered in place, and 126 moved to temporary shelters. The Chetco Bar Fire had the highest number of evacuations with 5,148 residents under Level 3. The next highest was Eagle Creek, with 1,822 people evacuated, including nearly the entire populations of Cascade Locks, Dodson, Warrendale, Bridal Veil, and Latourell.

Significant Contributions

- Emergency Support Function #4 activations – none in Oregon and Washington.
- Number of Conflagration Act activations (Oregon) – 5 (Nena Springs twice, Milli, Chetco Bar, Eagle Creek). Conflagration Act declared for Flounce Fire, but canceled before mobilization occurred due to heavy rain.
- Number of Fire Service Mobilization Plan activations (Washington) – 21
- FEMA/Fire Management Assistance Grant requests:
  - Washington – 3 approved, 2 requested and later withdrawn
  - Oregon – 4 approved (Milli, Chetco Bar, Eagle Creek, Pipeline)
- National Guard mobilizations: Washington - 4 (Sawmill, Jolly Mountain, Norse Peak, Uno Peak), Oregon - 5 (Chetco Bar, Umpqua

North Complex, High Cascades Complex, Milli, and Eagle Creek)

- Active duty military mobilizations – 245 soldiers from Joint Base Lewis-McCord (Umpqua North Complex, High Cascades Complex, Elephant Fire)

Military Support

By August, approximately 4000 firefighters were committed to fires in the region. The strain on local, regional, and national firefighting resources within the PNW and other regions was felt by all fire managers, who were struggling to get resource orders filled for critical needs on large fires. This led to several State of Emergency declarations in both Oregon and Washington and the mobilization of the military and national guards from both states. Joint Base Lewis-McChord activated 245 soldiers from the 23rd Brigade Engineer Battalion and 1-23 Infantry Battalion and mobilized them to the Umpqua North Complex on September 11. On August 14, the Washington Air National Guard provided an RC-26 aircraft and support personnel, basing this aircraft out of Fairchild Air Force Base in Spokane. The Arizona Air National Guard provided a second RC-26 and support personnel to Oregon, basing the aircraft at Mahlon Sweet Field in Eugene. Both aircraft conducted infrared mapping and provided updates on fire locations and direction of spread until released on September 15.

The Washington Air and Army National Guard sent 535 personnel and 130 equipment/aircraft to assist in firefighting efforts on multiple Washington fires, including the Jolly Mountain, the Uno Peak, Norse Peak and Sawmill fires. The Oregon National Guard was activated four times during the 2017 fire season and provided approximately 600 personnel along with equipment and aircraft on several fires in the region. Deployments included Chetco Bar, Eagle Creek, Whitewater, and Horse Prairie and several other fires in the Cascades near Crater Lake National Park.

Most of the civilian soldiers and active duty soldiers had never fought wildland fire before and had to undergo wildland fire training. Prior to going to the fireline, all of the individuals were required to take basic firefighter and fire weather courses. Military assistance in the Pacific Northwest lasted until the end of September on some fires. The military helped provide many different roles on fires throughout the fire season such as radio operators, road guards, security and firefighters on the line. They also supplied crucial aircraft needs providing several helicopters to multiple fires throughout the Pacific Northwest.

Greening Fire Team 2017 Pilot Program: Whitewater Complex ICP Recycling Program

For many years, agency leadership has been tasked with promoting sustainable operations in Fire and Aviation. The volume of recyclable materials produced on incidents and in fire camps such as cardboard, plastic water bottles, plastic kitchen utensils and compostable materials has been a continual area of concern. In 2017, a pilot program was mobilized on the Willamette National Forest's Whitewater Complex to take a different approach to recycling at incident bases. The national USFS Greening Fire Team helped to fund a pilot EERA, who was ordered to manage the incident's waste and recycling stream.

The Facilities unit oversaw the Vendor recycling program which recouped over 17,000 bottle returns, 50 cubic yards of cardboard, and 15 cubic yards in recycling. This diverted about 51% of land fill materials for the time the NW8 team was at the incident.

Because the Vendor provided easily identifiable recycling containers, and conducted on-site sorting, prep and transport functions, the impact was minimal for firefighters and the IMT. Facilities staff members commented on how quickly firefighters adapted to the new system, and how well-received the program was. Both groups acknowledged appreciation for the opportunity to recycle, as well as the minimal impact to the IMT operations, and firefighters' limited time in camp to eat, shower, and rest between shifts. The Vendor handled everything, once a site was designated for the program.

Further advances are being explored to accommodate food waste for composting, where recyclable/compostable plates and utensils can be included. This additional phase could allow a base camp to achieve estimated 75-80% materials diverted from landfills, and further achieving cost savings for waste disposal.

Appendix B: Southwest Oregon

The 2017 fire season in Southwest Oregon was significant in many ways. The Rogue River-Siskiyou National Forest had 146 fires, 12 of which became large fires, four of those over 5,000 acres. Some Remote Automated Weather Stations (RAWS) in Southwest Oregon showed 212 consecutive days without measurable precipitation, defined as half an inches in 48 hours. Between the Chetco Bar and Shan Creek fires, and Miller and High Cascades complexes, the Rogue River-Siskiyou National Forest had 26 Type 2 and 1 IMTs, an area command team and a joint information center. The Chetco Bar Fire was not only the largest fire in the Pacific Northwest, but also the top priority fire in the nation during the peak of fire season, and its impact reached not only private homes and lands, but also more than 7,000 acres of lands managed by the BLM and commercial timberlands. Several factors, including the 1987 Silver Fire and 2002 Biscuit Fire made the Chetco Bar Fire politically charged, leading the Forest to host four meetings and make a concerted effort on telling the factual story of the initial attack efforts through an interactive timeline and GIS-based story map.

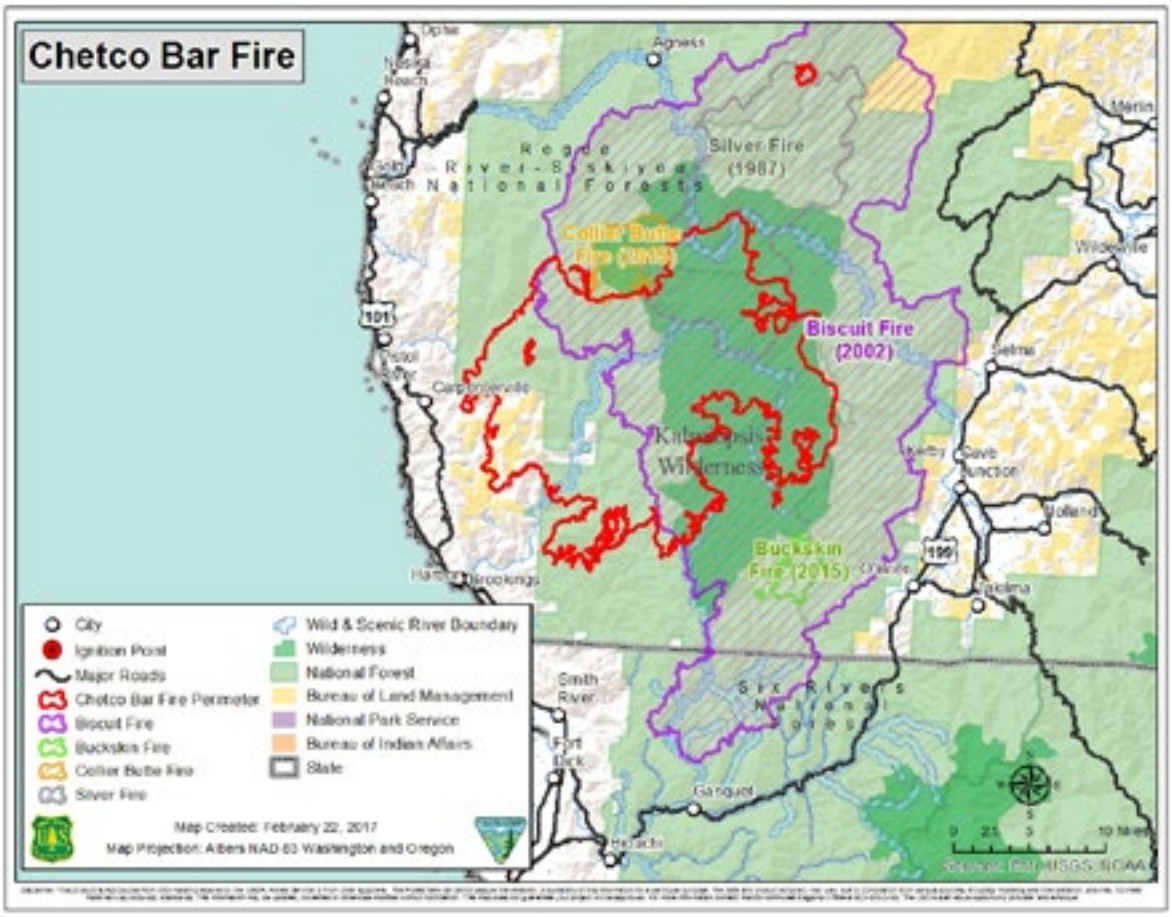
The Miller Complex included the Abney Fire, which was burning on the portion of the forest that is in California, meaning the IMT worked with multiple partners and a different geographic area. The forest ordered a Type 2 IMT just for the Abney Fire on October 14, well after the rest of the fires in the region had been contained.

The High Cascades Complex was truly a complex incident, starting with teams on individual fires, then combining fires into complexes, splitting fires into two different complexes and moving fires between complexes.

One thing that stood out about all of the fires in this appendix were the duration. The Chetco Bar Fire started from lightning in late June and still had IMTs on it into September. The Miller Complex started in mid-August and released the last type 2 IMT on October 20. While the duration of the fires was taxing to the local units, it was also a trying time for all the communities in Southwest Oregon. Smoke (which is covered in a separate part of this report) affected communities for much of the summer. Evacuations were in place on many of the fires. Even now, long after the fires have been called out, closure areas remain in effect as recovery efforts continue.

Chetco Bar

Interactive Progression Map: https://arcg.is/1v9SSa



July 12

A commercial airline pilot first reported the Chetco Bar Fire on the afternoon of July 12, 2017. The fire was burning mid-slope along the Chetco River. The first size up by aviation resources put the fires at half an acre with low to moderate spread potential in timber and brush. It was a suspected holdover fire from lightning storms on June 24 and 25. A crew of four heli-rappellers were dispatched to the fire, which was burning within the footprint of the 1987 Silver Fire and 2002 Biscuit Fire.

The incident commander reported being on the ground in the fire area at 4:14 p.m. Air attack requested aerial support to provide water bucket drops to check the fire spread. Three helicopters made 54 bucket drops totaling 17,280 gallons of water dropped on the fire during the first 24 hours.

Meanwhile, the incident commander requested permission to construct a helispot at a location east of the fire and was approved shortly thereafter. At that time, the incident commander reported the fire at half to three-quarters of an acre in steep terrain, creeping and smoldering in thick brush, with burning materials rolling out from the bottom of the fire. Two sawyers constructed a helispot and coordinated radio traffic with Air Attack and Rogue Valley Interagency Communication Center, while another sawyer cut brush. Two 20-person hand crews and logistical support were ordered, and due to report to the helibase for shuttle at 8 a.m. on July 13.

Because of the steep, difficult terrain, and tall, volatile brush and hazardous trees in the fire area, the incident commander also requested the closest location of an available short-haul helicopter in case of an injury. Helicopter aviation resources remained on the fire until 9:14 p.m. Air Attack reported the fire was holding at three-quarters of an acre, burning in heavy fuels. The rappellers continued work constructing the helispot until 10:30 p.m.

July 13-20

The fire grew to more than 10 acres overnight and was established on the north side of the spur ridge. Four more rappellers, saw fuel, and medical gear were ordered and arrived at 9 a.m. The incident commander reported at 8 a.m. to Rogue Valley Interagency Communication Center that the fire had pockets of high heat with dead and down material and heavy brush. He also requested an additional type 1 (heavy) or type 2 (medium) helicopter to support with bucket work. The additional four rappellers arrived about 9 a.m.

By early afternoon, fire intensity increased significantly, to the point the incident commander and trainee were concerned that their route back up the hill to the helispot may be compromised. He directed bucket drops from the Type 2 helicopter to cool the area. With just eight firefighters on scene and the increased fire behavior, the incident commander was concerned that with fire on both the north and south sides of the drainage, the fire could make a direct run towards the helispot. The fire behavior, rugged terrain, limited resources and no escape routes added up to an unacceptable risk of entrapment, and the incident commander made the decision at 3:05 p.m. to elevate the fire to a Type 3 incident command. The rappel helicopter returned to retrieve the first load of firefighters off the hill at 3:47 p.m. Meanwhile, two helicopters dropped 58 buckets totaling 18,200 gallons of water that day.

Based on Wildland Fire Decision Support System (WFDSS), the Agency Administrator decided to take an indirect suppression strategy on the fire, which would be managed by a Forest Type 3 IMT. The decision incorporated the USDA Forest Service Chief's focus items found in his 2017 Letter of Intent for Wildland Fire to "implement strategies and tactics that commit responders only to operations where and when they can be successful, and under conditions where important values at risk are protected with the least exposure necessary while maintaining relationships with the people we serve."

The decision was to complete a long-term assessment to evaluate the threat to values at risk relative to the current fire location and projections over the next three-week period. The primary values at risk at the time were located outside the wilderness area 6 to10 miles to the south and southwest of the fire (Industrial timber lands/Federal timberlands, Emily Camp, Quail Prairie and Pearsoll Peak Lookouts, and Packers Cabin). Considerations were also given to public safety and socioeconomic concerns in development of the strategy. The course of action included minimal use of resources to mon-

itor fire activity and look for potential management action points and areas for contingency line construction. The decision also recognized the need to implement a communication strategy to inform the public, cooperators, and key stakeholders on fire status and planned actions.

Between July 13 and 19, the Type 3 IMT began constructing containment lines outside the wilderness boundary to the south and southwest of the fire in anticipation of "Chetco Effect" winds (a NE to SW flow) which could be expected to occur 2 to 4 times during the fire season. Resources began brushing roads and trails to be utilized in the event the fire crossed south of the Chetco River.

A new WFDSS decision was issued on July 19, reaffirming the July 13 decision. The fire was approximately 300 acres in size, burning exclusively on National Forest System Lands. Cooperators, including Coos Forest Protective Association (CFPA), Oregon Department of Forestry (ODF), and local government entities, were updated on the current situation and decision. Fire behavior was low to moderate spreading in surface fuels (primarily brush fields).

Chetco Bar Fire during ICT3 reconnaissance flight on July 13

Over this period, firefighters cleared helispots in order to land and install remote automated weather stations (RAWS) to obtain accurate weather data from near the fire site. Fire crews also constructed primary fire line and explored access points from the outer edge of the Kalmiopsis Wilderness to locate ridgelines closer to the fire's perimeter within the wilderness that would allow safe access for the firefighters to take action.

The IMT determined that addressing the southwest portion of the indirect containment strategy was necessary. Crews were tasked with opening road systems and chipping brush with the objective of constructing contingency lines. The fire grew to about 500 acres, still well within the wilderness. The fire behavior remained low-to-moderate. The first forest area closure was implemented on July 20.

July 21-28

The IMT installed a remote camera to monitor the fire's movement and activity and requested GIS support to provide detailed maps of the Kalmiopsis Wilderness plus surrounding areas to help determine contingency and alternate fire lines. Operations identified and began clearing contingency lines, primarily using existing roads and trails, and improving lines used in the 2002 Biscuit Fire. Two Interagency Hotshot Crews (IHC) were ordered, but no crews were available on July 23 when the order was placed.

On July 24, Forest management ordered a NIMO team for the Chetco Bar Fire due to the anticipated long-term duration of the incident. The NIMO team assumed command of the incident on July 29 and continued to implement the strategy and course of action of the July 19 WFDSS decision. Roads and trails outside the wilderness boundary continued to be prepared for potential burnout operations should the fire cross the Chetco River.

By July 24, 80 firefighters were constructing and improving containment lines. Two IHC Crews arrived and analyzed options for containment lines closer to the fire. The crews also were utilized for contingency line work with the other resources in order to expedite the work.

Over this timeframe, the fire had an east wind event that increased the fire behavior to about 100 acres a day in growth, but the Chetco River was checking spread to the south and west.

July 29-August 19

Between July 29 and August 14, the fire grew from 2,180 acres to 5,438 acres with spread primarily to the north and northeast. The fire remained north of the Chetco River. On the evening of August 15 and morning of August 16 the fire experienced its first "Chetco Effect" wind event that resulted in the fire crossing the Chetco River to the south. The winds are created when northeast winds are pushed downslope from the surrounding mountains towards the Pacific Ocean. This movement increases the wind's temperature up to forty degrees above the surrounding areas. The Chetco River Valley further funnels the winds to the west into the Brookings area. Infrared mapping from August 16 estimated the size of the fire to be 6,011 acres. Fire growth between August 17 and August 21 outpaced modeling predictions for a "Chetco Effect" wind.

The fire became established south of the Chetco River on August 17. Three airtankers dropped 30,823 gallons of retardant in and adjacent to the wilderness to slow the spread of the fire. The team requested resources from both the High Cascades Complex and the Shan Creek Fire. The forest law enforcement officer closed Packer's Cabin, a local rental cabin, asking renters to evacuate to allow crews to complete structure preparation. Hand line construction was completed on the south side of the Chetco River through the Wild and Scenic Corridor to the Chetco River, as well as primary contingency lines north and south of the Chetco River. The fire was estimated at 8,500 acres with 65 personnel assigned.

From August 16-22, temperatures, relative humidity and winds were more typical of extreme conditions seen in the dry forests of eastern Oregon, not the coastal forests of western Oregon. Instead of nighttime humidity recovery to or near 100 percent, maximum humidity reached only into the mid-40s and daytime relative humidity dropped below 30 percent. Daytime temperatures peaked into the low 90s on August 16-19 and into the 80s on August 20 and 21. Nighttime low temperatures dropped only into the low 70s. The combination of above average temperatures and below average relative humidity recovery at night meant burning conditions did not moderate, allowing for increased fire behavior earlier the next day and active burning for 24 hours each day. Over this same period, peak wind gusts ranged from 30 to 40 mph. High wind gusts caused ember showers and prolific spotting into a much wider area ahead of the fire to receive embers and start spot fires, causing the fire to spread by jumping long distances. The speed and frequency of the gusts made it unsafe for aircraft to operate at the low altitudes needed to fight fire, especially in mountainous terrain. The surging spread behavior also made it unsafe for ground crews to operate, greatly increasing the risk of entrapment and burnover.

An infrared (IR) flight on August 18 estimated the fire to be 10,957 acres. During this timeframe, the fire breached the primary contingency containment line that crews had been preparing. Point-protection tactics were undertaken to protect values at risk at a private ranch and Wilderness Retreat. The fire continued to gain momentum and exponentially increased in size prompting additional resources to be ordered.

At 7:30 a.m. on August 18, the incident commander recommended the Curry County Sheriff evacuate roads south along Chetco River to Alfred Loeb State Park. Curry County activated its Emergency Operations Center (EOC) in Brookings. Around 10:30 a.m., visibility was too poor for airtanker use, and Type 1 helicopters were requested for bucket work. One heavy (Type I helicopter), on loan from the Miller Complex, dropped 30,000 gallons of water on the fire.

An engine crew experienced a near miss at Packer's Cabin around noon. They were preparing to burn out around the cabin to create a buffer when a spot fire crossed the road, became established, and compromised the engine's egress. The three engine crewmembers maintained communications with a helicopter assigned to that division who requested more aerial resources for the potential entrapment. An order was placed for support from air attack, an airtanker and a rappel ship, and a large airtanker borrowed from the Milli Fire jettisoned a load of retardant on the fire after responding to the near miss. The crew then made their way into the black and remained there until 5:30 p.m. when it cooled enough to return to the cabin. The crew stayed at Packers cabin until early the next morning when the passing flame front had cooled enough to allow for a safe egress. A Facilitated Learning Analysis (FLA) was developed for this near miss and can be accessed in the Wildland Fire Lessons Learned Center.

The forest ordered the Type 2 IMT that was finishing up on the Shan Creek Fire to be reassigned to Chetco Bar Fire to support the NIMO team.

At 3:30 p.m., a Level 2 Evacuation order was issued for Gardner Ridge and Cate Road. Three structures burned. The fire was estimated at 22,042 acres at 4 p.m. with 65 personnel assigned.

An IR flew on August 19 showed the fire to be 48,825 acres. Red Flag conditions were in effect from the late afternoon through the following day. Unified command was initiated between NIMO/Rocky Mt. Team Black and CFPA. The Conflagration Act was invoked by Oregon Governor Kate Brown, allowing for the deployment of Oregon State Fire Marshal resources to support the fire. The Level 2 evacuations for Gardner Ridge Road turned to a Level 3 Evacuation at 6 p.m. Firefighters began backfire operations north and west of Wilderness Retreat to protect structures. Their efforts redirected fire spread to the east and south, allowing resources to begin structure protection and firing operations around Wilderness Retreat and the Chetco River Inn. Five primary residences and 18 minor structures burned on Gardner Ridge and Cate Road. The fire was estimated at 48,825 acres at 11 p.m. with 280 personnel assigned.

August 20

The Oregon State Fire Marshal's Office (OSFM) resources began officially supporting the incident at 6 a.m., and joined unified command with NIMO/RM Team Black/CFPA. OSFM had responded with four task forces for structure protection, which included 127 personnel on equipment in addition to 26 personnel on the Incident Management Team. Operations formalized plans for an aggressive attack to occur when the weather moderated. Under continuing Chetco Effect winds, by late that evening the fire grew to an estimated 91,551 acres.

The Curry County Emergency Operations Center (EOC) was activated to coordinate evacuation activities. Multiple evacuation notices were issued by the Curry County Sheriff's Office that affected more than 3000 residences/properties.

August 21

The number of incident responders grew to 788 on August 21. Heavy smoke limited the use of aviation assets. The Chetco Bar Fire experienced rapid growth during National Preparedness Level 5, which contributed to delays getting resources. This was anticipated and overcome by using previously established lend/lease procedures with nearby incidents. The teams held an informal meeting at the Red Cross Evacuation Shelter at Riley Creek Elementary School, and a meeting at Azalea Middle School in Brookings. Approximately 1,000 people attended. The Agency Administrator ordered a National Type 1 IMT to manage the Chetco Bar Fire. National Guard resources were supporting the incident by providing 24/7 security at road closures, traffic assistance at control points, mop-up, fire rehabilitation and extraction of hose and pumps.

The OSFM began structure prep and triage in the Carpenterville Road area. The CFPA and private timber industry resources worked with resources assigned to construct direct and indirect line on the far western flank of the incident. This action was instrumental in the protection of a number of residences in the Gardner Ridge and Wilderness Retreat areas. The weather conditions finally moderated and allowed for operational resources to initiate direct and indirect line construction on the west and south sides of the fire. Between August 17 and August 21, Chetco winds had driven fire growth from around 6000 acres to almost 100,000. The fire was 97,758 acres with 788 resources assigned.

August 22

The incident meteorologist warned of the potential for the Chetco Effect to return over the fire area on Aug. 26. The fire was 99,944 acres at 10:15 p.m. with 1,078 personnel assigned.

August 23

The PNW Team 3 (Type 1 IMT) was in-briefed at 2 p.m. The unified command teams held a public meeting in Gold Beach at the Curry County Fairgrounds. The fire was 102,333 acres, now categorized as a megafire, with 1,174 personnel assigned. Approximately 251 personnel and 75 pieces of equipment were assigned through OSFM.

August 24

The incident commanders, Sheriff, and Oregon State Police conducted a tabletop exercise to work through a potential evacuation of areas north of Brookings and Brookings proper. At 5 p.m. a Level 1 evacuation notice went into effect for Brookings. Eight large airtankers, one single engine airtanker, and one very large airtanker dropped a total of 46,892 gallons of retardant on the fire. The fire was 104,144 acres at 11:20 p.m. with 1,398 personnel assigned.

The August 24 damage assessment confirmed that five single residences and 20 other minor structures had been destroyed. As of August 24, 1,712 single residences (2,367 people), 809 nonresidential commercial properties, and 50 minor properties remained threatened. Temporary Red Cross Shelters had been established for displaced residents.

August 25-September 2

The fire was mapped at 105,518 acres with 1,612 personnel assigned. PNW Team 3 shadowed the NIMO and Type 2 team and joined Oregon State Fire Marshal's Office and CFPA in unified command at 6 a.m. on August 26.

September 3

The National Weather Service issued a heat warning, and high temperatures and critically low humidity contributed to an increase in fire behavior. On the eastern flank, a significant smoke column developed to a height of 23,000 feet. Shifting winds improved visibility, allowing aircraft to support ground operations with water drops on portions of the fires. More than 500 people attended the community fire briefing in Cave Junction.

September 4-5

An excessive heat warning remained in effect with temperatures above 100 degrees, creating critical burning conditions including numerous spot fires. The Sheriff issued a Level 1 evacuation order for residents of Illinois Valley and a Level 3 "GO" evacuation order for Illinois River Road within US Forest Service boundaries, including Oak Flat. Forest Closure areas were expanded due to fire growth on the eastern flank.

September 6

On September 6, a non-fire employee located in fire camp went into cardiac arrest and was resuscitated by EMS on scene. After the individual collapsed, a medic responded quickly and conducted CPR for about 30 seconds until the individual regained consciousness. The patient was transported to nearest cardiac center in Medford,

Oregon. A Rapid Lesson Sharing (RLS) assessment was developed for this incident and can be accessed via the Wildland Fire Lessons Learned Center website.

September-October

The fire received precipitation, with some areas reporting over an inch of rain in early September. The fire experienced another warming trend before returning to cooler temperatures and increased precipitation in mid- to late- September. On September 18, the Curry County Sheriff's Office lifted all evacuation orders for Curry County. The IMT transferred command of the Chetco Bar Fire to a Type 3 organization on October 5. On October 18th, the Chetco Bar Fire transitioned from a Type 3 to a Type 4 organization.

A Burned Area Emergency Response (BAER) Team arrived in early October to conduct post fire hazard mitigation. Weather continued to moderate fire behavior and spots of heat decreased significantly.

November 2

Fire was declared 100 percent contained.

Shan Creek

The lightning-ignited Shan Creek Fire was reported August 10, burning about 10 miles west of Grants Pass, Oregon, on the Rogue River-Siskiyou National Forest. Initial attack fire crews responded on August 11 and made progress on the fire. Due to the its potential and multiple fires in Southwest Oregon, the MAC group made the decision to redirect an out-of-area type 2 IMT, Rocky Mountain Team Black, which had been ordered to pre-position in Central Washington for upcoming weather events. Team Black assumed command of the Shan Creek Fire, which was estimated at 400 acres, on August 17.

Fire crews had already successfully contained all but the west flank of the fire by the time the Rocky Mountain team arrived. The team mapped the Shan Creek Fire at 156 acres, had firefighters install a hose lay around the perimeter effectively containing 85 percent of the fire by August 19, when they transferred command back to a Type 3 team. Since the Chetco Bar Fire had made a significant push toward Brookings, Oregon, the MAC group reassigned Rocky Mountain Team Black to support the NIMO team on that fire.

The Shan Creek Fire was 100 percent contained on September 1 and declared out on November 6.

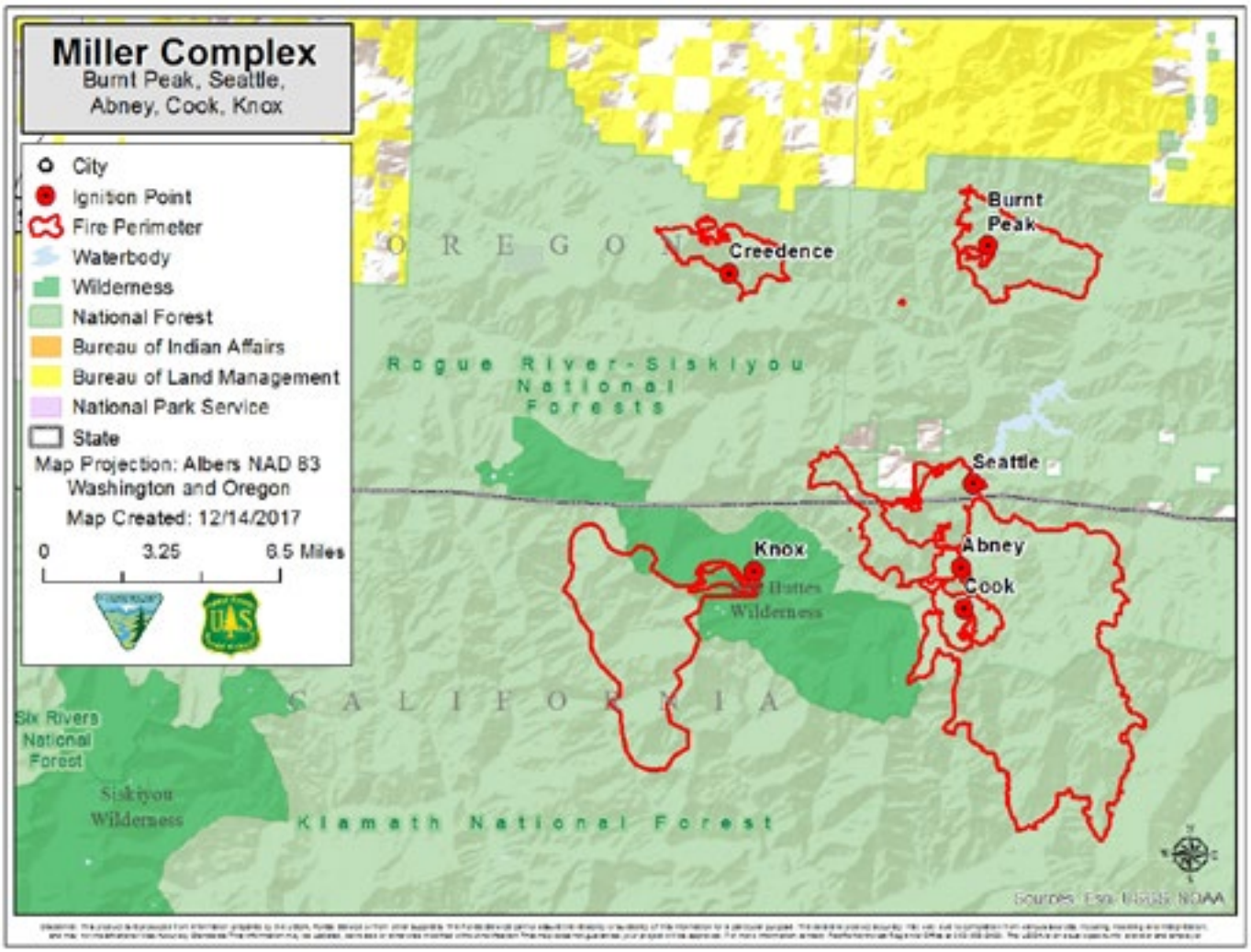
Miller Complex

August 14-15

A series of thunder and lightning storms moved across the Rogue River-Siskyou National Forest on August 14 igniting 25 wildfires that spanned across two separate National Forests, two GACC's, two states, and 3 counties (and 2 IMTs). The series of fires became managed as the Miller Complex. All fires within the complex were terrain- and fuel-driven and fire growth was primarily a result of rollout and slope reversal. All IMTs that commanded this fire during its duration noted the jurisdictional complexities in managing an incident that was across state and regional boundaries.

August 16-19

When the fires first ignited, a local Type 3 organization was already in place managing earlier ignitions and assumed responsibility for some of the new fire starts. A Type 2 IMT took command of the fire on August 16 to address the increased complexity around safety, external political factors and resource constraints. The steep terrain and numerous snags made for hazardous conditions for firefighters, prompting the Forest to implement a contain and control strategy. The team took on an incident



that had multi-jurisdictional boundaries with challenging collaborative missions, and low priority status for resource allocation. On August 18, smoke became a significant issue over the complex. Locally generated smoke was enhanced by considerable smoke from other area fires, most notably the Chetco Bar fire. It remained hot and dry, but temperatures in the lower valleys were affected quite a bit by smoke shading. On August 19, unauthorized incursions by two non-mechanized hang gliders grounded all aircraft over the fire.

August 20-26

Very heavy smoke covered the complex beginning August 20 and continued through August 23. Temperatures in the valleys during this period were relatively cool with high humidity due to the smoke trapped under the inversion. By August 24, 17 of the original 25 fires in the complex were contained and in patrol status. Smoky conditions and resource shortages persisted, and on August 25, a Type 1 IMT assumed command of the Miller Complex, which was 46 percent contained.

August 27-30

An engine rollover resulting in a serious injury occurred on Aug. 27. A Type 6 contract engine was assigned to conduct structure triage assessments. While driving, the driver came too close to the edge of the roadway and rolled down a steep embankment into a shallow creek. The engine driver was not wearing his seatbelt and was seriously injured. Although not ejected, the driver was partially pinned underneath the engine, and partially submersed in the creek. Seeking to understand the risk management process and cultivate a learning environment, the Regional Forester requested a Facilitated Learning Analysis (FLA) team to review the accident, which is attached at the end of this appendix.

August 31-September 5

Heat began to build again on August 31. The National Weather Service issued a Red Flag Warning for poor night time humidity recoveries and gusty east winds for the night of August 31, followed by a Red Flag Warning September 1 for hot, dry, and unstable weather with a Haines index of 6.

The dire conditions prompted the sheriff to issue a mandatory evacuation Level 3 for 40 residences in the Applegate community.

During this hot spell, temperatures peaked at around 100 degrees on September 1 and humidities bottomed out at 12 percent on September 3.

The other significant event on September 3 occurred when the incident management team branched the Abney Fire. Due to the activity on the southern end of that fire, the number of fires in the Miller Complex and land jurisdictions affected, the team managing the Eclipse Complex on the Klamath National Forest in California assumed command of branch of the Abney Fire south of the Pacific Crest Trail.

The National Weather Service issued a Red Flag Warning for poor night time humidity recoveries and strong east winds for the night of September 3 into the morning of September 4. September 4 and 5 were generally hot, dry, and smoky with less wind as a thermal trough moved right over the complex.

September 6-14

Red Flag Warnings were issued for the potential of lightning on very dry fuels for both September 6 and 7. Thunderstorms formed south of the complex on September 6, but weakened and collapsed as they moved over more stable air caused by heavy smoke limiting the sun from reaching the ground, which in turn lessened surface instability. September 7 was a much more active day as a very strong trough moved through. Thunderstorms were already on the radar as of daybreak, and these storms gradually moved over the complex through the morning. Five different lightning alerts were issued for the divisions and incident command post during the thunderstorm outbreak. While not a lot of rain fell, there was a fairly widespread tenth of an inch over the complex. Far western areas of the Abney Fire reportedly received between a tenth and quarter of an inch. The thunderstorms and associated winds helped clear out the smoke. As a result, smoke was much thinner over the complex on September 8, and visibilities improved to several miles. On September 8, evacuations were relaxed for all communities on the Oregon side of Miller Complex. On September 11, the Type 1 IMT transferred command of the fire to a Type 2 IMT.

September 15-16

Generally warmer conditions were observed September 15 and 16, but smoke returned and held surface temperatures down and humidities up in many locations.

On September 15, three members of the same crew working on the Abney Fire suffered medical incidents. One was stung multiple times in the head and neck, one crew member received a significant laceration to the hand, and a third crew member suffered a serious heat-related injury.

September 17-19

Conditions began to change significantly on September 17. Clouds moved over the area as a cold front approached the coast, and a few showers were observed over the complex. Rain moved in overnight and into September 18 with as much as a half-inch of rain received over the western portions of the incident and lighter amounts elsewhere. Rain became much spottier during the afternoon, and then returned the night of September 18 into September 19. Another quarter to one half inch of rain was observed, again, mostly focused over the western portions of the fire. Temperatures were much cooler and humidities very high over the entire incident with highs ranging from the mid-40s over the ridges to the upper 50s in the valleys and humidities remaining above 60% area-wide through the two-day period.

September 20-November 2

A strong warm front moved through the complex in the early morning hours of September 20. Rain was once again sparse, but winds were strong with west-southwest winds gusting up to 41 mph for much of pre-dawn morning hours.

On September 22, the incident was turned over to a Type 3 IMT. The incident was 65 percent contained and had 200 firefighters assigned.

A mid-October heat wave caused an increase in fire activity on the northeast flank of the Abney Fire where private property was still threatened. With a continued warming and

drying trend in the forecast, the Rogue River-Siskiyou National Forest managers decided on October 14 to order a Type 2 IMT to assume command on October 16. The IMT was in place through October 20 when the area received significant rainfall and the fire was transferred back to the local unit.

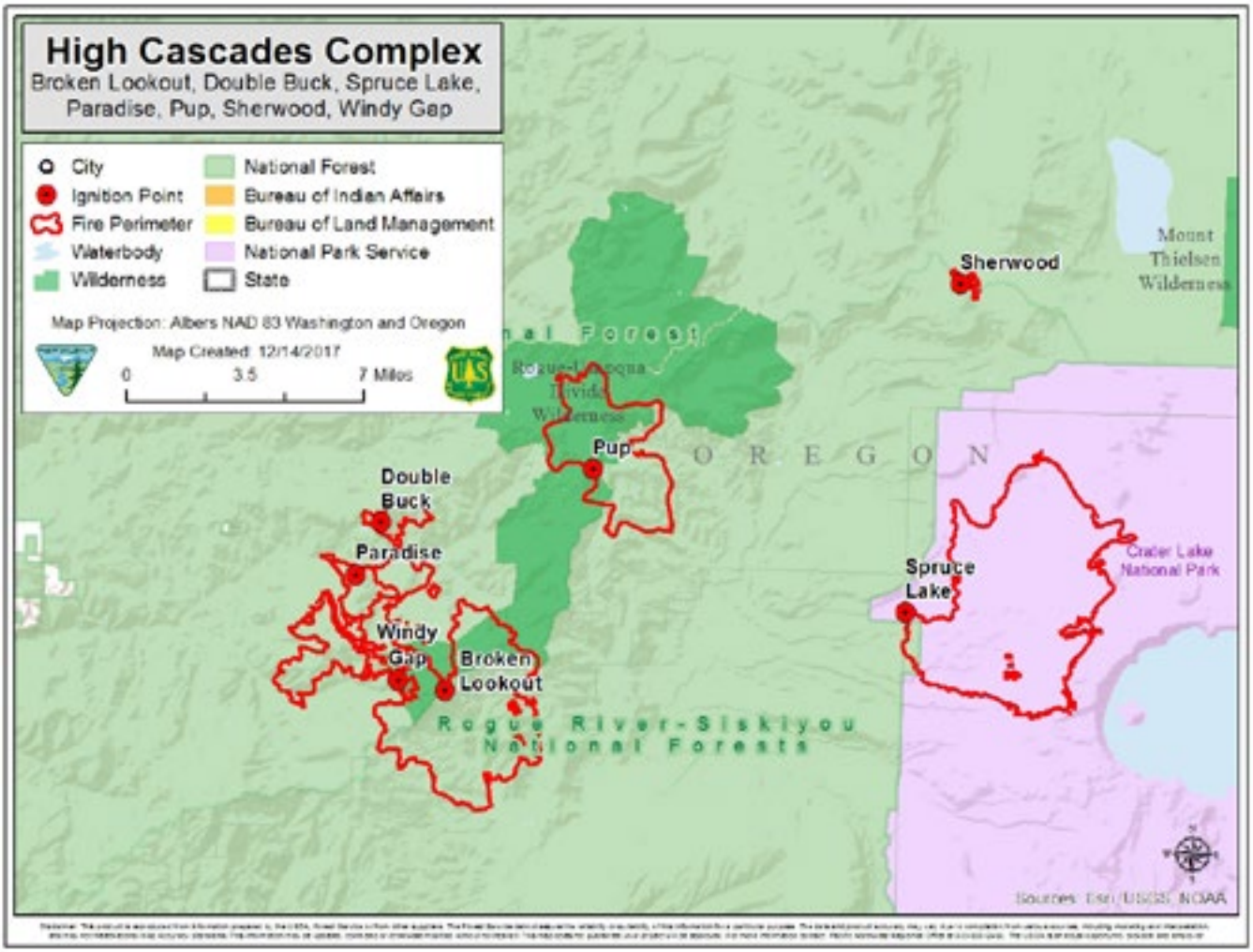
The fire reached 100 percent containment on November 2.

High Cascades Complex

Late July – Early August

A series of lightning storms July 23 started upwards of 40 ignitions dispersed through the Rogue River-Siskiyou National Forest, Umpqua National Forest, and Crater Lake National Park. Initial attack resources were unable to contain all of the fires in the complex due to the number of fires reported, difficult access, heavy volume of recent initial attack activity by local resources and general shortage of regional resources.

Local units ordered IMTs for several of the fires. The Blanket Creek Fire began on July 26 and was managed by a Type 2 IMT. On July 31, that team also assumed command of the Spruce Lake Fire.



The timeline of the High Cascades Complex is indeed complex. Fires in the surrounding area were managing separately, then complexed, then moved from one complex to another throughout the duration of the incidents.

August 13-16

On August 13, the Broken Lookout, Pup, North Pelican, Blanket Creek, and Spruce Lake fires became managed as a complex under one IMT. Broken Lookout, Pup and North Pelican were originally part of the Falcon Complex and managed by a different IMT.

Most of the initial attack efforts were effective with the exception of nine fires that became the High Cascades Complex, the largest of which were the Blanket Creek and Spruce Lake fires. The nine fires totaled approximately 10,500 acres by August 14. The fires were burning in continuous mixed conifer stands with abundant dead and down trees and standing snags. The size and jurisdictional complexity along with the possibility of this being a long-term event, prompted local fire managers to order a Type 1 IMT to manage the complex. The IMT managed all fires in the complex and were responsible for initial attack of any new starts in a 451,322-acre management area. Their strategy was to manage the incidents as full suppression fires, utilizing existing roads and fuel breaks to create direct and indirect lines.

The fires prompted the closure of many trail systems and forest roads, as well as portions of the Pacific Crest Trail within Crater Lake National Park. The fire complex threatened the communities of Red Blanket Creek, Union Creek, Diamond Lake, and Prospect. The incident was an immediate threat to 84 single residences, 8 mixed commercial residential, 28 nonresidential commercial, and 75 additional minor structures and outbuildings, in addition to threatening several threatened and endangered species habitats. On August 16, the Oregon National Guard 141st Brigade support battalion arrived on the incident supplying 150 additional personnel to assist with suppression efforts.

August 17 – September 18

Over the next several days, fire weather conditions worsened with an unstable atmosphere influencing the complex. Efforts were made to insert firefighters on the north side of the Broken Lookout Fire but the plan was abandoned due to how close the fire was to another large fire (The Falcon Complex) and the possibility of the fires growing together. The fires continued to grow daily with some active crown runs and short-range spotting. As the fires continued to grow, aircraft was utilized to keep sections of line in check while ground crews prepped indirect lines.

By August 28, the complex had reached 19,000 acres. The Blanket Creek Fire had grown to 9,300 acres and had prompted a Level 1 evacuation for Mazama Village. The Broken Lookout Fire also made a run on the same day and prompted a Level 1 evacuation for the community of Union Creek. The workload regionwide had diverted many of the available resources to assist with critical fire suppression efforts needed to protect the threatened communities, commercial businesses, and high value natural resources. The Blanket Creek and Broken Lookout fires required difficult line construction and critical burnouts in steep, rocky, timbered areas to accomplish containment as well as protect communities and high value natural resources.

The addition of the Pup Fire to the complex also complicated the incident. It was burning in the Rogue-Umpqua Divide wilderness in steep and remote terrain. The fire threatened the Hershberger Telecommunications site and the Hershberger Lookout. The Complex was eventually split between two teams and divided into West and East zones.

By mid-September, the Blanket Creek, Spruce Lake, Broken Lookout, Pup, and North Pelican Fires combined reached approximately 80,000 acres.

September 18 – October 31

During the week of September 18, the region was hit with a significant weather event that brought abundant rain to the fire area. Most work efforts were then redirected to suppression repair and stabilization. The fire was split between two Type 3 IMTs, dividing the workload between jurisdictions on the Rogue River-Siskiyou National Forest and the Umpqua National Forest. The fire was called controlled on October 31.

Appendix C: Central Cascades

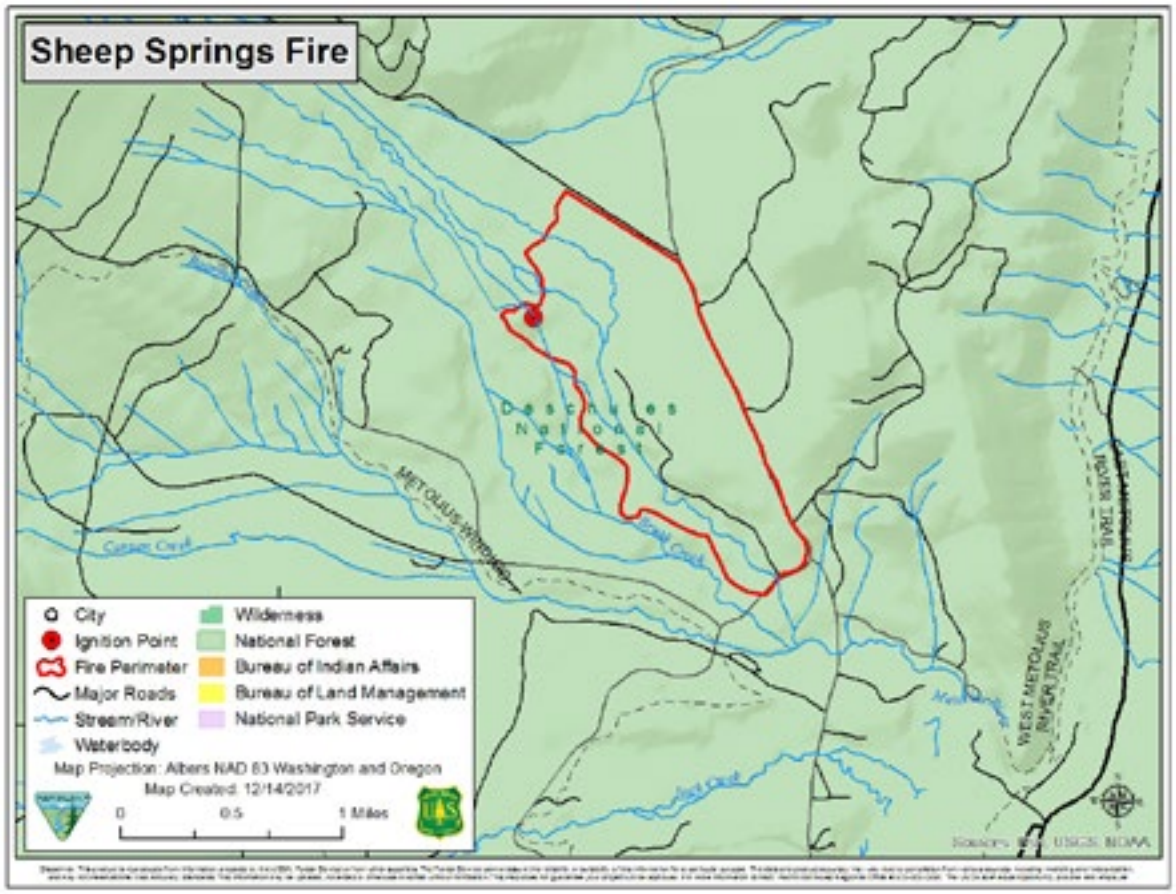
Introduction

Fire season began in earnest in July in the Central Cascades when a lightning strike ignited the Whitewater Fire on the Willamette National Forest. The fire was burning in the Mt. Jefferson Wilderness, which was touted as a prime solar eclipse viewing site. By July 31, the Willamette Forest Supervisor closed Jefferson Park, including 11 miles of the Pacific Crest Trail, prompting the cancellation of a 1,000-person hike to Mt. Jefferson to view the eclipse.

Lightning storms August 10 and 11 ignited more fires in the Central Cascades, including the 12 fires that were managed as the Umpqua North Complex on the Umpqua National Forest, and the Milli Fire on the Deschutes National Forest that eventually threatened Sisters and other outlying communities. Several new starts on the Willamette were managed with the Whitewater Fire, including the Little Devil and Rebel fires, and the Horse Creek Complex.

In late August, a human-caused fire started on the Douglas Forest Protective Association lands west of Riddle and spread onto lands managed by the BLM. The threat to commercial timber was significant, making the fire a high-priority for resources.

Many of these fires were long duration and caused significant smoke impacts, both in the Willamette Valley and Central Oregon.



Sheep Springs

June 26-27

The Sheep Springs Fire started from a lightning strike in the early morning of June 26. The fire ignited in an area with abundant snags that had burned in the 2003 B&B Complex. An Oregon Department of Forestry engine responded on June 27 and recommended using an indirect attack strategy due to the number of snags, the hot, dry conditions and increasing winds. Firefighters began preparing an indirect fireline for use in burnout operations to contain the fire.

June 28-29

A Type 3 IMT assumed operational control of the fire on June 28. The fire grew over this two-day period from 10 acres to an estimated 20 acres, spreading slowly but steadily in the B&B fire scar. Smoke impacts in the Metolius Basin reminded locals of the B&B Complex. Building rapport with the community was a management concern along with public and firefighter safety.

June 30

Current and planned burnout operations increased the fire size to an estimated 750 acres. The team declared the fire 50 percent contained due to the combination of completed fireline, level of completed burnout, and the continued slow spread of the main fire. Mop-up began on parts of the burnout area to make sure the fire would not spread beyond the established control lines.

July 1-2

Better mapping reduced the fire size to 696 acres. Firefighters completed burnout operations by July 2, and began mop-up and patrol to ensure the fire stayed within the established perimeter and reduce the possibility of spot fires from snags burning near the fireline.

July 3-5

Management of the fire was transferred back to the Ranger District on the morning of July 3 and most of the crews and engines sent back to their home units. Mop-up of remaining hot spots along the perimeter and patrolling of the firelines continued for some time after July 5 before the fire was considered fully contained on July 31. Mop-up did not occur in the fire interior due to the safety threat of abundant snags. As a result, the fire was checked regularly until the District was certain that it would not spread beyond the control lines. The fire was fully contained by July 31.

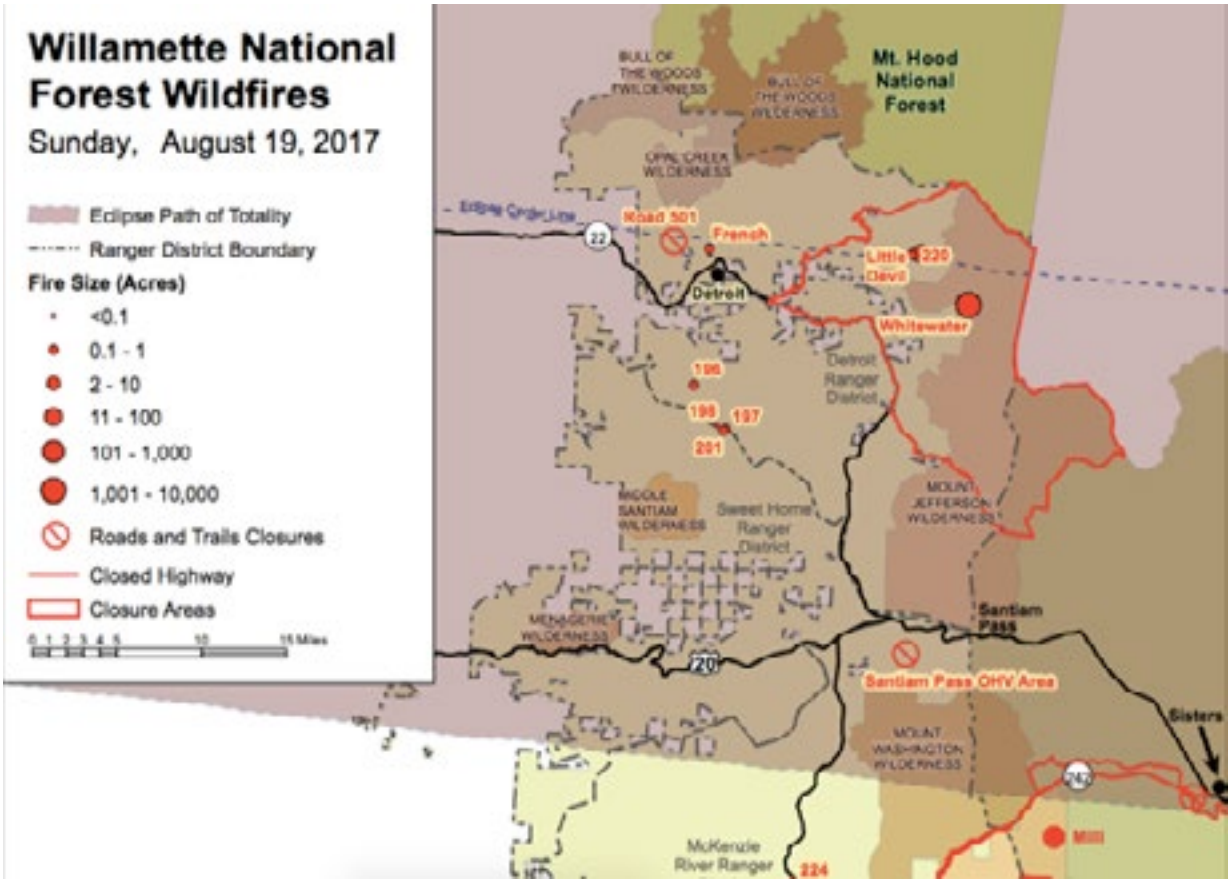
Significance

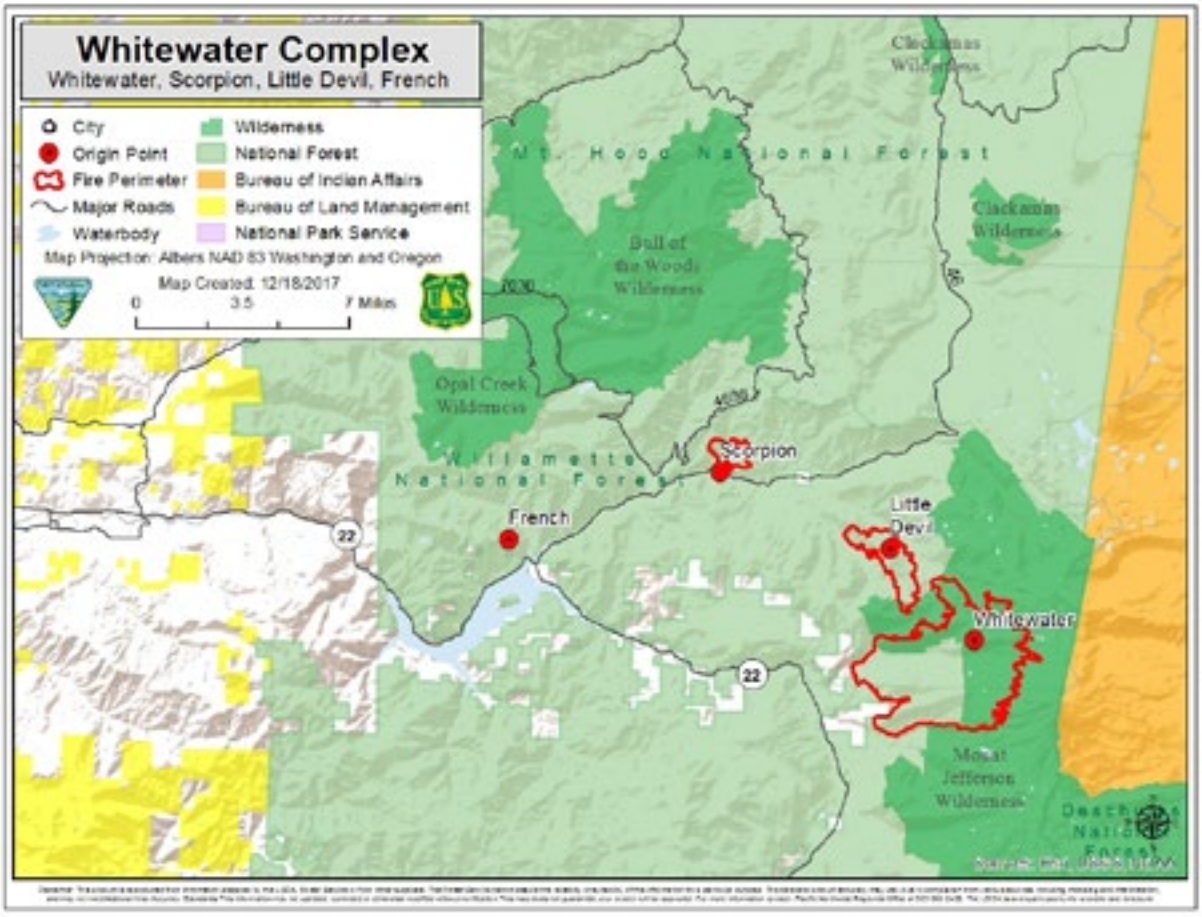
The initial attack incident commander recognized the high safety risks posed by the number of snags in the fire area and initiated an indirect attack strategy to contain the fire.

Whitewater Complex

July 23-27

The Whitewater Fire was reported on July 23, and attributed to a holdover from a lightning strike a month earlier. The fire was located in Mount Jefferson Wilderness, approximately three miles up the Whitewater Creek Trail, 20 miles


Willamette National Forest Wildfires
Sunday, August 19, 2017
Eclipse Path of Totality
Ranger District Boundary
Fire Size (Acres)
<0.1
0.1 - 1
2 - 10
11 - 100
101 - 1,000
1,001 - 10,000
Roads and Trails Closures
Closed Highway
Closure Areas
Mt. Hood National Forest
Road 501
French
Little Devil
Detroit
Whitewater
Detroit Ranger District
Sweet Home Ranger District
Santiam Pass
Santiam Pass OHV Area
Sisters
McKenzie River Ranger


Whitewater Complex
Whitewater, Scorpion, Little Devil, French
City
Origin Point
Fire Perimeter
Major Roads
Waterbody
Wilderness
National Forest
Bureau of Indian Affairs
Bureau of Land Management
National Park Service
Map Projection: Albers NAD 83 Washington and Oregon
Map Created: 12/18/2017
0 3.5 7 Miles
Mt. Hood National Forest
Clackamas Wilderness
Bull of the Woods Wilderness
Opal Creek Wilderness
Willamette National Forest
Scorpion
French
Little Devil
Whitewater
Mount Jefferson Wilderness

east of Detroit, Oregon. A local Type 3 IMT took charge of the 50-acre fire on July 25. Early efforts focused on full suppression with a light touch. The fire was burning inside the wilderness boundary and presented limited risk to private property and timber values. Located about four miles from the Whitewater Creek Trailhead, the fire was in a popular launching point for hikers into the wilderness area. Early on, local crews hiked 3 miles into the wilderness to begin suppression efforts and by July 26, the fire was estimated at 15 percent contained. Hand crews built fireline and helicopters dropped water to prevent the fire's spread. Fire managers also used helicopters to fly in pumps and thousands of feet of hose to get water to strengthen existing handlines. By July 27, over 85 percent of the 80-acre fire had handline around it, and the remaining 15 percent was located on inaccessible rocky cliff bands.

July 28-July 31

On July 28, fire managers began to develop large scale contingency plans, including ordering heavy equipment to work on fuel reduction around the road systems next to Whitewater Creek outside of the Mount Jefferson Wilderness. At this time, Willamette National Forest managers ordered a Type 2 IMT for the 89-acre fire based on forecasts for hotter, drier conditions. An incident base camp was established at Hoodoo Ski Area.

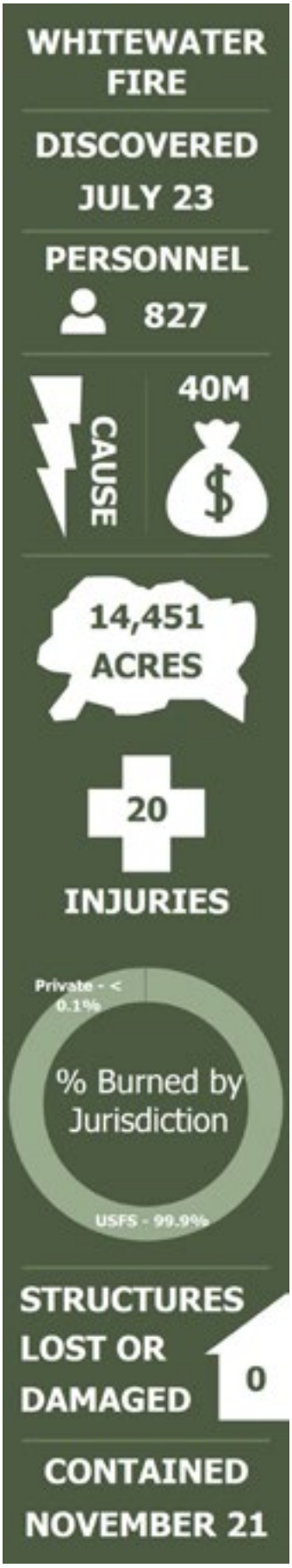
On July 31, the Type 2 IMT took command of the fire and the Willamette Forest Supervisor closed all trail access points into Jefferson Park inside the Mt. Jefferson Wilderness, including 11 miles of the Pacific Crest Trail. On August 1, the weather forecast was for very hot, dry and unstable conditions to the fire area for several days. The fire grew to 1,500 acres overnight, crossing out of the Mount Jefferson Wilderness near the Whitewater Trail and threatening 100 residences and 150 other structures. Rapid spread continued on August 2 to the west with the fire reaching an estimated 4,579 acres.

August 1-9

On August 3, a heavy smoke inversion tempered fire behavior and grounded aircraft due to low visibility. Dense smoke continued to cause problems for fire operations as well as affecting air quality in central Oregon generally on both sides of the Cascade crest. By August 5, the closure expanded to almost half of the Mount Jefferson Wilderness and 28 miles of the Pacific Crest Trail. On August 7, the area closure was expanded yet again to include 117,000 acres in the Mount Jefferson area. Crews used indirect tactics, constructing fireline away from the main fire and burning out to protect the identified values at risk.

August 10-20

August 10 brought thunderstorms to the fire area late in the day in the fire area. Two small lightning-caused fires from the storms were discovered on August 11 approximately three miles southeast of the Breitenbush Community on Devil's Ridge in steep terrain. Aircraft were used to keep those fires in check. Crews constructed fireline around the smaller of the two fires on August 12, but the larger fire was in inaccessible, rocky terrain. For the next several days, crews continued to construct indirect line, burnout and hold it, and supported initial attack operations on new starts in the Whitewater Fire area. Light rain on August 13 aided firefighting efforts for a brief period, but unseasonably hot and dry conditions quickly returned. By mid-month, national and regional demand for firefighting resources was extremely high. On August 15, a Type 1 IMT took over management of the fire and supported the Little Devil, French, Rebel, Avenue, and Box Canyon fires as well.



August 21-26

On August 21, during the eclipse, fire behavior decreased dramatically as temperatures dropped and relative humidity increased. On August 22, the team added Ollalie, Pete, Separation, and Roney fires to their responsibilities. East winds caused these fires to grow rapidly. On August 23, the Avenue, Olallie, Separation, and Roney fires were combined into the Horse Creek Complex. Due to the unavailability of additional IMTs, the team for Whitewater and Little Devil also managed the Horse Creek Complex.

August 27-September 18

On August 27, a new Type 1 IMT assumed command of Whitewater, Little Devil, and Rebel fires and the Horse Creek Complex. A Red Flag Warning was in place on August 28 for dry and unstable conditions and on that day, the Scorpion Fire was detected at 30 acres north of Breitenbush. The Potato Hill Fire was discovered at 50 acres on August 29. Crews continued to employ indirect tactics, but using direct attack when burning conditions and fire behavior permitted. Dense smoke hampered firefighting efforts on many days and affected air quality in communities to the west.

September 19-November 24

On September 19, the entire area saw heavy rain and mixed snow, effectively halting fire spread. Firefighting efforts then transitioned to suppression repair and retrieval of equipment. A local Type 3 IMT assumed management of the complex on September 27. The fires were declared contained on November 24.

Significance

The Whitewater Fire ignited in an area located within the 2017 solar eclipse path of totality. The fire triggered an extensive area closure in a large stretch of public lands in a prime viewing location for thousands of visitors. The smoke from Whitewater Fire along with multiple fires burning in the region at the same time impacted the quality of life of many people, the recreation of thousands of visitors, and the local economy.

Although the number of structures threatened was far less than in other large fires in the region, the effects from the smoke, the impaired visibility, and the extensive area closure had a notable impact to many people this year. In particular a 1,000-person hike to Mt. Jefferson to view the solar eclipse was canceled, almost 28 miles of Pacific Crest Trail were closed, and an incalculable amount of people planning to camp or hike during the eclipse were forced to adjust their plans to account for area closure, smoke effects and other variables. This brought higher numbers of people to coastal forests and towards central and eastern Oregon—areas also managing their own challenging fires.

Umpqua North Complex

August 11-20

Lightning started several fires on the North Umpqua Ranger District on August 11 and began spreading rapidly under hot, dry, and windy conditions. The Forest supervisor ordered a Type 1 IMT to manage the fires as a complex given the increasing scarcity of firefighting resources and the number of new starts across the region. A Type 1 IMT from Alaska was assigned to the complex of approximately 34 fires and given initial attack responsibility over 183,919 acres of the North Umpqua Ranger District on August 13. Several campgrounds were evacuated along Highway 138 and trailheads closed. The fires threatened the community of Dry Creek.

The Fall Creek, Happy Dog, and Ragged Ridge fires quickly emerged as the main threats and the focus of much of the firefighting effort. The Douglas County Sheriff's Office is-

sued Level 3 evacuation orders for the Dry Creek community, resulting in the evacuation of 50 people, and Level 2 evacuation orders for Moore Hill Lane. Other values at risk included transmission and distribution lines, commerce and tourism on the Umpqua River, cultural and heritage resources, threatened and endangered species habitat for northern spotted owl and salmon, and recreation facilities such as trailheads and campgrounds.

Morning inversions with dense smoke hampered air operations on most days, but also moderated fire behavior until lifting around mid-afternoon. Once the inversions lifted, fire activity increased with fires spreading via spotting and rolling material. The fires remained active well into the night. Steep terrain created multiple concerns over access and firefighter safety given the number of fires included in the complex, the extent of rolling material, and limited escape routes and safety zones.

The Happy Dog Fire burned 13 power poles on August 13 and began burning through the Dry Creek community. A structure protection group was in place to protect the homes with both day and night shifts. On August 18, the Happy Dog Fire spotted across the North Umpqua River, soon posing threats to the Clearwater and Steamboat areas as well as hampering access to the Calf Copeland cluster of fires.

The Fall Creek Fire spread primarily south and west, threatening to cross the National Forest boundary onto a checkerboard of lands managed by the BLM and private lands. Several fires began merging together, such as the Happy Dog fire and fires 396 and 397, as well as the cluster of fires around Brokentooth and Devil's Canyon.

The team held a community meeting in Glide on August 15 to provide an update on the fires and firefighting efforts and to answer questions. Several campgrounds, trails, and recreation sites were closed. The Sheriff's Office and Oregon State Marine Board closed the North Umpqua River between Boulder Creek and Susan Creek.

On August 16, the Sheriff's Office initially lowered the evacuation level for Dry Creek to 2, but a rapid increase in fire behavior later in the afternoon resulted in re-implementing Level 3 evacuation orders and expanding it to include the Illahee area. By August 18, the Sheriff's Office issued Level 1 evacuation orders for the Susan Creek residential area and for the Clearwater area on August 20 due to spotting and spot fire spread from the Happy Dog and Fall Creek fires.

Rolling material onto the road promoted the Oregon Department of Transportation to close the road shoulders and pullouts in a section along Highway 138 later to close the highway between mileposts 39 to 54 and use pilot cars to escort vehicles through the closure area. PacifiCorp de-energized the powerlines in the area as well.

August 21-27

Both the Happy Dog and Fall Creek fires continued to move both east and west along Highway 138, threatening additional miles of highway corridor, transmission lines, and a hydroelectric power plant site. The Ragged Ridge Fire was threatening an alternative confinement line to the north. The structure protection group worked several miles ahead of the fires developing protection plans for individual homes and structures. On August 21 and 22, the Oregon Department of Transportation closed Highway 38 between mileposts 50 and 51 to all traffic, including firefighter traffic, due to dense smoke and debris falling on the highway, later expanding the closure to all but firefighting traffic between mileposts 43 and 54. The team held a community meeting in

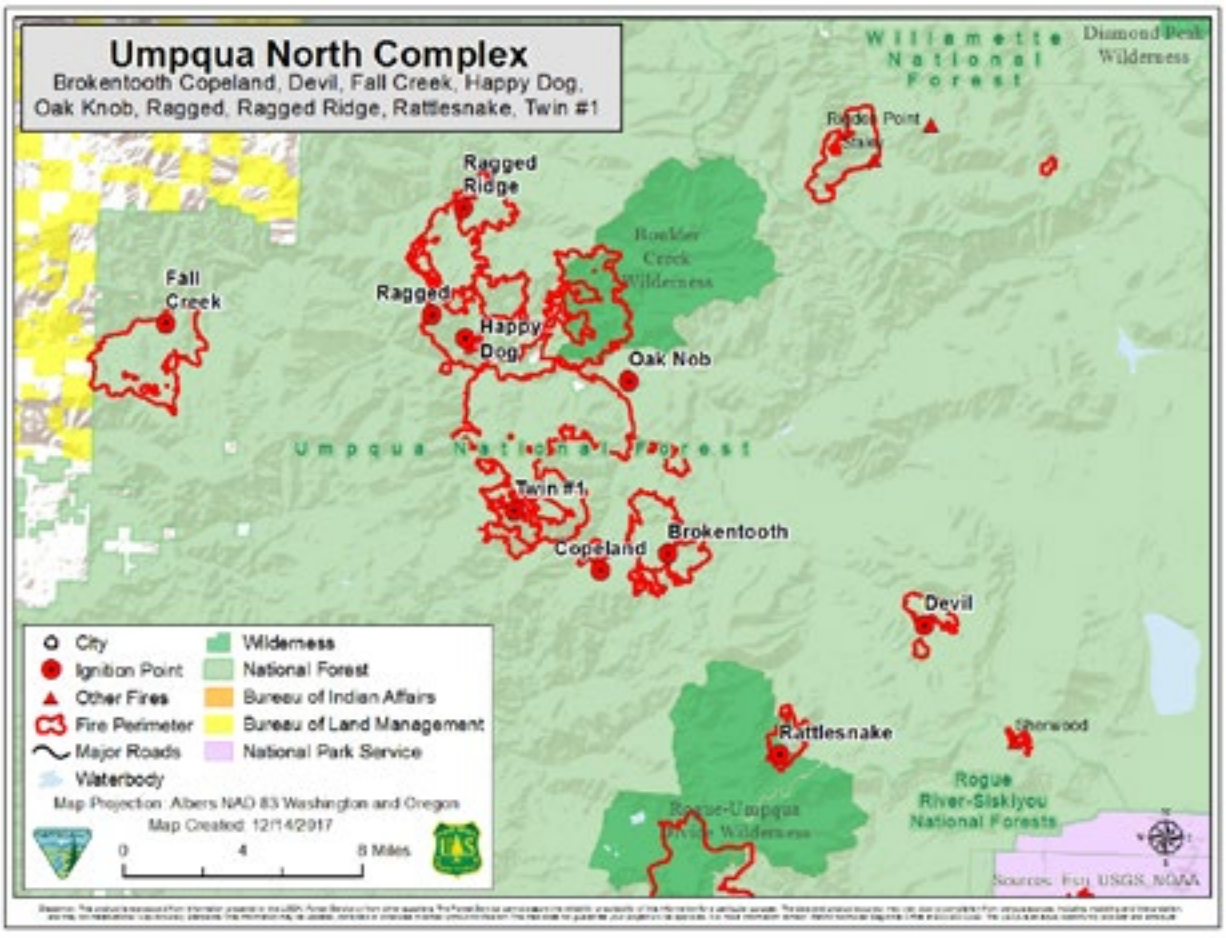
Glide on August 22 and in Toketee on August 23 to update people on the status of the fires and answer questions.

Although crews continued to make some progress on the Fall Creek, Ragged Ridge, and Happy Dog fires, terrain and falling debris continued to limit firefighting efforts, especially in Devil's Canyon. Moderating weather aided firefighting efforts, allowing burnout operations to strengthen containment lines, especially on the Fall Creek and Ragged Ridge fires. Firing operations were also used to help protect the PacifiCorp transmission lines, residences at Soda Springs and Slide Creek, the Fish Creek Power Plant, and Toketee Ranger Station. On August 26, the IMT established a 200-person camp east of the closure area on Highway 138 to facilitate firefighting efforts. Crews developed contingency lines by reopening roads, brushing out roads, and reestablishing old dozer lines used in previous fires.

By August 27, conditions became hotter, drier, and fire activity increased. The Happy Dog Fire spotted across Forest Road 28; the spot fire quickly grew to 30 acres. The Mudd 2 and Brokentooth fires also crossed Forest Road 28 and spread rapidly to the southeast. Four new fires, likely holdover fires from the lightning event two weeks prior, popped up as well. An infrared flight on August 27 mapped 18,073 acres within the complex and revealed that the Happy Dog and Ragged Ridge fires had joined north of Highway 138.

August 28-September 3

Severe burning conditions led to the widespread use of indirect suppression tactics such as construction of containment lines away from the fire edges followed by burning out and the construction of contingency lines in case the main containment lines did not hold. Spot fires, inversions, thermal trough passages, and dense smoke remained problematic throughout the week. By August 29, the Happy Dog Fire began burning into other recent fire scars and crews worked to keep the fire from emerging from those burn scars. The Sheriff's Office reduced the evacuation notice to Level 2



Umpqua North Complex as seen from the 1996 Spring Fire scar

in the Dry Creek and Illahee areas and Highway 138 was reopened between mileposts 43 and 47, allowing those residents to return home on August 29.

The IMT held community meetings in Glide on August 30 and Toketee Ranger Station on September 1. The Alaska Type 1 IMT transferred command of the complex to a California Type 1 IMT on September 1. The Sheriff's Office also increased the evacuation order to Level 2 in the Slide Creek area on September 1. On September 2, the IMT used an unmanned aerial system to scout Rattlesnake Fire in the Rogue-Umpqua Divide Wilderness to assist in developing a management strategy for this fire and established a secondary fire camp at Diamond Lake to reduce drive times for firefighters.

September 4-10

Firing operations continued to contain the active fires in the complex. Crews burned out along Forest roads to tie the Happy Dog and Brokentooth fires together since these fires seemed inclined to burn together anyway, and to keep the Happy Dog Fire from burning additional areas along Highway 138. Air quality conditions prompted the Oregon Department of Environmental Quality to issue an air quality alert for the area in and around the complex on September 4. Dense smoke continue to affect both the fire behavior and the ability to use helicopter bucket drops until the end of the week.

On September 4, the Sheriff's Office lifted the Level 1 evacuation orders for Moore Hill Lane and Susan Creek area. Firefighters secured the Illahee area, allowing PacifiCorp to re-energize the transmission line. By September 7, cooler, moister conditions, and some rain moved over the complex area, allowing firefighters to begin using direct tactics on portions of the Happy Dog and Ragged Ridge fires. The Oregon Department of Transportation reopened all of Highway 138 with pilot cars. Rain fell on the complex on September 8 but also brought an estimated 186 lightning strikes in Douglas County. The team used an unmanned aerial system to scout the southern boundary of the Happy Dog and Brokentooth fires for access and to assess fire behavior. Suppression action was taken to check the Rattlesnake Fire as it moved out of the wilderness with additional actions planned when firefighting resources are available.

On September 9, soldiers from the Task Force Spearhead, 1-2 Stryker Brigade Combat Team, 7th Infantry Division, Joint Base Lewis-McChord, Washington, completed their first day of training on the fireline. The following day, they began working on the Devil, Brokentooth, and Ragged Ridge fires. Additional rain on September 9 aided suppression efforts. The Fall Creek Fire was contained on September 10.

September 11-17

The IMT held a public meeting in Roseburg at the Umpqua National Forest headquarters on September 11. Crews began making significant progress in containing the more active fires across the complex. Dense smoke returned on September 12 as conditions dried and fire activity began to pick up. However, direct tactics became more viable across more and

more of the complex as days shortened and more seasonable temperatures and relative humidity resumed. The main weather concerns changed to cold front passages.

Holding, mop-up, and suppression repair operations continued on inactive fires and less active portions of the main fires. Some rain fell on the Devil Fire on September 12 and scattered areas of the complex on September 13. Fire activity overall declined as fires or portions of fires moved into the mop-up phase and scattered rain and cloud cover kept temperatures lower and relative humidity higher. By September 13, the complex was an estimated 40,343 acres in size with the Happy Dog the largest fire. The Umpqua National Forest reduced the extent of the area closure around Cougar Bluffs and reopened Fall Creek Trail on September 13.

A holdover fire in the Devil's Canyon area popped up on September 16 and was quickly suppressed. Holding, mop-up, and patrolling continued on all fires, although increased fire activity was noted in the Eagle Rock area just north of Highway 138. Crews focused their efforts on the east side of the Happy Dog Fire, the west flank of the Brokentooth Fire, the north end of the Ragged Ridge Fire and the Highway 138 corridor. The California Type 1 IMT transferred command of the complex to a Great Basin Type 2 IMT on September 16 and the incident base camp was moved from Glide to the Diamond Lake area.

September 18-October

As much as three inches of rain and snow fell on the complex on September 18 and 19, allowing the firefighting efforts to switch to mop-up, patrol, suppression repair, and backhaul of equipment out on the firelines. Public use restrictions were lifted on September 19 and Highway 138 fully opened on September 20. By September 22, the Umpqua National Forest began reducing area, trail and road closures although some roads, trails, and campgrounds would remain closed until next spring. September 24 was the last day on the fireline for the soldiers of Task Force Spearhead, 7th Infantry Division, 23rd Brigade Engineering Battalion who handled multiple fire suppression and repair assignments on not only the Umpqua North Complex but also the High Cascades Complex and Elephant Fire. Fallers worked with the Oregon Department of Transportation to remove hazard trees along Highway 138 by September 25, which also resulted in resumption of pilot cars during falling operations.

Milli

August 11-15

The Milli Fire started August 11 in an area of abundant snags burned in the 2006 Black Crater Fire. The initial response resources recommended using an indirect attack strategy due to the snag hazards and fire weather conditions.

Between August 12 and 13, fire activity intensified and the fire grew to an estimated 110 acres. A Type 3 IMT was assigned to the fire. The fire continued to burn in green timber, brush and snags within the old fire scar. Firefighters and heavy equipment began fireline construction outside the Three Sisters Wilderness as a contingency. Several temporary closures of adjacent trails, trailheads and roads were put in place.

On August 14, the Milli Fire received a load of seven rappellers who worked to secure the heel of the fire into the Black Crater Fire scar. Other resources assigned to the fire included a handcrew, four dozers, and two excavators. By evening, the fire was 150 acres and 2 percent contained. There was moderate fire behavior

Retardant drop on Mill Fire, August 19, 2017

and crews used minimum impact suppression tactics (MIST) within the wilderness. Outside the wilderness, equipment was utilized to construct contingency lines and improve Forest Service roads in anticipation of fire growth to the east

On August 15, additional closures were placed in the Three Sisters Wilderness area. A Type 1 IMT from the Southwest arrived to assist with management of this and other area fires in the Deschutes and Ochoco National Forests, as well as manage any new fire starts anticipated to occur over the next several weeks due to drying conditions and increased visitation from the solar eclipse.

August 16-21

Winds continued to push the fire east, forcing it out of the wilderness and approaching areas where fire operators could conduct direct suppression strategies to contain the fire. Minimum impact suppression strategies continued to be employed by crews operating within the Three Sisters Wilderness. The Southwest Area Type 1 IMT assumed command of the fire, estimated at 3500 acres with 0 percent containment.

The Deschutes National Forest and IMT conducted a public meeting to inform the community on the status and strategies for managing the fire, and the resources at risk. There was heavy fire activity with winds up to 35 mph in the fire area. The fire moved by torching and spotting toward the east and southeast. Due to the dangerous conditions caused by the winds, crews were forced to cease suppression actions directly in front of the fire front and move to flanking positions. Some spot fires crossed to the east side of FS road 1018. The fire also grew on the west flank and moved north toward Black Crater Mountain. Crews worked to control the spot fires and conducted burnout operations to strengthen and hold the containment line developed along that roadway.

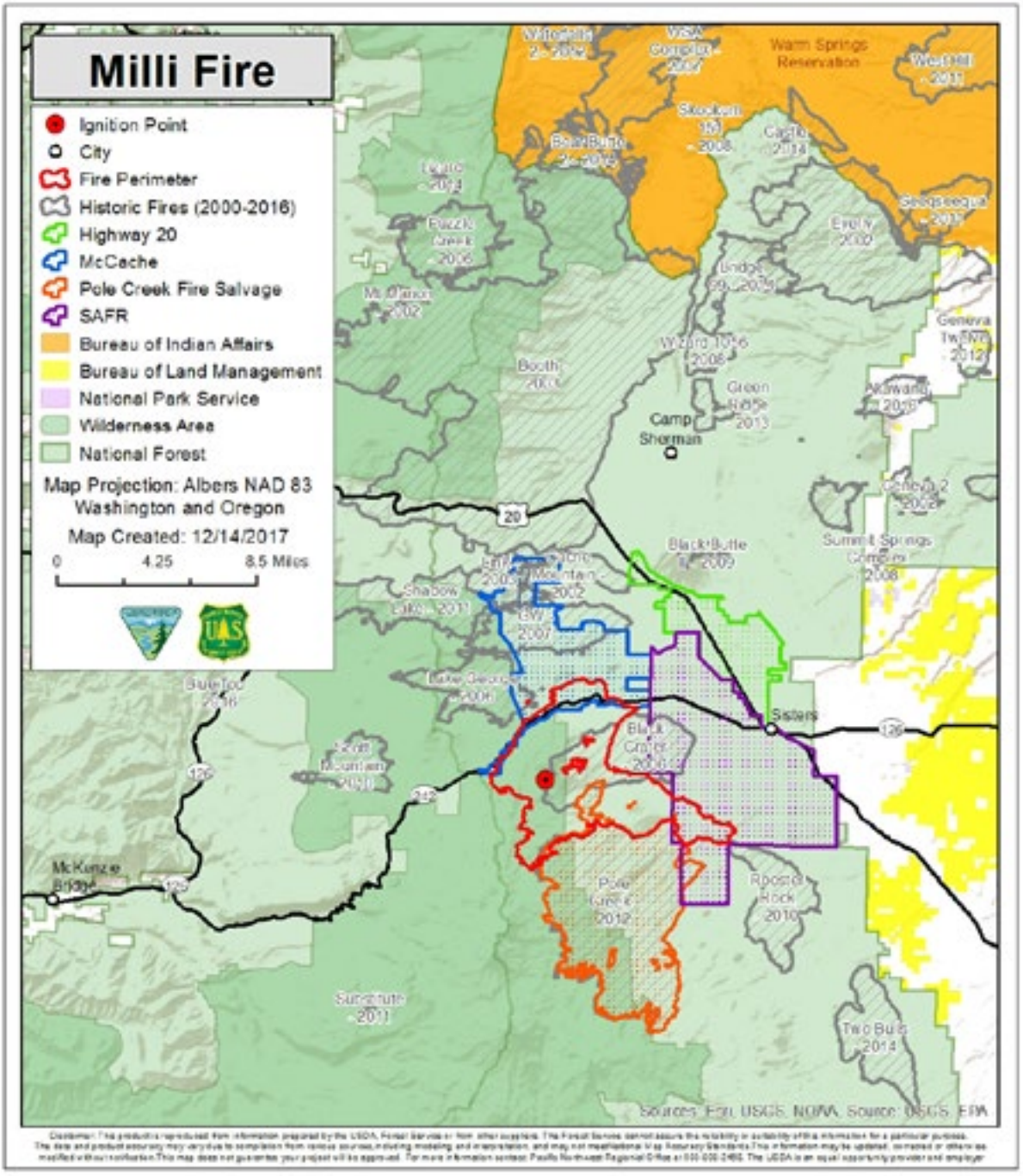
On August 18, immediate evacuations were ordered for residents as the fire continued to push to the east. The Deschutes County Sheriff's Office moved residents on both sides of Three Creeks Road (FS Road 16 from Sisters) south to FS 1514 Road to a Level 3 evacuation.

The following day firefighters worked to complete a containment line on FS Road 15 along the eastern edge of the fire, tying the line into work completed on the south side of the fire. Strong winds caused the fire to spot across the containment line, pushing it 2 to 3 miles east/southeast toward subdivisions on the edge of the city of Sisters. The run triggered

several Level 3 evacuations, affecting approximately 600 people, while an additional 1,000 people remained under a Level 1 evacuation order.

Oregon Governor Kate Brown invoked the Conflagration Act, which prompted the Oregon State Fire Marshal to provide five task forces of structure engines for protection in the evacuated subdivisions. Engine crews remained in the neighborhoods, providing assistance in strengthening defensible space around buildings. Crews continued to work through the night re-establishing primary containment lines and developing alternate lines as backup, working to contain the main body of the fire, locating and containing any spot fires out ahead of the fire.

By August 20, the fire had grown to 8,014 acres. Crews made good progress, and control lines on the northern flank were holding. Along the southeast flank crews worked with



air support to secure the line in the Whychus Creek area and construct dozer line west to the Black Crater area. The main part of the fire continued backing into the Wilderness moving to the west and south.

The Oregon State Fire Marshal's Green Team structure protection group continued working to assess homes, access, egress and safety zones in the Edgington community. They conducted some hazardous fuels reduction work to remove needles from roofs of homes.

Due to increased fire activity on August 21, the Deschutes County Sheriff's Office issued a Level 1 evacuation notice for areas between Hwy 242 and Hwy 20 and west of Cold Springs Cut-off Rd (FS 1012), which included the community of Black Butte Ranch.

Winds from the southeast pushed the fire north between Lava Camp Lake and Black Crater Lake. Crews and masticators worked along OR242 to clear heavy fuels and strengthen the control line. Securing the northern flank of the fire was the highest priority.

Firefighters made good progress extending and strengthening hand lines and dozer lines along the northeast, east and southeast flanks in an effort to protect private lands and communities. Aircraft provided support with water drops in various locations on the fire. Structure protection continued with support from the Oregon State Fire Marshal's Green Team. No structures were destroyed in this fire.

August 22-27

By August 22, the fire had grown to 11,236 acres. A public meeting was held to provide information regarding status of the fire, closures, and evacuations. Heavy smoke filled the air as winds from the southwest carried smoke from fires in southwest Oregon and northern California blanketing much of Oregon and grounding aircraft assigned to the incident. Direct suppression occurred on the northeast and southeast side of the fire. Crews on the northwest side of the fire near OR 242 continued fuel reduction work with plans to conduct burnout operations when conditions allow, to better secure the area.

Air quality outlook was determined to be unhealthy in the Sisters area. People with heart or lung disease, older adults, and children were advised to avoid prolonged or heavy exertion. Everyone else was instructed to reduce prolonged or heavy exertion, especially avoiding outdoor activity in the early morning.

At noon on August 23, Crossroads subdivision, Edgington, Remuda, Peterson Burn, Wild Wing and Three Creeks Road residences returned to Level 2 evacuation notice, allowing residents to return to their homes.

Burnout activity initiated overnight on the north side of the fire. This work was conducted as an offensive strategy to reduce the fuel load and build a line of defense between the fire and structures to the east should the fire make a run from the northwest. Mechanical vegetative removal work continued to further prep these areas for future burnouts.

The northwest, west, and southwest sides of the fire remained active with slow growth near Black Crater Lake. On the southwest side, the fire came across FS Road 1026 burning into the old Pole Creek Fire area. The western side moved slowly toward the lava fields. Control lines on the northeastern and southeastern sides of the fire were further reinforced with wider lines and cooling off hot spots around the fire perimeter.

On August 24, fire behavior was moderate with isolated torching within the fire perimeter. Fire growth was on the western side and in the wilderness. Crews took advantage of cooler temperatures to strengthen control lines and mop up. A cold front moved in helping break the inversion and clear out heavy smoke, allowing aircraft to re-engage.

Planned aerial and burnout activities were delayed the following day due to poor visibility from heavy smoke. These burnout activities and retardant drops were conducted to build a "catcher's mitt" intended to stop the fire should it spread toward the north and east.

The fire grew to 13,485 acres by August 26. Favorable weather conditions allowed good prog-

ress along FS Road 1018, south of OR 242, and north of the fire between FS Road 1030 and OR 242 to reinforce containment lines.

Warmer and drier conditions on August 27 made the fire more active. Crews continued mop up, patrol and fireline rehab efforts, as well as burnout, securing and deepening control lines in anticipation of aerial burnout when conditions allow. To the west, near Lava Camp Lake, the fire continued to move slowly toward the lava field.

August 28-September 3

On August 28, the Milli Fire was 18,067 acres. The internal area on the fire continued to burn actively, primarily in the burnout areas on the north side of the fire. This active burning produced smoke and ash fall throughout the Sisters communities.

Aerial ignitions did not occur since the helicopter conducting this operation could not fly safely at low altitude in the heavy smoke. A specialized aircraft flying at higher altitude flew above the smoke layer to monitor the fire's activity, with infrared mapping technology to monitor the perimeter and detect heat concentrations.

A three-acre spot fire was found on the north side of the lava bed. The west side of the fire continued to be active through the day. Concentration levels increased to Very Unhealthy and continued into the evening. Smoke impacted travel on the highways from the crest of the Cascades to east side of Sisters.

On August 29, smoke from the Whitewater Fire on the Willamette National Forest and several other fires affected the Milli Fire and surrounding areas.

The fire size on August 30 was 21,703 acres. The fire became very active on the private land within its perimeter. Crews worked through the night to monitor the area, backburning as needed to keep fire intensity down. Taking advantage of a short period of clear skies, a reconnaissance helicopter flew the fire to look for possible spot fires outside the fireline. No spot fires were found. Crews patrolled the eastern fireline and extinguished one small spot fire. Firefighters worked through the night to complete a low-intensity burnout on the private land to strengthen the eastern fire line. Fire behavior consisted mostly of creeping and smoldering with a few isolated pockets of unburned trees torching. Firefighters found minimal hotspots within contained areas of the fire.

Clear skies on August 31 allowed a reconnaissance flight over the fire to assess current fire behavior. Crews patrolled the northern perimeter of the fire and continued to mop up. Fuels on a portion of the private land within the fire perimeter burned the previous day. However, valuable regeneration areas on the private land were protected. Crews strengthened containment lines to the east that crossed through private property. The southeast and south perimeters of the fire continued to be in patrol and mop-up status. The west side of the fire continued to burn down slope with occasional torching in pockets of timber in the Three Sisters Wilderness within established containment lines. On the northwest side, the fire continued backing down to OR 242.

Fallers began removing hazard trees and debris on OR 242. The road remained closed for some time as workers continued to remove hazards, make repairs, and until Oregon Department of Transportation could assess the condition of the road.

Good progress was made on rehabilitation and repairs in and around the contained areas of the fire. Crews, dozers, excavators and wood chippers knocked down berms and returned control lines and dozer lines to a more natural state.

On September 2 and 3, the Milli Fire saw mostly interior fire activity and stayed within the confines of the established perimeters. The east, southeast, and south flanks of the fire were in patrol status with firefighters mopping up any detected heat to further secure containment lines. Several smokes were detected near the containment line and mopped-up. Secondary containment lines outside the perimeter were in the repair process. Crews, dozers, excavators, and wood chippers worked to return unused containment and dozer lines to a more natural state.

On the southwest flank, the fire backed down into the old Pole Creek burn. Heavy smoke kept firefighters from visually monitoring this perimeter. Several engines and firefighters worked in the Lava Camp area to mop-up hot spots and secure the infrastructure of the campground. The fire backed down to Hwy 242 at Windy Point.

Clean-up began along Hwy 242 removing logs, rocks, and debris; however the road remained closed as additional work was required to remove hazards. Smoke from several nearby fires mixed with the Milli Fire and settled over the area keeping temperatures 10 degrees lower than predicted and moderating fire behavior. As a result, the air quality became an issue and the conditions persisted. The poor air quality and visibility also restricted the use of helicopters to assist firefighters.

September 4-15

The east, southeast, and south flanks of the fire were placed in patrol status with firefighters mopping up detected heat to further secure containment lines. The southwest flank of the fire was pushed by the winds west to North Matthieu Lake. Helicopter water drops were utilized to extinguish heat and check any movement in the lava fields. On the west flank, the Lava Camp campground area was placed in patrol status. Strong north winds created several small spots within the lava fields, where helicopter water drops were utilized to extinguish any heat.

Hwy 242 remained closed as crews worked to remove remaining hazards and repair road surfaces.

By September 8, the Milli Fire was 24,079 acres. The Deschutes County Sheriff's Office dropped all evacuation notices that were in place. All Deschutes National Forest closures remained in place. A local Type 3 IMT took command of the fire on September 9. Crews, dozers, excavators, and wood chippers continued to knock down berms and return control lines and dozer lines to a more natural state. Fuels within the secured fire perimeter continued to burn producing a moderate level of smoke. Containment remained at 60 percent, with moderate growth expected. The west side of the fire continued to burn down slope with occasional torching in pockets of timber in the Three Sisters Wilderness and where it was expected to extinguish naturally when it ran out of fuel in the lava fields. Thunderstorms passed through Central Oregon on August 8 and blanketed the area with lightning and rain. The Milli Fire area received between .03 and .10 of an inch of rain.

Resources on scene include 59 personnel from the Forest Service, BLM, Oregon Department of Forestry, and Oregon Department of Transportation. The area closure in place for the Milli Fire was reduced. While the western, southern, and eastern boundaries of the closure remained the same, the northern border decreased to open access around Black Butte Ranch and Cold Springs Campground.

From September 10 to 15, the Milli Fire acreage remained at 24,079 with 60 percent containment. With minimal fire activity, the fire was 100 percent contained as of September 24, 2017.

Horse Prairie

August 26

The Horse Prairie Fire started on private lands under severe burning conditions mid-afternoon on August 26. The fire exhibited extreme behavior almost from the moment of ignition, with tree torching, crown runs, and rapid spread in the understory. Smoke affected residents along Highway 42 and Olalla Road immediately. The area of the fire start was a checkerboard of private timberlands and lands managed by the BLM with commercial timber and late successional reserves. The initial responders included Oregon Department of Forestry, BLM, Tenmile Fire Department, Camas Valley Fire Department, and local timber companies. The fire grew to an estimated 425 acres in less than 12 hours.

August 27-September 1

Morning inversions dampened fire spread in the mornings and also hampered air operations. Once the inversions lifted around midday or mid-afternoon, fire behavior picked up and the fire made significant runs, burning in recently felled timber, young Douglas-fir plantations, and older Douglas-fir forests on both private and public lands. It quickly began moving into steeper, more rugged terrain, contributing to control difficulties and prompting the use of indirect suppression tactics. Horse Prairie rated as a high priority fire due to rapid spread and the values at risk.

Smoke from the fire affected residents along Highway 42 and Olalla Road as well as Roseburg and Winston. On August 28, the Douglas County Sheriff's Office issued Level 2 evacuation orders for the area. On August 29, the fire spotted across Cow Creek resulting in the Sheriff's Office issuing Level 3 evacuation orders for a portion of Cow Creek Road. Roads on both public and private lands in and around the fire were closed to public use as a safety precaution. Crews from the Oregon National Guard joined the firefighting efforts on August 29. By August 30, the fire was moving into Ponderosa pine stands. Control lines on the north and northwest sides of the fire were holding and crews made good progress on line construction on the northeast side of the fire.

The fire was estimated at 11,500 acres on August 31 with 39 crews and 34 engines assigned to the fire. While the fire size continued to increase, much of that was due to burnout operations on the western side of the fire that tied the fireline into Cow Creek. Mop-up progressed on the northwest, north, and northeast sides and beginning on the western side. A wind shift helped to push smoke away from nearby communities, providing some relief. By September 1, fire spread was slowing as firefighters gained the upper hand. All established lines continued to hold. Structure protection efforts around the residences on Cow Creek continued. Crews began preparing contingency lines in case the forecast warming and drying conditions caused the fire to spot across control lines. The IMT moved the incident base camp to a new location near Riddle.

September 2-8

Containment of the Horse Prairie Fire grew steadily. By September 2, the fire had 49 crews and 39 engines assigned to it. The homes along Cow Creek Road were considered secure and mop-up continued on the cooler parts of the fire. Inversions, smoke, and excessive heat remained on-going problems, however. On September 3, the fire made downhill runs under north winds and smoke reduced visibility along Cow Creek Road to as little as 50 feet. Security at road closures increased due to the Labor Day holiday. On September 5, the high-pressure system that had been affecting the fire began to break down, bringing more unstable conditions, shifting and gusty winds, and an increased risk of erratic fire behavior. Fire behavior was very active over the next two days with downhill runs, crowning, and spotting up to a half mile. All resources focused on mopping up, gridding for spot fires, and felling all snags within 300 feet of the control lines. September 7 was the first day the fire did not increase in size as some rain fell. The Douglas Sheriff's Office reduced the evacuation orders for Cow Creek Road to Level 1 as a

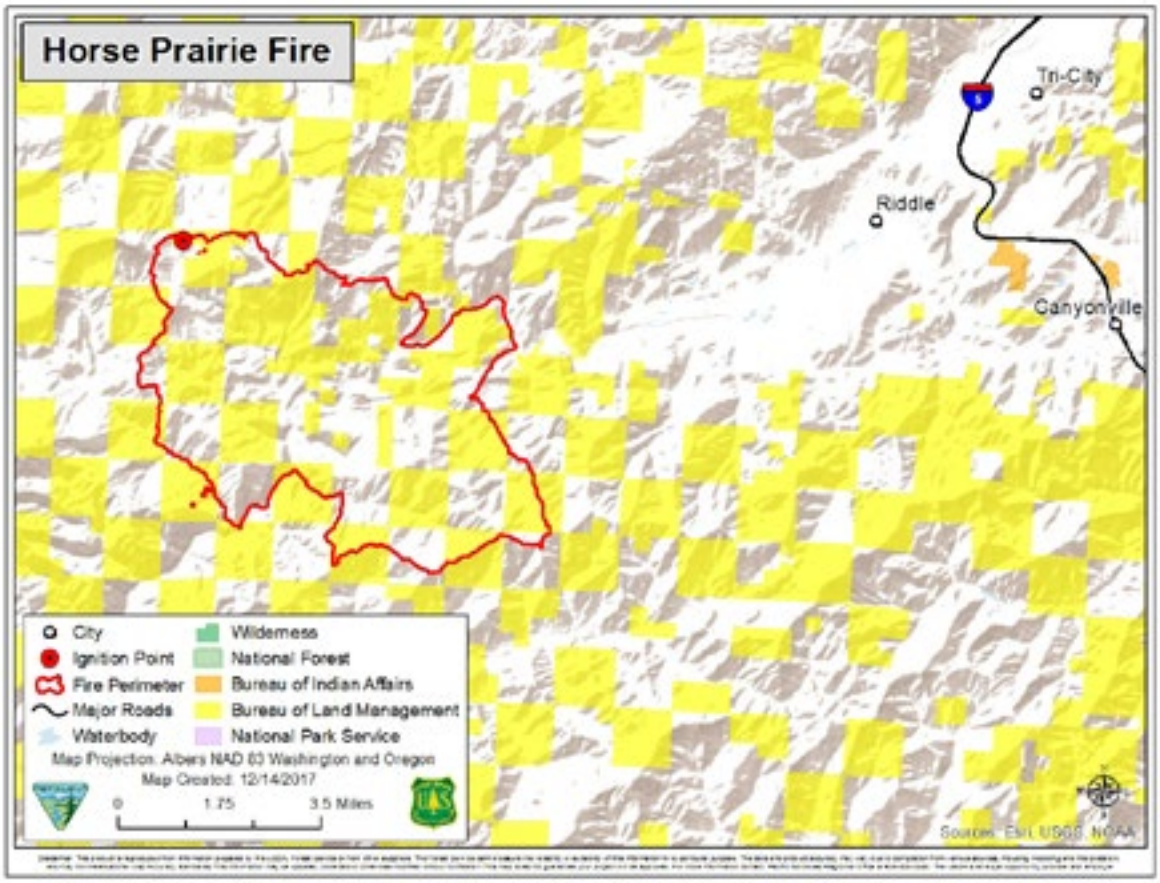
result. On September 8, additional rain, cooler temperatures and higher relative humidity aided containment efforts.

September 9-24

The team used an unmanned aircraft system equipped with an infrared camera as well as handheld infrared cameras to locate hot spots. The Central Oregon Railroad line reopened on September 10. A dry cold front moved over the fire on September 13, bringing gusty winds, and more seasonable temperatures and relative humidity. Command of the fire was transferred to a local Type 3 incident commander on September 15. Containment of the fire increased every day through the period, reaching 95 percent by September 18, and steady demobilization of firefighting resources began. Of the 16,436 acres within the fire perimeter, 7,626 acres were managed by the Roseburg BLM and 8,810 acres were managed by private timber companies.

Significance

Even though the Horse Prairie Fire was a relatively small fire, the values at risk, especially private commercial timberlands, made this fire a high priority in the Northwest. As a result, this fire had as many crews and nearly as many engines assigned to it as the much larger Chetco Bar Fire.



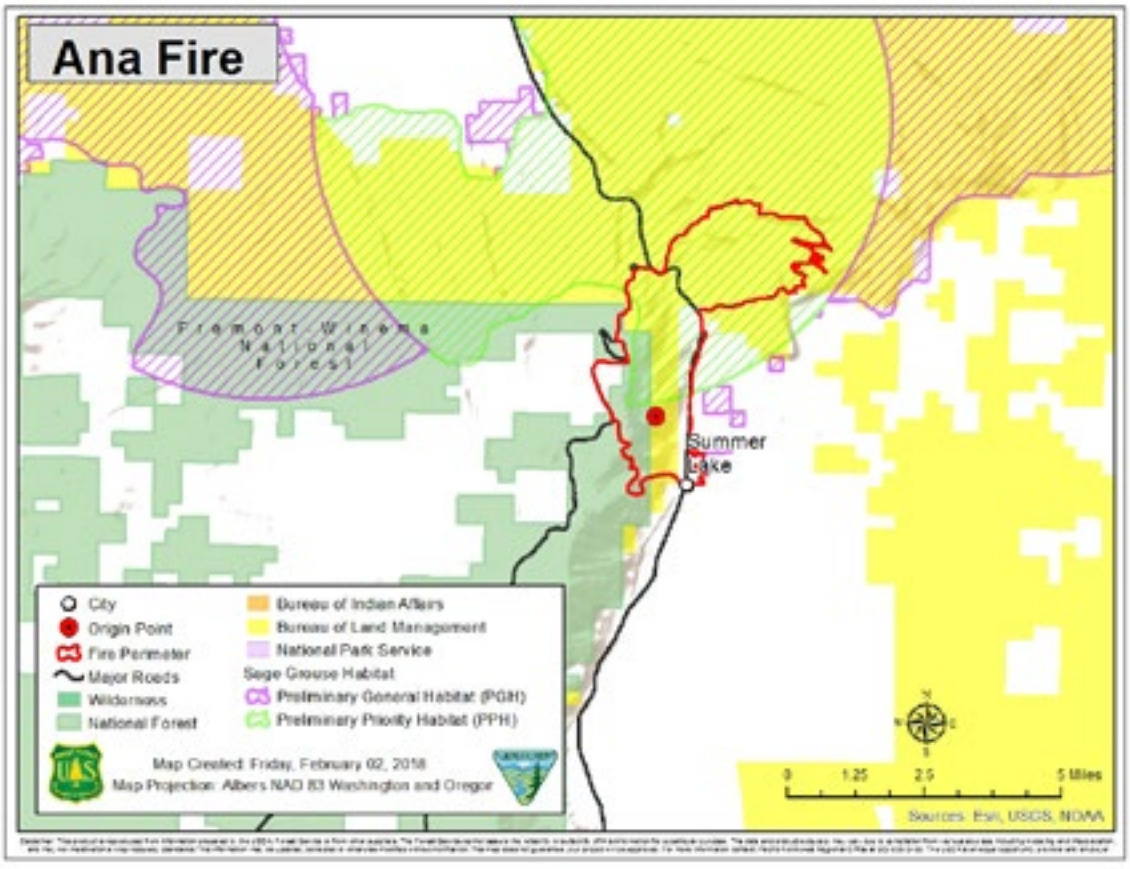
Appendix D: Southeast Oregon

Introduction

The fire season was mild in the rangelands of southeastern Oregon. In all, 29 large fires originated on the four BLM Districts in southeastern Oregon, burning an estimated 135,133 acres. Vale District experienced the greatest number of large fires with 14, which affected an estimated 37,557 acres. Burns District had only four large fires, but had the greatest number of acres affected at 58,267, mostly in the Cinder Butte Fire. Lakeview District had five large fires, affecting an estimated 8,019 (the least acres of the four Districts), and Prineville District experienced six large fires for 31,290 acres. Only three fires – Cinder Butte, Rhoades Canyon, and Bowden – exceeded 10,000 acres in size. The 5,874-acre Ana Fire was the most significant fire that affected the Fremont-Winema NF. Later in the summer, the Blanket Creek Fire (covered under the High Cascades Complex in Appendix B) also burned onto the Fremont-Winema NF.

Greater Sage-grouse and RFPAs

Protection of habitat for the greater sage-grouse is a top priority for wildfire response in southeastern Oregon. Both the approved resource management plan amendments for sage-grouse and the 2015 Integrated Rangeland Fire Management Strategy lay out principles and management direction for reducing the impacts of wildfire on sagebrush ecosystems. Sage-grouse and several other species, such as pygmy rabbit and pronghorn antelope in these plant communities are dependent on sagebrush for food and cover. Most sagebrush species do not resprout and often require several decades to return to useful habitat. Like northern spotted owls and marbled murrelets, sage-grouse depend on a type of old-growth that requires long recovery times.



Land use plan amendments specific to greater sage-grouse and the Integrated Rangeland Fire Management Strategy cover the four eastern Oregon BLM Districts (Burns, Lakeview, Prineville, and Vale). The 2016 sage-grouse amendments identified three different types of habitat areas, based on the State of Oregon's sage-grouse management strategy. Sagebrush Focal Areas (SFAs) have the highest value for maintaining sage-grouse and sagebrush habitat and are considered the most intact and contiguous habitat remaining. Priority Habitat Management Areas (PHMA) contains the habitat used by 90 percent of sage-grouse for breeding and brood-rearing; in southern Oregon along the Nevada and Idaho borders, SFA overlaps with PHMA. General Habitat Management Areas (GHMA) largely connects the patches of PHMA. All of Oregon's PHMA also has been designated as Priority Areas for Conservation, or PACs, with 20 PACs identified throughout southeastern Oregon. These PACs are the highest priority for wildfire protection.

Eastern Oregon has a limited number of state and federal firefighting resources and their ability to provide rapid response to new fires is also limited. To supplement existing capacity, BLM and Oregon Department of Forestry have been promoting the formation of Rangeland Fire Protection Associations (RFPAs). These RFPAs have proven to be valuable assets in protecting sage-grouse habitat.

The RFPAs are well-trained and well-equipped to fight wildland fires. They receive equipment, much of it military surplus vehicles, through Oregon Department of Forestry and via grants from county, state, or federal partners. As a result, RFPAs have engines, water tenders, dozers, and lowboys for transporting heavy equipment. Grants also help the RFPAs purchase radios and personal protective equipment (PPE), such as fire shirts, hardhats, and fire shelters. Both ODF and BLM provide training and additional PPE. Members of an RFPA are able to take on most of the suppression tasks, such as line construction and burnout operations, that federal and state firefighters do.

Oregon Department of Forestry provides oversight and guidance to the RFPAs, but each RFPA is an independent entity. In 2017, Oregon had 22 RFPAs located across much of eastern Oregon. Nineteen RFPAs responded to wildfires on BLM-managed lands in 2017. Jordan Valley RFPA had the most responses, followed by Post/Paulina and Brothers/Hampton RFPAs. All told, RFPAs responded to 85 wildfires that wound up burning 96,539 acres.

The following three fires illustrate how wildfires affected important sage-grouse habitat as well as other resource values and the roles that local RFPAs and rural fire departments played in handling those fires.

Ana

July 7-9

The Ana Fire started on July 7 on private land north of the town of Summer Lake and quickly spread under the influence of high winds and dry fuels. The fire threatened approximately 25 homes, 10 commercial buildings, and 10 other structures along with sage-grouse habitat in the Picture Rocks Priority Area for Conservation, Highway 31, the transmission line along Highway 31, and cultural resources towards the

Ana Fire on July 9, 2017

north of the fire. Several rural fire departments along with resources from the Forest Service and BLM responded to the fire.

By July 8, Ana Fire had burned approximately 700 acres with hot, windy conditions hampering control efforts. Dense smoke on Highway 31 affected traffic safety, resulting in closure of the highway, the main route between Bend and Lakeview.

Lakeview District ordered a Type 2 incident management team on July 9 manage the fire due to the threats to Summer Lake, Highway 31, private timber, and sage-grouse habitat. The Ana Fire, now estimated at 3,200 acres continued to burn actively. The Lake County Sheriff's Office issued Level 2 evacuation orders for residents of Ana Estates and homes along Highway 31 two miles south of The Lodge. The national preparedness level increased to 4, indicating firefighting resource shortages developing in several geographic areas.

July 10-15

A Type 2 incident management team assumed command of the fire on July 10. Ana Fire was now an estimated 6,000 acres in size and had burned lands managed by Lakeview BLM and the Fremont-Winema National Forest, as well as state-protected lands and private lands. An outbuilding, a barn and a hunter's cabin were believed to be damaged or destroyed by the fire. The fire crossed Highway 31, burning from west to east. Parts of the fire were difficult for crews to reach, hampering control efforts, although crews made good progress on the fire otherwise.

Oregon Department of Transportation was able to reopen Highway 31 on July 11 with pilot cars guiding traffic through the fire area. The team met with cooperators mid-morning and with community members that evening in Summer Lake. Better mapping reduced the estimated fire size to 5,833 acres.

Firefighters continued to improve the containment line on the south flank of the fire, while mopping up on the rest of the fire. On July 12, the team estimated the fire at 5,874 acres and 75 percent contained. The Sheriff's Office reduced evacuation levels to Level 1, although smoke on Highway 31 required continued use of pilot cars for driver safety. Although Fremont Point Lookout was not affected, the Fremont-Winema National Forest closed the site through August 1 to allow unrestricted suppression and recovery traffic in the area. Fire behavior consisted mostly of smoldering under juniper trees and slow burning of interior pockets. Better reconnaissance revealed the number of destroyed structures was only two.

By July 13, crews began conducting suppression repair on the cold parts of the fire. On July 14, the fire was fully contained at an estimated 5,874 acres. The Sheriff's Office lifted all evacuation orders and normal traffic resumed on Highway 31. The team transferred command of the fire back to Lakeview BLM on July 15.

Hawk

July 27-28

Lightning started the Hawk Fire on July 27 in previously unburned sagebrush within the Cow Lakes PAC, which prompted aggressive suppression action due to loss of sagebrush cover and declining sage-grouse population. Jordan Valley RFPA was one of the responding units, with five Type 4 engines and three water tenders. Responding resources from BLM included one helicopter, five type 4 engines, one type 6 engine, two dozers, and one water tender while the Forest Service also sent a type 6 engine. Several airtankers supported the incident as well. The rapid response resulted in full containment of the fire on July 28 at 1,432 acres.

Cinder Butte

August 2

Human activity along U.S. Highway 20 near Glass Butte started the Cinder Butte fire which spread rapidly to the south-southeast. The fire initially ran an estimated 15 miles under temperatures in excess of 100°F, single digit relative humidity, 30 mph winds, and an very unstable atmosphere (Haines Index 6) through tall grass, sagebrush, and scattered pockets of western juniper trees. Eight people were evacuated and Oregon Department of Transportation (ODOT) closed five miles of U.S. Highway 20, the main route between Bend and Burns. The fire also affected the 12 Mile PAC and general habitat for sage-grouse, residences, powerlines, and local livestock and was threatening the Eastern Oregon Agricultural Experiment Station and the community of Wagontire.

Responding units included Burns BLM, Prineville BLM, Malheur National Forest, Malhuer National Wildlife Refuge, Silver Creek RFPA and Wagontire RFPA. The Harney County Sheriff handled evacuations, and Harney County Electric deactivated the powerlines in the area. The initial strategy consisted of trying to keep the fire from crossing major roads and protect structures in the area.

August 3

Severe burning conditions continued with high temperatures, critically low relative humidity overnight and into the day, strong winds, and an unstable atmosphere. A Type 2 incident management team was ordered and in-briefed that evening. Additional crews arrived to help with the containment effort. Helicopters, single engine air tankers (SEATs), large air tankers, and the DC-10 Very Large Airtanker (VLAT) made water and retardant drops throughout the day. The fire continued to threaten the same resource values as on August 2, along with numerous archaeological sites, including Rimrock Draw, a highly significant site under study by the University of Oregon.

August 4-8

The primary goals for the fire were to continue fireline construction and mop-up and protecting unburned islands and archaeological sites. On August 4 and 5 the fire remained quite active on the south end, including group torching in clumps of western juniper, but had moderated considerably on the north end of the fire. The team found two minor structures that had been destroyed in the initial run of the fire on August 4 and two more minor structures on August 6. By August 5, cooler conditions moderated fire behavior, although safety concerns related to smoke, traffic, and firefighter activity continued on U.S. Highways 20 and 395. By August 8, the fire was 90 percent contained with most effort on mop-up and suppression repair and the Type 2 team transferred command to a Type 3 team.

August 9-17

The Type 3 team handled the remaining suppression damage repair and demobilization of firefighting resources between August 9 and 12. After that, a Type 4 incident commander managed continuing patrol of the fire through a warmer, drier, windier period to make sure no additional flare-ups within the fire perimeter could threaten the final containment lines. On August 17, the fire was declared 100% contained.

Along with destroying four minor structures, causing the evacuation of 8 people, damaging powerlines, disrupting traffic on U. S. Highways 20 and 395, and burning in four grazing allotments, the fire affected approximately 1,062 acres of the 12 Mile PAC (priority habitat) and 50,984 acres of general habitat for greater sage-grouse.

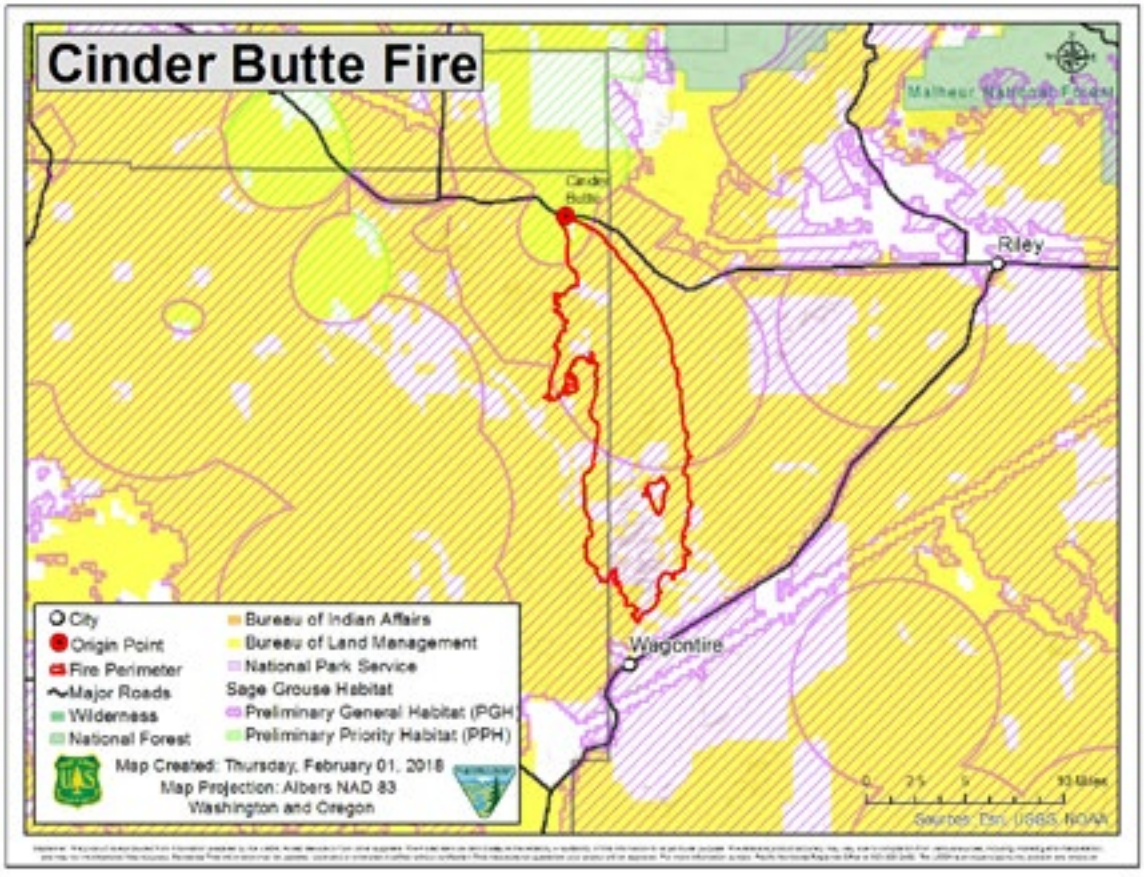
Significance

These three fires illustrate the importance of rapid responses to protect sage-grouse habitat and the role of RFPAs in that rapid response. The Ana Fire burned in the Picture Rocks PAC, which is small and isolated from other PACs with a declining sage-grouse population at risk of extirpation. Spring lek surveys in 2017 found only seven male birds in this PAC. Loss of habitat to wildfires, given the decades-long recovery times, places this particular population at even greater risk of loss. The Hawk Fire burned in a previously unburned portion of Cow Lakes PAC. Both sage-grouse habitat and populations are in decline in this PAC largely due to the combination of wildfires and invasive annual grasses. Rapid response by the Jordan Valley RFPA likely was a factor in avoiding further significant losses of habitat.

Over the course of the summer six wildfires in Oregon burned in priority habitat for sage-grouse (Folly Farms, Picture Rock, Cow Lakes, Louse Canyon, and 12 Mile PACs) and nine fires affected general habitat. Some of the wildfire impacts in southeastern Oregon include:

- 1,575 acres of Sagebrush Focal Area burned
- 8,311 acres of sage-grouse Priority Habitat Management Area burned
- 80,562 acres of sage-grouse General Habitat Management Area burned
- 121 miles of fence lost
- 31 allotments impacted
- 0 grazing permitees affected
- Approximately 5,217 animal unit months of forage unavailable until recovery objectives are met.

Greater sage-grouse are considered an umbrella species for many other sagebrush obligate species, such as pygmy rabbit, pronghorn antelope, and several species of birds and reptiles. Loss of sage-grouse habitat affects habitat availability for these other sagebrush obligate species as well. A sagebrush obligate species is one that requires sagebrush to meet all or part of it's habitat needs, such as habitat for breeding, hiding cover, winter cover, and/or food.



Appendix E: Mt. Hood & Columbia River Gorge

Introduction

The Columbia River Gorge National Scenic Area (CRGNSA or informally "Scenic Area") protects the spectacular canyon where the Columbia River cuts through the Cascade Mountains, with cliffs and overlooks of Washington to the north and Oregon's mountains and waterfalls to the south. The CRGNSA is unique in its natural and cultural history, as well as its designation as a National Scenic Area, one of only a handful in the country. On November 17, 1986, President Ronald Reagan signed into law the Act that created the Columbia River Gorge National Scenic Area, an 80-mile long canyon that spans from the outskirts of the Portland Metropolitan area until the mouth of the Deschutes River. The CRGNSA spans across two states, six counties, and 13 municipalities. It is a mix of private, municipal, county, and state land. The CRGNSA has multiple partnerships with state, county, and tribal governments, and the USFS fire management program has mutual aid agreements in place with state county and rural fire departments to respond to fires in the area. The area is also unique in its climate patterns. The drier east side of the CRGNSA, with short shrubby grass experiences more fire activity than the temperate west side. In fact, west side fires are sparse. It is not unusual to have rain on the west side and sunshine on the east side. Often, the temperatures can vary greatly from Cascade Locks, to Hood River, to The Dalles. The events from two notable fires in 2017 are documented below.

Indian Creek

July 4-July 27

The Indian Creek Fire started on July 4 near 7 1/2 Mile Camp by the Eagle Creek Trail #440, in the Mark O. Hatfield Wilderness on the Mt. Hood National Forest. Firefighters hiked into the area by way of Eagle Creek Trail, and found that the fire was burning west of Eagle Creek in deep duff on steep slopes covered by loose rock about 200 feet down in a canyon. It was determined to be unsafe for firefighters to work directly on the fire.

Water drops from helicopters and airplanes were used starting July 4 to cool the fire and reduce the rate of spread. The water drops, sometimes over 100,000 gallons in a day, raised the humidity and fuel moisture in the fire area. The fire held at 83 acres for much of August.

July 28-August 16

A National Incident Management Organization (NIMO) team managed the fire. This team coordinated the collection of information on potential control lines to prepare for potential fire spread, resource needs to prepare these lines, Management Action Points (MAPS) that would trigger a change in fire management, and more. On August 16, a Type 3 IMT assumed command of the fire.

Crews assigned to the fire observed and conducted reconnaissance for areas where fireline could be safely and effectively constructed. They also collected weather observations to help predict the fire behavior and smoke movement.

August 18-September 5

Starting around August 18, spells of warmer, drier weather caused the fire to become more active. By August 23, the fire had grown to 293 acres. By early September 2, the acreage had increased to 373 acres. The afternoon of September 2 aircraft, including type 2 helicopters, were diverted from the Indian Creek Fire to

help with the new Eagle Creek Fire. They helped search for hikers and campers near the fires, and dropped water to try to slow the spread of Eagle Creek Fire.

On September 2, the crew and security officers assigned to the Indian Creek Fire helped locate hikers and campers in the vicinity of the Eagle Creek Fire. They provided assistance to a large group of people stranded above the new fire, led them to a safer location for the night, and helped them hike out to Wahtum Lake in the morning. The crew also diverted Pacific Crest Trail hikers to Wahtum Lake for transportation past the fire.

On September 4, a Type 2 IMT assumed command of the Indian Creek Fire and Eagle Creek Fire. On September 5, the fires merged and became managed as the Eagle Creek Fire.

Eagle Creek

September 2

The Columbia River Gorge National Scenic Area is a popular hiking destination east of Portland along the I-84 corridor. Due to its close proximity to the Portland metro area, the CRGNSA hosts many visitors on any given day. On Saturday September 2 (Labor Day weekend), hundreds of visitors were hiking on the west side of the CRGNSA. A Red Flag Warning was in place from noon on September 2, through the weekend for dry, unstable conditions, and the Indian Creek Fire was already burning in the adjacent Mt. Hood National Forest. The temperature soared into the 90s, relative humidity dropped to the teens and an unstable atmosphere set up over the Cascades.

The Eagle Creek Fire was reported on Saturday, September 2 at approximately 4 p.m. Two Columbia River Gorge National Scenic Area engines were dispatched soon thereafter to respond to an initial fire report at the Eagle Creek Trail. The reporting party, a Forest Service law enforcement officer, was attempting to make contact with a group of teens reported to have been setting off fireworks about a mile up the Eagle Creek Trail.

As the engines drove to the incident, a senior firefighter assigned to the Indian Creek Fire, which was burning about seven miles up the Eagle Creek Trail, sent one of the engine captains a photo from her vantage point on Chinidere Mountain, which confirmed the new fire start.

The photo, taken about 25 minutes after the initial call showed the development of a small smoke column. Noting the weather conditions, and the high numbers of visitors in that area that were likely spread throughout the trail systems, the engine captain ordered a Type 3 incident commander and a helicopter, and continued toward the Eagle Creek Trailhead. When the helicopter arrived over the fire a short time later, the pilot estimated the fire had already grown to 50 acres and was cresting the ridge.

Around 4:30 p.m., Air Attack arrived over the fire area to provide "eyes in the sky" for the incident, and to coordinate aviation resources. Air Attack began ordering aviation resources, including four helicopters from the Indian Creek Fire, three fire boss water scoopers and three large airtankers. Some of these air resources from the Indian Creek Fire were actively dropping water. Retardant was ordered and planes were diverted from other active fires in the region to help slow fire spread towards the hikers that were cut off from the trail. Hikers that were not able to make it back to the trailhead were now caught on a trail with the Indian Creek Fire on the south side and the developing Eagle Creek Fire on the North.

Eagle Creek Fire as seen from Indian Mountain shortly after ignition (L) and developing plume as captured by Air Attack (R)

Two engine crew members were sent to "sweep the trail" and attempted to make contact with hikers and determine if the trail was passable. When the crewmembers reached the fire's edge, they found it burning about a quarter mile wide on either side of the trail, and fanning up the slope. They found no hikers between the trailhead and the fire and reported the trail was compromised, with fire on both sides. Finding no way to reach the hikers, or to find a safe exit route for them, they turned around.

Meanwhile, one of the helicopters assigned to the Indian Creek Fire began dropping streamers with directions to the people at Punch Bowl Falls. The first instructions were to head toward the Columbia River, but that message was quickly replaced with "stay put." One of the hikers climbed high enough to get cell coverage and called 911. This was when fire managers first learned that there were 153 people trapped at Punch Bowl Falls. Another group of three hikers on Ruckel Ridge reported fire burning a quarter mile below them, making their rescue a priority.

The helicopter assigned to the Indian Creek Fire flew over Ruckel Ridge to locate the hikers and recommended ordering a hoist ship to rescue the three hikers whose access off the ridge was cut off. The Hood River County requested a National Guard hoist-capable helicopter from Salem to rescue the three hikers. The National Guard completed their rescue by about 7:30 p.m.

With 153 people facing an unexpected night out on the trail, the responders developed plans to get food, water, and sleeping bags to the area near High Bridge where the hikers were spending the night. The National Guard helicopter was unable to sling-load supplies after assessing the narrow canyon, fading light, and smoke in the area. A division supervisor along with three members of the fire crew joined three from a search and rescue crew to begin hiking in to High Bridge from Wahtum Lake, a roughly 10 mile hike, carrying drinking water and food in their packs. A second group of about 20 hikers had left the Punch Bowl Falls area earlier in the evening and made it to Wahtum Lake around midnight. A waiting bus took them to their cars at the Eagle Creek Trailhead.

September 3

The fire continued to burn actively through the night, moving towards the town of Cascade Locks. The night shift Incident Commander recommended Level 3 evacuations for the south side of Cascade Locks. Just after 4 a.m., the Hood River County Sheriff's Department raised the evacuations to Level 3 south of the interstate, Level 2 for everything south of WaNaPa Street, and Level 1 for the rest of Cascade Locks.

Meanwhile, the rescue crew arrived at High Bridge at 3:20 a.m. They slept for a couple of hours before heading out at first light. At 5:30 a.m., the crew prepared the stranded hikers for the long hike up to Wahtum Lake. In all, 144 hikers and nine rescuers had spent the night near High Bridge. All hikers arrived safely at Wahtum Lake around midday.

The Red Flag Warning for significantly dry and unstable conditions was extended, with poor relative humidity recovery overnight on the ridgetops. While the winds were expected to stay light through that day, they were predicted to become gusty east winds that would increase through the next day.

The calm winds allowed the smoke to settle in so heavily that aviation resources spent most of the day grounded. The fire was estimated at 1,090 acres that morning, and adjusted to 3,000 acres by afternoon.

Firefighters conducted structure triage on the west side of the Gorge near Warrendale and Dodson in anticipation of the predicted shift in winds. By this time, the fire was in unified command with the Forest Service and Cascade Locks Fire Department. Task Forces from Hood River, Wasco, Klickitat, and Multnomah Counties came in to assist with structure protection and more were being ordered or en route.

September 4-5

A Type 2 IMT assumed command of the 3,200-acre Eagle Creek Fire and the 850-acre Indian Creek Fire on the morning of September 4. By 1:30 p.m., the IMT entered into unified command with the Oregon Department of Forestry and the Oregon State Fire Marshal.

Once east winds materialized on September 4, the fire began exhibiting very explosive fire behavior under strong east winds with spotting in excess of a mile. The fire burned downhill towards I-84. Mount Hood National Forest and the Columbia River Gorge National Scenic Area both issued large closure areas due to the fire activity.

By 3:30 p.m., the fire had jumped Eagle Creek and was making a push west, with the ridge to the west of Indian Springs covered in 10 to 15 spot fires. By 5:42 p.m., the fire was established between Moffett Creek and McCord Creek and continued spotting to the west, putting it near the communities of Warrendale and Dodson. Thirty minutes later, the fire had reportedly made it three miles further west, prompting the evacuations of the two communities and the closure of I-84. A Type 1 IMT was ordered at this time.

At 8:45 p.m., Multnomah County Sheriff's Offices ordered Level 3 evacuations for the communities of Warrendale and Dodson, Level 2 evacuations for East Corbett, and Level 1 evacuations for Corbett, Latourell, and Bridal Veil. The Hood River County Sheriff's Office increased all Level 1 evacuations in Cascade Locks to Level 2.

Along with reported 30 mph winds and frequent gusts to 45 mph, the temperature at 1 a.m. was still 91 degrees, and the relative humidity was at 24 percent. At 2:20 a.m. a patrol captain called dispatch to report that the fire had about doubled in size and had jumped the Columbia River near Multnomah Falls and was burning on the Washington side. He also reported the fire was surrounding Multnomah Falls Lodge.

An hour later, a Washington Department of Natural Resources employee called to report they were taking suppression actions on a 25-acre spot fire near Archer Mountain in Washington, and they were doing evacuations on Smith-Cripe Road. The spot fire quickly grew to 100 acres.

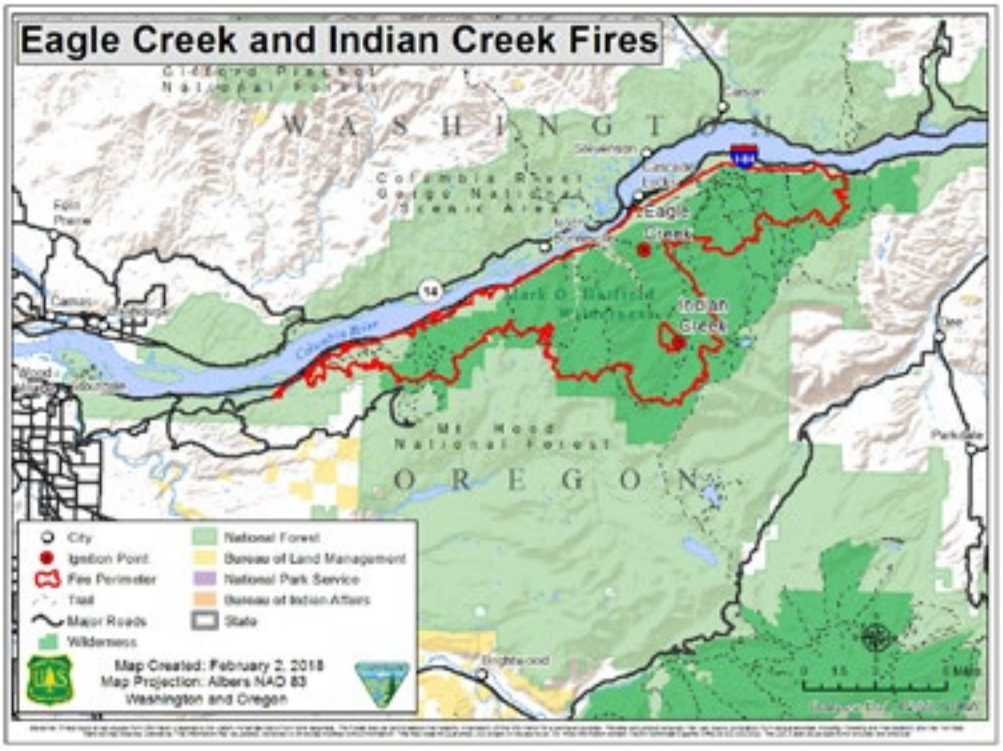
Four Oregon State Fire Marshal's Office task forces of engines were awakened during the night and sent to assist with evacuations, and structure protection, including protecting those structures around Multnomah Falls. By the morning of September 5, 1,122 residents were evacuated from residences along the I-84 corridor.

During this burn period, the Indian Creek and Eagle Creek fires merged and were estimated to be around 20,000 acres. One single residence and five minor structures were confirmed destroyed. At 10:24 a.m., the Columbia River was closed to all public and commercial use until further notice.

In this 16-hour burn period, the Eagle Creek Fire made a 13-mile run to the west, a large part of this spectacular fire behavior occurring overnight and had a spot fire cross the river and become established on the Washington side.

September 6-11

The fire was quieter but with the shift to westerly winds, the southeast corner of the fire, near Indian Mountain, became more active with some crown runs. The fire's acreage was confirmed to be 30,929 with a new estimate of three residences impacted, one of which was a primary



residence. There were 928 personnel were assigned at this point. On September 9, a Type 1 IMT was in-briefed and established unified command with the ODF and OSFM. Two days later, the containment was at 11 percent, with 905 personnel.

September 12-14

Westerly winds increased fire behavior on the east end of fire. The fire grew to 35,636 acres and crossed Herman Creek above Camp Creek. Fixed wing aircraft conducted reconnaissance over parts of the fire, but heavy smoke prevented water drops. Two minor injuries were reported. The fire was active overnight September 13, growing to 37,567 acres.

Early on September 14, air resources dropped 30,420 gallons of water. Aerial ignitions were conducted near Shellrock Mountain to prevent fire hooking back towards Cascade Locks. Hazardous air quality prompted the Hood River School District to release students two hours early and cancel school on September 15. The fire grew to 41,550 acres with 967 personnel assigned.

September 15-17

Crews conducted burnout operations adjacent to Herman Creek and were successful in securing the utility corridor. Aviation resources dropped 32,328 gallons of water on the fire. No new acreage was reported, as 1,060 personnel, including ground crews and engines, continued to confine the fire to wilderness where possible. By evening, the fire was 31 percent contained.

September 18-22

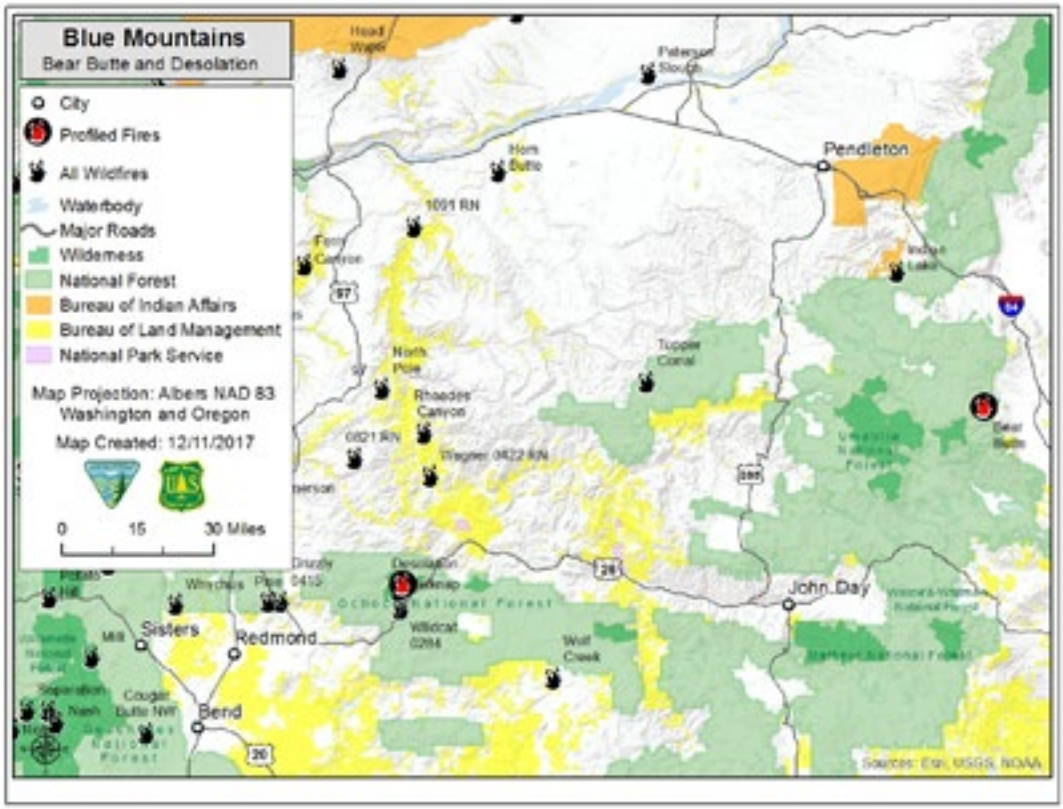
The Sheriff's Office lifted all evacuation orders in Multnomah County, and the Hood River County Sheriff downgraded evacuation levels for Hood River Valley. All evacuation levels for the fire along I-84 were lifted, but due to a flash flood advisory, exit 56 west to the county line remained on Level 1 notice.

September 23-November 30

Interstate 84 eastbound lanes were reopened, with access limited to one lane near Shellrock Mountain on September 23.

The fire was declared 100 percent contained on November 30.

Appendix F: Central & Northeast Oregon



Introduction

While many early season factors suggested the Blue Mountains might have a busy fire season, the area was unusually quiet this year. Heavy snowpack provided for abundant fine fuels, which raised concerns that human-caused fires may be a factor with the Rainbow Family Gathering on the Malheur National Forest in July followed by the Total Solar Eclipse on August 21. Neither event led to new large fires. The area had two significant fires, which are outlined below.

Bear Butte

August 4

The Bear Butte Fire was reported on the afternoon of August 4 and due to the fire spread and intensity, it became immediately managed as a Type 3 incident. Fire behavior in the initial burn period was observed as short crown runs with long-range spotting and group torching. A full suppression strategy was chosen as the fire was in close proximity to Anthony Lakes Ski Resort, 25 residences and cabins, campgrounds, and powerline infrastructure. The fire was burning in high elevation closed timber with thick timber litter understory. High temperatures, low

relative humidity, and erratic east winds were all influencing fire behavior. The rapid fire spread and lack of aerial and ground resources available prompted a quick evacuation of the campgrounds and summer homes in the immediate fire area. Approximately 50 people were evacuated in the first burn period. The Forest ordered a Type 2 IMT the first day of the incident.

August 5

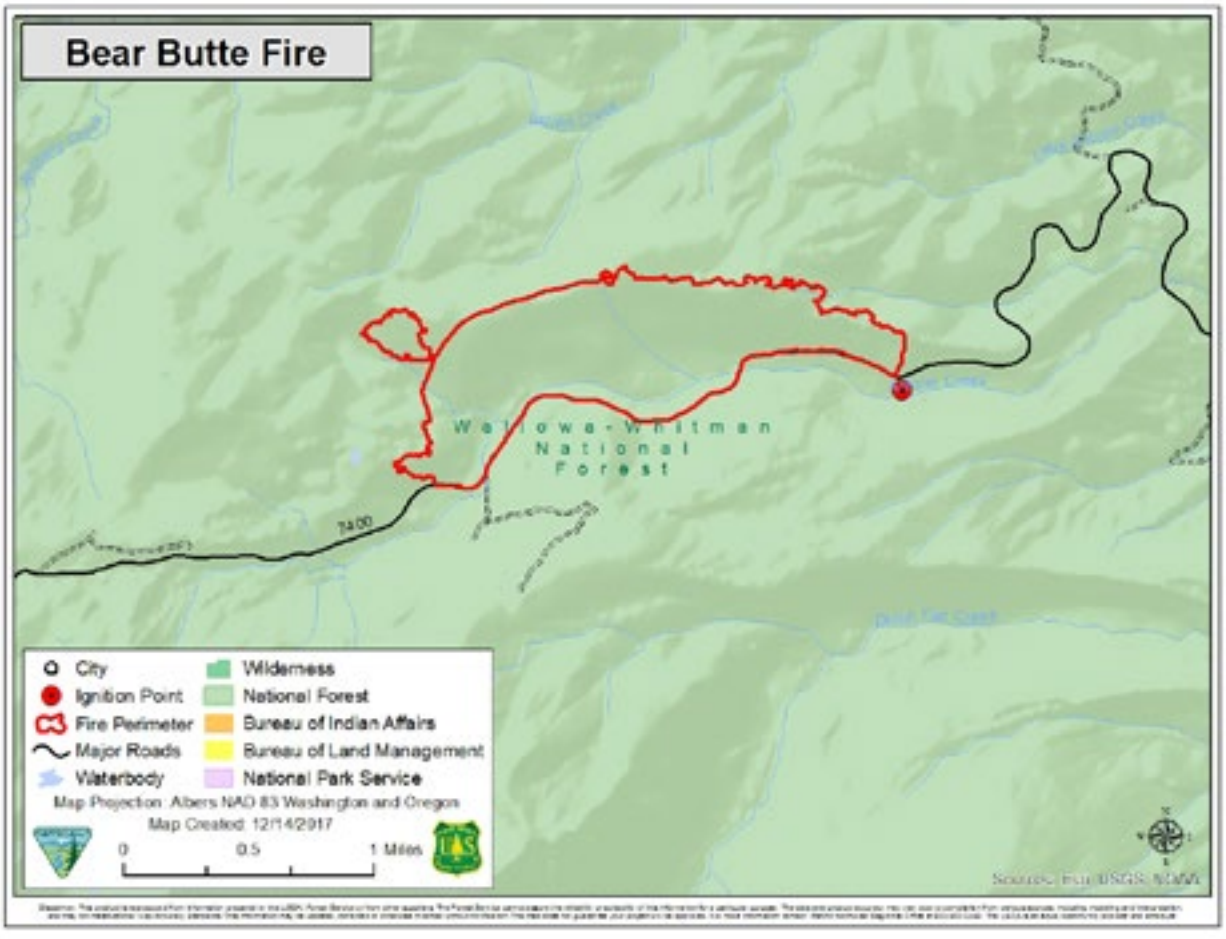
The fire size on August 5 was estimated at 350 acres and had no containment. This incident was surrounded by high values and still had the potential to spread in any direction. Due to the threats, Level 1 evacuations were ordered for the Floodwater Flats, Anthony Lakes Highway, and Anthony Lakes Ski Resort. Northwest Team 9 arrived and was in-briefed.

August 6 - August 11

With an influx of resources to assist fire managers (including line overhead and aircraft), the fire was successfully held at 499 acres. Firefighters constructed direct fireline with the use of dozers and handcrews. The weather also became milder and assisted firefighters with more moderate fire behavior that allowed for the use the direct fireline strategy.

August 12 - August 24

On August 12, Level 1 evacuations for the Flood Water Flat, Anthony Lakes Ski Resort, and Anthony Lakes Highways were lifted. The fire was showing minimal fire behavior and was 85 percent contained. Mop-up efforts continued on the incident through a transition back to the local unit on August 14 and the fire was called 100 percent contained on August 24. The Bear Butte Fire was continually mopped up and rehabilitated in areas where deemed necessary for the next three months. It was called controlled on October 2 and declared out on November 8.




Fire behavior during Initial Attack, September 4 (Bear Butte Fire)

Significance

The Bear Butte Fire was the only large fire to be assigned an IMT in Northeast Oregon during the 2017 fire season. During a record fire year in the region and with a shortage of resources regionally and nationally, this fire was held at a minimal size while threatening valuable resources.

Desolation

September 9-12, 2017

The Desolation Fire started in the Mill Creek Wilderness, about 20 miles northeast of Prineville, Oregon near the intersection of the East Fork of Mill Creek and Desolation Canyon. Due to safety concerns related to snags and steep terrain, no ground resources were initially assigned to the fire, and aircraft was used to drop water and check its growth, while obtaining better size estimates. On day three, strong wind gusts out of the northwest fanned the fire, pushing it south out of the wilderness toward private structures along Highway 26, including the 53-acre site of the Ochoco Christian Conference Center (formerly Mount Bachelor Academy), and prompting Level 2 evacuation notices for another 27 residences in the Mark's Creek area along Hwy 26 between mileposts 45-50. The fire was estimated at 2,000 acres.

September 13, 2017

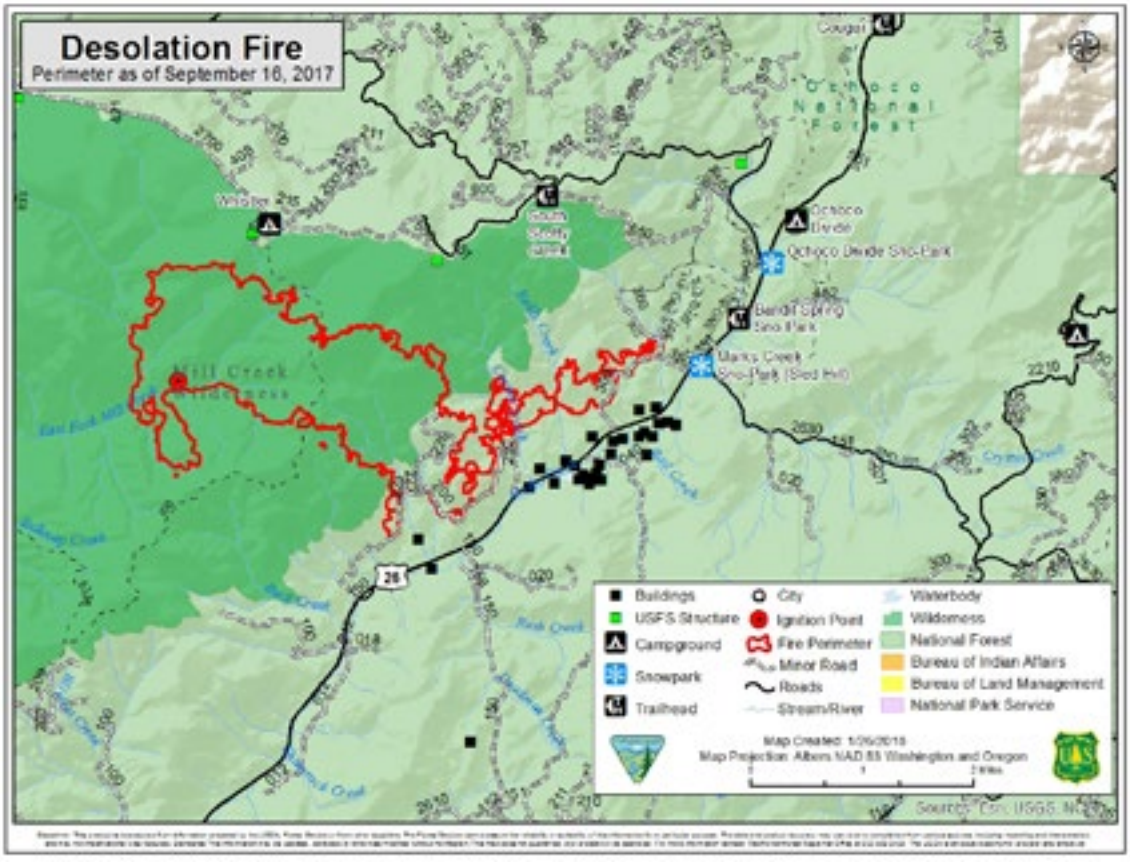
On September 13, a Type 3 Central Oregon Incident Management Team took command of the fire, with a focus on a confine and contain strategy to keep the fire north of the highway. Primary concerns for the IMT and Cooperators were related to unprotected lands and private insurance protection resources in the threatened wildland-urban interface concentration. Five airtankers were utilized, supporting ground resources by slowing the fire's progress and cooling actively burning flanks. Challenges remained with heavy fuel, warm temperatures and afternoon winds. A structure protection group began working to secure private residences in the area, and 75 firefighters were on scene, with six additional 20-person crews arriving.

Retardant drop on Desolation Fire as activity picked up near residences.

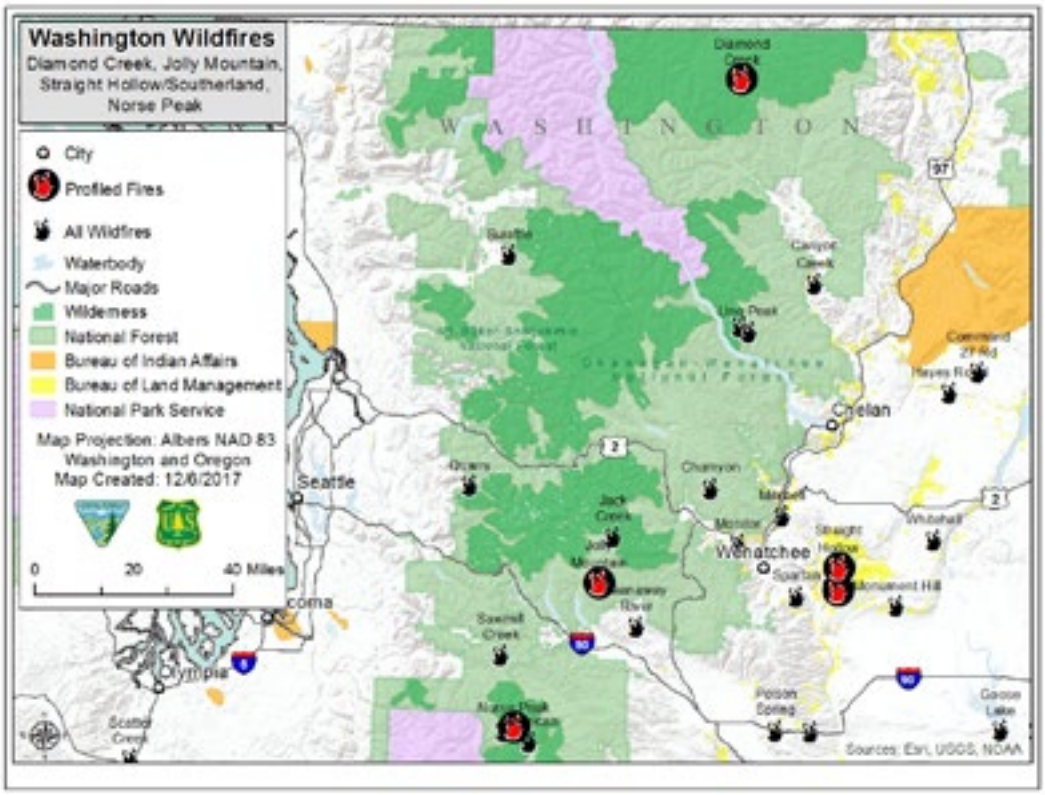
September 14-16, 2017

From September 14-16, the Desolation fire stayed within planned containment lines through gusty winds as firefighters worked through the day and into the night to keep the fire north of Highway 26 and protect adjacent private residences. Crook County lowered the evacuation notice for homes in the Mark's Creek area to a Level 1 (Get Ready).

Firefighters continued prepping the northern containment line along Forest Road 27 with feller bunchers and other heavy equipment to form a "catcher's mitt" should the fire grow toward the northeast. Crews also removed fuels around Whistler Campground and Bingham Springs Trailhead and around private property near the highway. The fire was mainly a ground fire, burning through dead and down timber and shrubs within the 2000 Hash Rock Fire scar. On September 16, Central Oregon experienced wetting rain, with some snow falling on the Desolation fire, helping reduce fire activity and clear smoke from area wildfires.



Appendix G: Washington



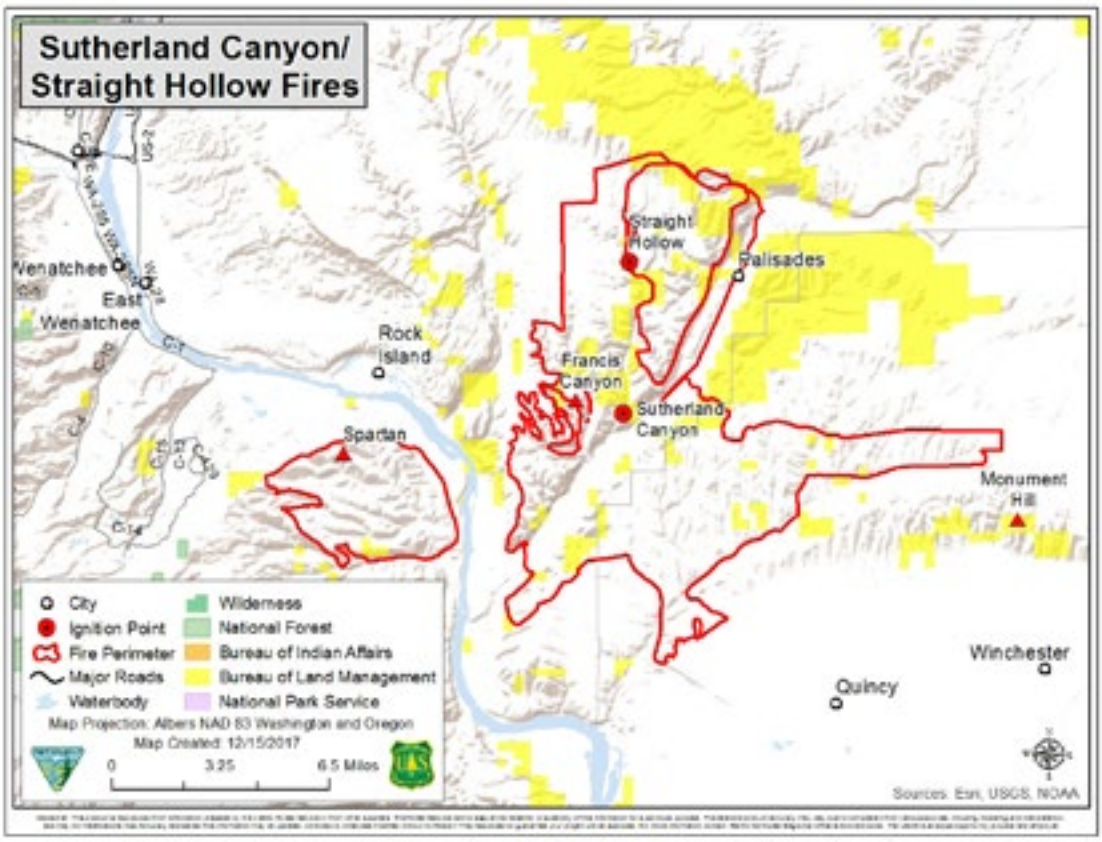
Introduction

The 2017 fire season in Washington demonstrated the same unusual trends seen across different areas of the Pacific Northwest. It was a relatively mild season in terms of the number of fires and overall acres burned. However, large fires occurred in unexpected places, which are typically considered too wet and temperate to burn, or at least burn readily. One item of note: 91 percent of the fires in Washington in 2017 were human-caused. The following sections document significant fires in Washington during the 2017 fire season.

Sutherland Canyon/Straight Hollow

The Sutherland Canyon and Straight Hollow fires developed rapidly from several lightning strikes in grass on June 26, approximately 9-20 miles south of Wenatchee, WA in Chelan, Grant, and Douglas counties. Five of these fires in the Palisades area about eight miles southeast of Wenatchee quickly burned together and were called the Sutherland Canyon Fire. The Straight Hollow Fire was located near East Wenatchee in Douglas County.

Type 3 incident commanders handled each fire initially, but severe to extreme burning conditions, impacts to greater sage-grouse habitat, evacuations, and steep, inaccessible terrain prompted an order for a Type 2 incident management team. The team took over both fires plus the Spartan Fire on June 28. Both fires spread rapidly in the flashy fuels under high winds. Level 2 evacuations were ordered for central Grant County and Level 3 evacuations in the Palisades Road corridor in connection with the Sutherland Canyon Fire.



Since grass-dominated fuels burn out quickly, containment was 50 percent on the Sutherland Canyon Fire and 75 percent on Straight Hollow Fire by June 29. Level 2 evacuations for Grant County were downgraded to Level 1 on June 29; Level 3 evacuations downgraded to Level 1 for the Palisades Road corridor on June 20, and all evacuation orders lifted by July 1. Traffic accidents closed Highway 28 on June 30, making travel to and from Sutherland Canyon Fire more difficult. Sutherland Canyon Fire also burned an abandoned homestead structure. Although firefighters originally thought that Sutherland Canyon and Straight Hollow fires had burned together, better mapping found that they had not. By July 2, full containment was reached for both fires.

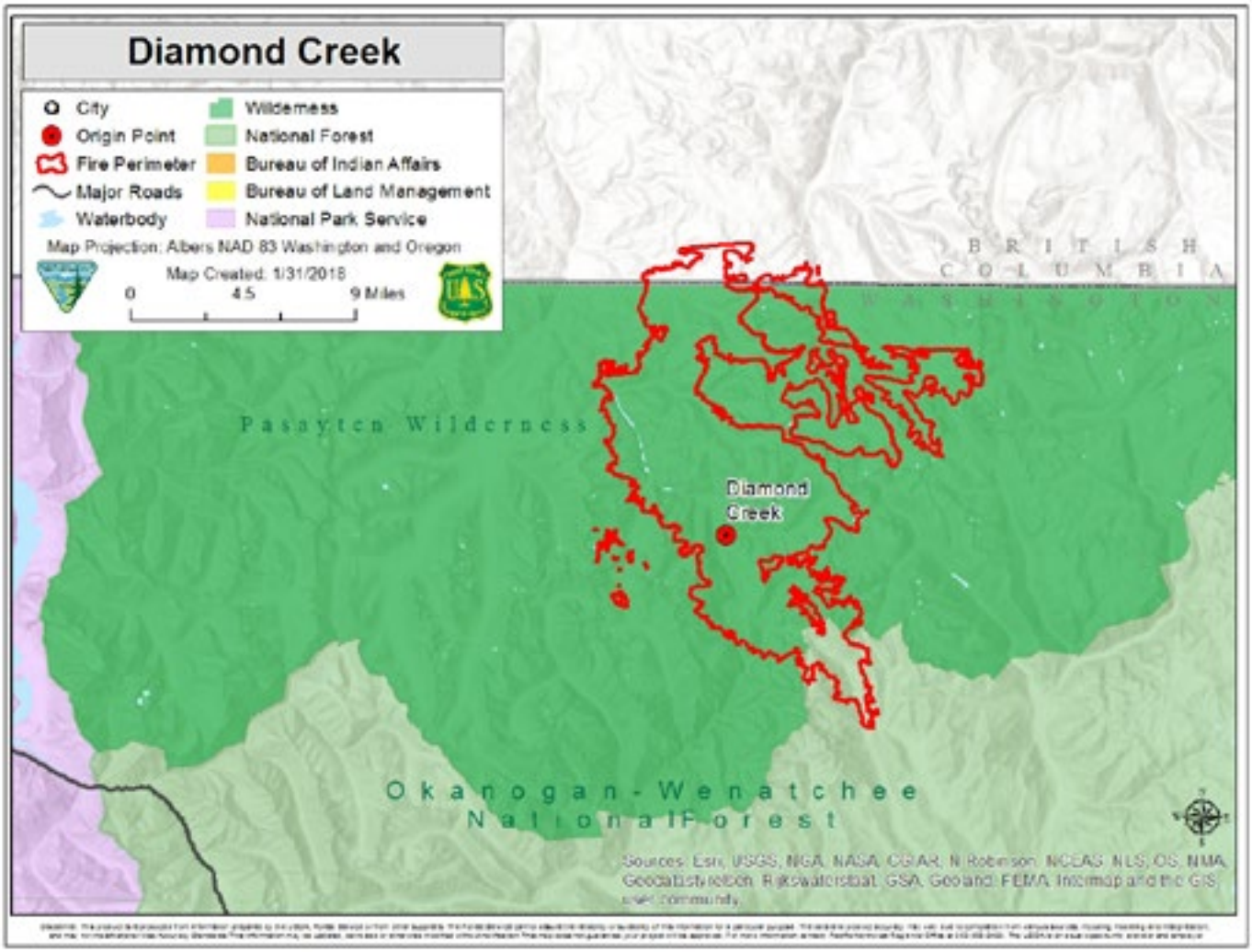
Significance

Approximately 4,900 acres of greater sage-grouse habitat burned and threatened several residences.

Diamond Creek

July 23

On the morning of July 23, the Diamond Creek Fire was reported deep within the Pasayten wilderness on the Methow Valley Ranger District of the Okanogan-Wenatchee National Forest, about six miles south of the Canadian border in very rugged terrain. Investigators later determined the cause of this ignition was an unattended campfire. Local fire managers responded with full suppression tactics to keep the fire as small as possible and within the wilderness area. A full load of smokejumpers from the North Cascade Smokejumper Base staffed the fire shortly after it was reported. The fire was one-half acre when initially reported, but within a few hours had grown to three acres. The fire was burning in continuous heavy dead and down fuels in thick, high elevation forest. The fire behavior was creeping, with single and group tree torching and short-range spotting. Several aircraft



were ordered to make bucket drops along the east side of the fire and multiple crews were ordered the first day. By the end of July 23, the fire was estimated to be 30-35 acres and a Type 3 incident management team was ordered to take command of the fire the following day.

July 24-29

Fire managers established communications with Canadian firefighting officials in the first week after the fire ignited. Several handcrews were flown in to assist the smokejumpers in suppression efforts. However, above-average temperatures, low relative humidity, poor overnight humidity recoveries and higher than average wind speeds hampered the containment efforts. As a result, Forest management closed several trails in and around the fire. The fire continued to grow, making significant runs of several thousands of acres on July 28 due to a dry cold front passage, resulting in spotting ¾-1 mile ahead of the active front. A short Type 1 incident management team was ordered and took command of the fire on July 29.

July 30–September 3

The team's initial strategy was to keep the fire within the Pasayten Wilderness and protect various key areas threatened by the fire. Several cabins at Billy Goat Trailhead and Hidden Lake ahead of the fire were wrapped in fire resistant material and crews prepared the area around the cabins to help protect them if the fire front should pass those areas. Over the next few weeks, the fire continued to grow daily within the wilderness and the confine strategy seemed to be the best option for fire managers for firefighter safety. The weather continued to be hot and dry with dry cold front passages and no significant precipitation. Management of the fire switched from a Type 1 incident management team to a Type 3 team and then to a Type 2 team in the month of August. By the end of August, a local Type 4 incident commander was handling

Diamond Creek Fire, July 28

the fire. In addition to public and firefighter safety, Forest managers were concerned about habitat for lynx, bull trout and northern spotted owls.

August 29-31

The fire experienced a second day of substantial fire growth on the north and northwest flanks that pushed the fire across the US border and into Canada. The fire increased by 16,196 acres, and burned an estimated 300 acres in Canada. Fire managers coordinated efforts with the British Columbia Ministry of Forest Land and Natural Resource Operations. By August 31, the fire had burned 52,681 acres in the United States and 4,200 acres in Canada.

September 1–15

In early September, the fire held between 50,000 and 60,000 acres under the confine strategy. With an abundance of dead and down timber and critical fire weather in place, the fire made a significant run on September 4. In this burn period, it grew to 100,000 acres, with 90,000 acres in the United States and 10,000 of those acres in Canada. During this time of rapid fire growth, the Okanogan Sheriff's Office ordered Level 1 evacuations for the communities of Mazama, Lost Creek and Rendezvous. The fire threatened approximately 500 residences and 50 nonresidential commercial properties. However, several other fires in the Northwest also made significant runs on September 4 and 5, resulting in severe resource shortages and Diamond Creek rated as a lower priority.

On September 9 cooler weather slowed fire spread and additional firefighters arrived. The fire had burned 91,750 acres in the US and had grown to 19,845 in Canada.

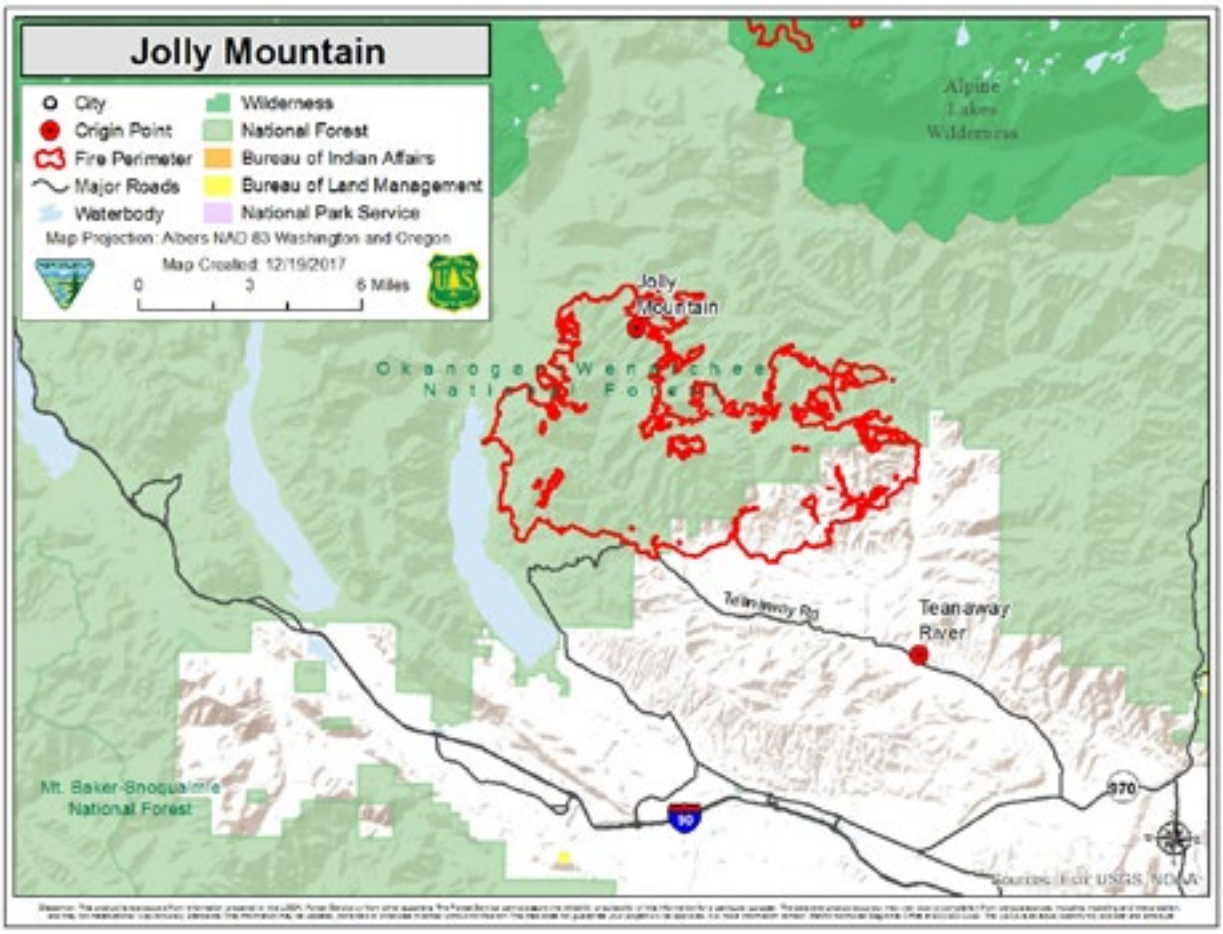
By September 12, acreage was 95,000 in the United States and 20,593 in Canada.

On September 15 a National Incident Management Organization (NIMO) team took command of the incident. The fire was 30 percent contained, and had burned 98,390 acres in the United States and 23,610 acres into Canada.

September 16-30

On September 16, cool moist weather in the area began to moderate fire behavior, and by September 19, crews completed fireline and began suppression repair work. The fire was at 129,000 on September 20 and containment increased to 65 percent. Containment climbed steadily and was at 79 percent on September 25. The NIMO transferred command to a local Type 3 organization on September 27. Final acreage was 97,140 in the United States and 31,132 in Canada.

The fire was 85 percent contained on October 3, and it reached full containment on October 15.



Jolly Mountain

August 11-23

The Jolly Mountain Fire was detected on August 11, 2017 on the Cle Elum Ranger District of the Okanogan-Wenatchee National Forest. It was one of several lightning ignitions two miles inside the Teanaway Inventoried Roadless Area. The Cle Elum District initially responded with an engine crew, hand crew, and dozer, which was used to reopen the road to the original trailhead. Two of the more experienced firefighters hiked about two miles into the fire area and reported the fire was too active for ground crews and there were no good anchor points to build fireline from. Much of the area had at least 90 percent standing dead from more than a decade of spruce budworm activity. No aircraft or aerially delivered firefighters (smokejumpers or rappellers/helitack) were available. As the fire did not meet the necessary criteria to make it a priority fire for resources, fire managers developed a confine/contain strategy.

Collectively, the fires threatened campgrounds, commercial buildings and over 500 structures within a high visitation recreation area with major trailheads. The area was also critical habitat for northern spotted owl. Steep slopes, rugged terrain and the distance from road systems limited access to these incidents.

The Jolly Mountain Fire quickly grew to 100 acres on August 11 and was at 300 acres by August 12. A Type 2 incident management team assumed command of the fire on August 13 to address fire growth, extremely dry conditions, and the potential threat to residences and nearby communities. Firefighters began to work on indirect control lines in efforts to protect homes, resources, and other values at risk. The management team used heavy equipment to construct indirect fireline and point protection. By August 18, the fire had potential to threaten 1385 single residences and 1,403 minor structures.

August 24-25

The fire grew modestly for the first 10 days, reaching an estimated 638 acres on August 21, burning in bug-killed forest. By August 24, the Jolly Mountain Fire had grown to 1,735 acres, prompting the team to establish night operations to observe fire behavior and monitor fire effects. That evening, the Kittitas Sheriff's Office issued Level 2 evacuation notices to residents of the Salmon La Sac, Paris Creek and Boulder Creek areas. On August 25, the Sheriff's Office expanded the Level 2 evacuation area to include residents of Morgan Creek, Bell Creek and Timber Ridge communities on Lake Cle Elem. The Forest Service also closed the Upper Cle Elem Valley to public access.

August 26-29

A Great Basin Type 2 incident management team took command of the fire on August 26. On August 27, as the fire continued to spread actively under hot, dry conditions, The Nature Conservancy closed its lands on Cle Elem Ridge to public access and the Washington Department of Natural Resources closed state lands north of the West Fork and west of the North Fork Teanaway River.

August 30-31

Strong westerly winds on August 30 increased the fire to an estimated 8,000 acres, almost doubling it in size. A day later, with acreage now at 11,496, the fire threatened several communities. The Kittitas Sheriff's Office ordered Level 3 evacuation notices for the Teanaway River corridor after the fire made a 3-mile run to the east. Numerous spot fires grew together as well and threw more embers ahead of the main fire. Because of the terrain and fire behavior, firefighters used indirect tactics, such as burning out along roads.

September 1-2

Firefighters reported extreme fire behavior September 1-2, such as rapid surface spread, group torching, short crown fire runs, and spotting ¼ to ½ mile ahead of the fire. On September 2, the Kittitas Sheriff's Office expanded the Level 3 evacuation area to include all residents north of the Double O Ranch Road to Boulder Creek and issued Level 2 evacuation notices for the area south of the Double O Ranch Road, including the communities of Ronald and Roslyn. On September 2, the Seattle Times ran a story about the Jolly Mountain Fire titled "3,800 Homes in Peril."

September 3-7

By September 3, nearly 1,000 people had been evacuated. Extreme fire behavior continued, with aggressive surface spread, short crown fire runs, flanking, and long range spotting 1/4 to 1/3 mile ahead. Night and day shifts reportedly extinguished numerous spot fires. The Washington State Governor declared a State of Emergency over wildfire concerns.

"Ash Falls like Snow in Seattle," the Seattle Times reported on September 4. A Type 1 incident management team assumed command of the fire and firefighters completed construction of indirect fireline and conducted successful burnout operations to halt fire growth towards communities at risk. The fire was at 20,975 acres.

By September 5, with 775 personnel assigned, the fire was at 24,514 acres and 5 percent containment. On September 6, 128 soldiers and 50 vehicles arrived from the Washington National Guard to assist firefighters, bringing with them mobile day-sleeping barracks for the night shift crews, security personnel, and two Type 2 firefighting hand crews. Forty-five state-mobilized fire engine structure protection groups continued to assist in protecting homes and communities threatened by the fire.

On September 6 with 831 firefighters on scene, the fire had 20 miles of active fireline with structures in close proximity with fuels at record dry conditions. The fire had aircraft, crew, and middle management shortages, and there was extreme fire behavior in this fire and other fires both nationally and regionally. The Kittitas Sheriff's Office issued Level 1 evacuation orders for the town of Cle Elum.

Jolly Mountain Fire July 28

By September 7, burning conditions began to ease and crews started gaining on the fire. Cold fronts with cooler temperatures, higher relative humidity, and some moisture began to replace thermal troughs. Firefighters began mop-up on cooler portions of the fire.

September 11-October 15

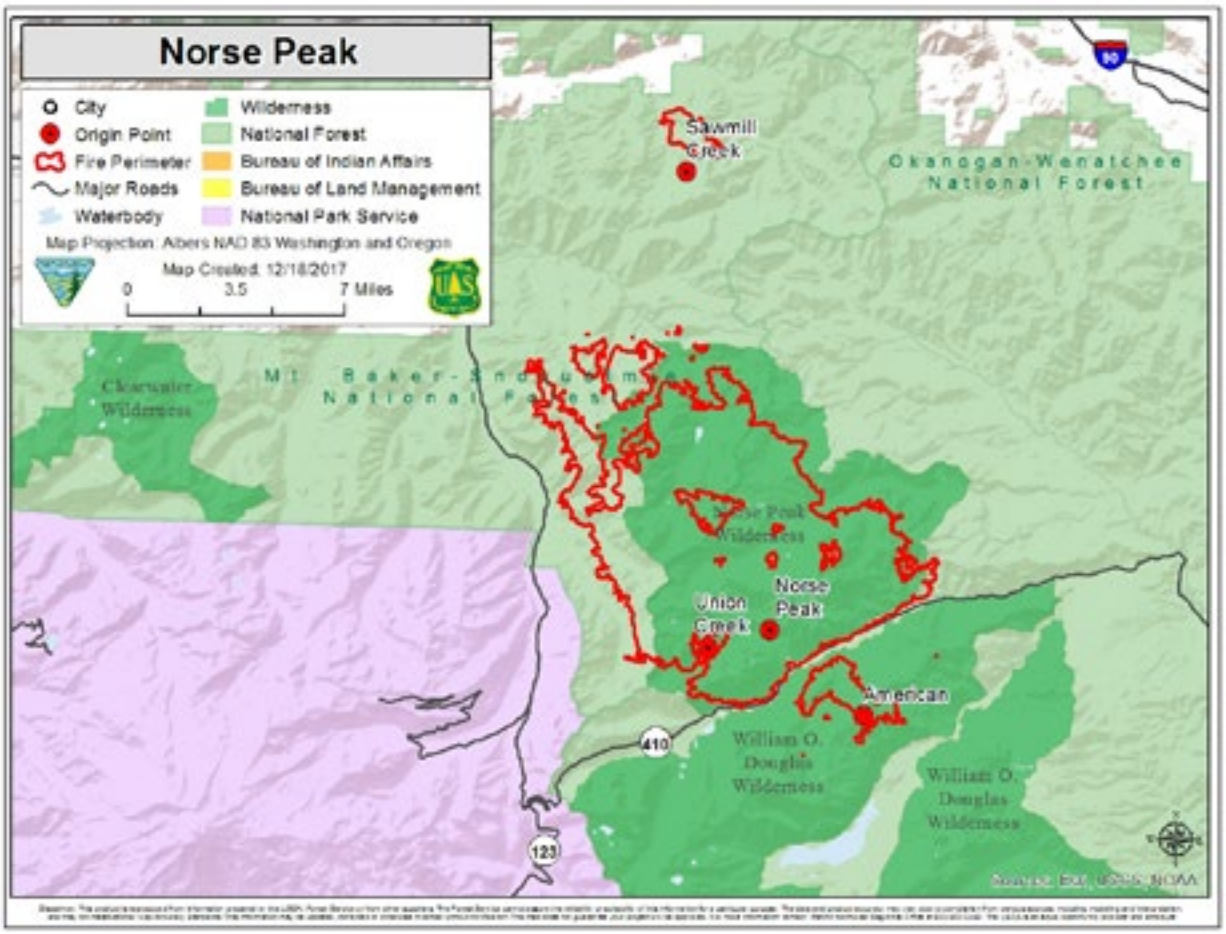
On September 11, the first phase of evacuation level reductions from 3 to 2 began in the Teanaway area. On September 13, the Sheriff's Office reduced the evacuation level to 2 in the Driftwood Acres and Pineloch Sun areas and did the same for all residents between Bear Creek and Night Sky Drive.

On September 18, with the fire 36,808 acres and 40 percent contained, and with significant rain on the fire, a Type 3 incident management team assumed command. Over the remainder of September, the Type 3 incident management team completed mop up, backhauling equipment, removing hazard trees along roadways, and repairing damage resulting from fire suppression activities. The fire reached 50 percent containment on September 25 and on September 28 the Sheriff's Office lifted all evacuation orders.

The fire was contained on October 15.

Significance

The Jolly Mountain fire burned in a part of the Okanogan-Wenatchee National Forest that had not had a major wildfire for several decades. Much of the fire was in inaccessible terrain and resulted in numerous evacuations. The Seattle Times published two articles when smoke and ash from this fire and the nearby Norse Peak Fire drifted into the Puget Sound area.



Norse Peak

August 11-17

Lightning started several fires within the Norse Peak Wilderness on the Okanogan-Wenatchee National Forest between August 11 and 13. The fires were burning in thick continuous high elevation forest with heavy dead and down from bug-kill in steep, rugged, and remote terrain.

By August 14, there were nine fires burning in the Norse Peak Wilderness with Norse Peak Fire as the largest one. Fire managers estimated the size of all fires together at approximately 500 acres growing to approximately 1,200 in the next few burn periods. Because of the fire locations, fuel types, and resource shortages, fire managers chose the initial strategy of confinement to the wilderness. Firefighters began preparing alternate indirect fire lines in case the fire made a push out of the wilderness. By August 17, the Yakima Sheriff's Office issued Level 3 evacuations for the Union Creek community and Level 1 evacuations for Goose Prairie and Bumping Lake. Highway 410 was also closed. Several values were at risk including 110 recreational residences, threatened and endangered species habitat, the Pacific Crest Trail, Naches Watershed and Crystal Mountain Ski area. Fire behavior was extremely active with short crown runs, group torching, and short ranged spotting.

September 18-27

Due to values at risk and the complexity of the incident, the Forest ordered a Type 2 incident management team that assumed command on August 18. Firefighters were conducting firing operations in the Union Creek cabin areas and preparing indirect line on the Highway 410 corridor. The team's objectives were to confine as much of the incident to the wilderness while continuing point protection and conducting firing operations where


Norse Peak Fire from Raven Roost

NORSE PEAK FIRE

DISCOVERED AUGUST 11

PERSONNEL 730

CAUSE

20M

52,056 ACRES

4 INJURIES

% Burned by Jurisdiction

USFS - 100%

STRUCTURES LOST OR DAMAGED 1

CONTAINED NOVEMBER 1

necessary. Fire weather reached critical levels with above average temperatures and the passage of several dry cold fronts. The national and regional demand for resources left the incident with many unfilled resource needs including Hotshot crews and Air Attack Group Supervisors. During this time, the fire grew moderately within the wilderness boundary, reaching 2,173 acres and eight percent containment by August 27.

August 28-September 4

By August 28, most of the state of Washington was under the influence of a thermal trough. The resulting unstable air mass created extreme burning conditions in the Norse Peak Fire area. Temperatures were in the 90s with relative humidity in the low teens. Winds on the afternoon of August 28 reached 15-20 mph on the higher elevations of the fire. These conditions caused extreme fire behavior. Over the next several burn periods the fire grew from approximately 3,900 acres to 17,000 acres by September 1, the same day a new team took command of the incident. The sudden large growth of the incident put Crystal Mountain Ski Area at an immediate threat with the fire within two miles. It crossed the Pacific Crest Trail and threatened communication buildings on the top of Ravens Roost.

Over the next few operational periods, the incident grew moderately within the wilderness boundaries. However, a similar weather event to the one that occurred on August 28, repeated itself on September 5. High temperatures, low relative humidity, and high winds gusting to 35 mph caused the fire to rapidly grow from 20,000 acres to 43,500 acres in just one burn period. This prompted the additional Level 3 evacuations of Pleasant Valley and Timber Creek. The amount of threatened structures increased from 110 to 320 as a result of the run. As other fires in the region continued to burn, the availability of any additional resources were slim. The fire crossed the Pacific Crest Trail to the west and burned its way out of the wilderness immediately threatening the Crystal Mountain Ski Area. The south side of the incident burned its way down to Hwy 410 and was held in check by previous work done to improve the highway. To the east, efforts were still being made to prepare roads to burn off if needed. The fire continued to burn to the north through the wilderness where it was monitored. On September 7, the Army National Guard and Air National Guard joined firefighting efforts. They supplied several hand crews, dispatchers, vehicles, security, and helicopters to aide with suppression efforts. By September 10, the fire was approximately 50,000 acres.

September 19-November 1

On September 19, the fire received its first significant precipitation as a storm system moved into the region. This was the first precipitation the fire area had seen in over 90

days. This occurred on the same day a Type 1 team took command of the incident. The weather event brought 2 to 4 inches of snow to some locations on the fire above 5,000 feet. This event had a significant impact on fire behavior and fire spread was limited for the remainder of the month. The fire grew to its final size of 55,909 acres, mostly within the wilderness. By September 22, all evacuations were lifted in the fire area due to the weather event. The change in weather brought a change in objectives. The focus switched from suppression, mop-up and line construction to fire rehabilitation work. On September 28, the fire was returned to the local unit to manage. Rehabilitation efforts continued for the remainder of the month with two local organizations managing the fire on either side. In early October, a Burned Area Emergency Response Team (BAER) came to the incident to evaluate the post-fire threats to the public and to identify mitigation needs for those threats. By November 1, the fire was called controlled.

Uno Peak

August 30-31

At about 8 p.m. August 30, a wildlife officer reported seeing flames near South Navarre Campground on the Okanogan-Wenatchee National Forest. A second reporting party estimated the fire to be approximately an acre in size on steep slopes on the northeast side of Lake Chelan near Uno Peak. The area was experiencing critical fire conditions. With high temperatures, low relative humidity and fuel moisture contents at critical levels, the decision was made to order a load of smokejumpers and aerial support to conduct reconnaissance of the incident early the next morning.

The following morning, air attack reconnaissance reported the incident as two separate fires, one 40 acres and another likely spot fire from the first ignition was at 10 acres. The fires were approximately a half mile east of the Sawtooth Wilderness with structures threatened near Lake Chelan. One structure was approximately a quarter mile from the incident, prompting an order for scooper planes and fire bosses. The load of jumpers was unable to staff the incident, named the Uno Peak Fire, due to mechanical issues and returned to Twisp. Some aerial resources were diverted to other priority incidents and the fire was staffed by fire bombers, helicopters and helitankers for most of the first shift. At 4 p.m. a Type 2 incident management team was ordered and by 5 p.m., the size the fire had grown to 90 acres prompting area closures on nearby trailheads and campgrounds.

September 1

By the morning of the September 1, the fire was still burning very actively with short uphill crown runs, spotting and creeping in all directions and was estimated at 400 acres. The initial management strategy was to utilize existing roads, construct new dozer lines and connect past fire lines to complete an indirect line to the northeast, east, and south east side of the fire.

The indirect strategy was chosen due to the fact the incident was burning in the Rex Creek burn scar from 2001 and had a large number of snags that presented safety issues to firefighters on the ground. There were also extensive logistical issues with the remoteness of the fire and poor road conditions for ground resources to reach the fire line. Travel time to the incident was two hours from camp, prompting the decision to build a spike camp to mitigate travel times. The fire was now threatening the historic Crow Cabin, as well as, the endangered White Bark Pine, which was scattered throughout the higher elevations of the incident. The extensive fire load in Oregon and Washington meant air and ground resource availability was scarce and many orders for additional support were not filled.

September 2

On September 2, the Type 2 Team assumed command of the fire, which was estimated to be approximately 900 acres with 109 personnel. The team continued to monitor the spread to the north and continue the indirect line construction to the northeast, east and

Uno Peak Fire on September 4, 2017

southeast side of the incident. A separate 75-acre fire was reported two miles northwest of the Uno Peak fire, called the Ferry fire, which was also to be managed by the incident management team on the Uno Peak fire. Due to the fire's location within the Sawtooth Wilderness, the incident would primarily be monitored. This would make for larger forest closure areas. Trail closures included the Uno Peak Trail, Safety Harbor Trail, a portion of the Summit Trail and Summer Blossom. Hot and dry conditions continued to persist over the fire area.

September 3

Under critical fire weather conditions, (near record high temperatures, low relative humidity and gusty winds) on September 3, the fire grew from approximately 900 acres to 2,151 acres. The fire spread across Safety Harbor Creek prompting Level 1 evacuations to structures and inholdings south and east of the fire. During the run the historic Crow Cabin burned. Helicopters and tankers were still being utilized to slow the fire spread directly as hand crews and equipment bolstered control lines to the southeast of the incident on Coyote Ridge.

September 4

After crossing Safety Harbor Creek, the fire had a wind and slope alignment that triggered an uphill/up-drainage run on September 4, causing extreme fire behavior and spread in the Safety Harbor Creek drainage. The fire grew from approximately 2,400 to 6,000 acres in a single burn period. The spread was mainly to the north and west and prompted more Level 1 evacuations to the Llama Ranch and Canoe Creek areas, threatening an additional 13 residences and 22 other minor structures. Despite the extreme fire behavior and rapid growth, the fire remained within the planned containment lines. The spike camp was set-up and operational for use at Gold Creek.

September 5

With critical fire weather conditions persisting on September 5, the fire spread was unexpectedly low the following day. The smoke of wildfires burning in Montana covered the Uno Peak fire area, causing temperatures to be lower and relative humidities to be higher than forecast. This moderated fire behavior on the incident but caused visibility issues for air

and ground resources. The fire had reached the 8200 Road and ran up Safety Harbor drainage to Chelan Ridge but was slowed by sparse fuels and rocky terrain. Crews constructed indirect handline to the lake down Coyote Ridge, continued road preparation efforts, and plumbed hose lines on the existing dozer lines. A structure group began structure protection and preparation efforts in the Llama Ranch area.

September 6-9

For the following three days, the heavy inversion of smoke from other fires was still an influence and had grounded all aviation assets due to poor visibility. During this time, the fire continued to spread moderately in heavy fuel loads. Line preparations on Coyote Ridge were completed down to the lake and resources were relocated to the Nelson Butte area (one ridgeline closer than Coyote Ridge) to begin prepping dozer lines there. The structure group completed structure preparations at Llama Ranch and had moved north to the structures at Canoe Creek to begin efforts there. The acreage, with the addition of the Ferry Fire, was 7,236 by September 9. Air National Guard helicopters arrived and conducted bucket work on the east flank of the fire allowing ground crews to continue line preparation on Nelson Ridge. Divisions on the north end scouted options for inserting Hotshot crews to begin a direct attack.

September 10-14

Crews were inserted by boat to the bottom of Nelson Butte Ridge to begin uphill line construction to tie in with dozer line. Masticators began work on Nelson Ridge removing fuels and widening the fuel break made by the dozers. Crews began direct attack on Sawtooth Ridge using a combination of hand line, check line and cold trailing to tie the north end of the fire into the rocks. Structure protection preparations in Canoe Creek were around 75 percent completed. Fire behavior would remain minimal with higher relative humidities and lower temperatures. Burning operations began on Nelson Ridge and a night shift was implemented to monitor the burn operations from the day shift. Infrared flights made by the National Guard showed that at some point during the days of limited visibility, the Ferry and Uno Peak fires merged in the wilderness.

September 15-20

A significant change in the weather slowed burning conditions. Four days of precipitation were forecast with snow levels falling to around 5000 feet. The weather changed the strategy of the team from direct suppression and burnout strategies to monitoring the existing burn, as well as backhaul and suppression repair efforts. Hose backhaul, road brushing and chipping, line rehabilitation, breaking down pumps and sprinkler systems on structures and demobilization of extra resources began as the precipitation moved into the fire area. By September 20, most of the fire above 5000 feet had seen as much as four inches of snow and below 5000 feet, significant rain stopped fire spread. The fire was approximately 8,750 acres. A Type 3 local team took over the fire on September 20 and continued monitoring the incident and overseeing repair work.

September 21-October 24

The local unit continued with suppression repair and backhaul efforts for the next month. The fire grew some within containment lines to its final footprint of 9,500 acres. The fire was called contained and controlled on October 24.

Sawmill Creek

September 4-5

The Sawmill Creek Fire started September 4 on the Mount Baker-Snoqualmie National Forest north of the active Norse Peak Fire. Steep rocky terrain, smoky conditions, and limited road access hampered the local and state responders. Initial air and ground operations were hampered the first 48 hours of the fire due to heavy smoke from both incidents. Responding agencies took a defensive stance for the first couple of days for firefighter safety due to the smoke, terrain difficulties, and fire activity.

September 6-8

A Type 3 Southeast Washington Interagency Team assumed command of the Sawmill Creek Fire on September 6, and held a public meeting at the Greenwater Fire Department to discuss evacuations and closures with the Greenwater, Alta Vista, and Crystal Mountain Resort communities.

September 9-10

A Type 2 Southern California Team assumed command of the Sawmill Creek Fire on September 9. The operational strategy remained the same—providing for firefighter and public safety followed by protecting natural resources and infrastructure.

September 11-16

On September 11, the IMT also took over management of the North Zone of the Norse Peak fire. The Norse Peak was divided into a North and South Zone by the Pacific Crest Trail. This allowed resources to mobilize each day from the Enumclaw Incident Command Post, which was closer to their assigned divisions along the North/Western flank of the Norse Peak fire.

Fire behavior was moderate through the second week of September with sunny skies and daily humidity levels dropping down to the 20 percent range.

September 17-19

Sunday, September 17 saw a big change in the weather with cooler temps, higher humidity and moderate to heavy rain at times. Due to the precipitation and moderating fire behavior, all three fires in the area were brought under the command of one team. A Type 1 Pacific Northwest Team assumed command of the South Branch of the Norse Peak Fire on September 17. The following day, they assumed command of the Sawmill Creek fire and the North Branch of the Norse Peak fire.

September 20-23

By September 20, all planned operations were complete and the fire was placed in monitor status. On September 23, the Sawmill Creek fire was transferred back to the local Washington Department of Natural Resources, South Puget Sound Region.

Appendix H: Post-Fire Response & Recovery

An experienced trails group worked on sections of the Herman Creek Trail and the Pacific Crest Trail, January 18, 2018

Fire Suppression Repair

Fire suppression repair is the first phase in recovery efforts where crews repair damages resulting from fire suppression activities and restore the area as close as possible to a "pre-event" state. Crews repair hand and mechanical fire lines, roads, trails, staging areas, safety zones, and drop points constructed as part of the fire suppression efforts.

Emergency Assessment and Mitigations: Burned Area Emergency Response/Stabilization

The second phase of post-fire response and recovery is an assessment of natural and cultural resource damage and identification of rehabilitation and restoration needs using Burned Area Emergency Response (BAER) teams.

The BAER teams assemble very soon after a fire is contained, or even before a fire is contained on very long-duration fires, to conduct a rapid assessment of burned watersheds. This team of specialists and experts evaluate and identify imminent post-wildfire threats to human life and safety, property, and critical natural or cultural resources. They identify emergency stabilization measures to take before the first major storms of the season arrive. High intensity fires can result in loss of vegetation, increased exposure of soil to erosion, and increased water runoff that may lead to flooding, increased sediment accumulation in rivers and streams, debris flows, spread of invasive plants, and damage to critical natural and cultural resources.

Teams develop a Soil Burn Severity (SBS) map to document the degree to which soil properties had changed within the burned area. Fire damaged soils have low strength, high root mortality, and water repellent properties that increase water runoff and erosion. Using the SBS map, the BAER team members run models to estimate changes in stream flows and debris flow potential. In general, the higher the soil burn severity, the larger the watershed response and the higher the risk of erosion and flooding. The findings provide the information needed to prepare and protect against serious post-fire threats. Emergency stabilization measures may include mulching, installation of erosion and water run-off control structures, temporary barriers to protect recovering areas, and installation of warning signs. The BAER work may replace fire-damaged facilities critical to public safety, such as guardrails; remove safety hazards; prevent permanent loss of habitat for threatened and endangered species, prevent the spread of invasive plants, and protect critical cultural resources.

Rapid Assessment and Long-Term Recovery

The third phase is the long-term recovery, or restoration, work, also referred to as burned area rehabilitation in the BLM and post-fire recovery in the Forest Service. Region 6 of the Forest Service uses a Rapid Assessment team process to evaluate these long-term recovery needs, including timber salvage. The BLM uses the same team that identifies emergency stabilization needs. Rehabilitation work in

both agencies consists of non-emergency actions to improve fire-damaged lands that are unlikely to recover naturally and to repair or replace facilities damaged by the fire that are not critical to life and safety. This phase may include restoring burned habitat, reforestation, other planting or seeding, monitoring fire effects, replacing burned fences, interpreting cultural sites exposed or damaged by the fire, treating invasive plants, and installing interpretive signs.

Bureau of Land Management

Burns District

The Cinder Butte, Coyote, and Upper Mine fires on Burns District have emergency stabilization and rehabilitation plans. Collectively, these fires affected 56,885 acres of lands managed by the BLM. Teams identified needs for seeding and invasive plant control on all three fires. The Cinder Butte and Upper Mine fires both identified cultural resource protection needs, and repair or replacement of damaged fences, gates or cattleguards. On the Cinder Butte Fire, the plan identified sagebrush planting as a need and the District requested funds for soil stabilization and water diversion structures on Upper Mine Fire. In addition, the Upper Mine Fire plan includes closure of much of the fire area to livestock grazing. The post-fire work is intended to restore habitat for greater sage-grouse, pygmy rabbit, pronghorn, big game, and wild horses and burros. Major land allocations affected include sage-grouse general habitat management areas, priority habitat management areas including 12 Mile/Paulina/Misery Flat Priority Area for Conservation (PAC), wilderness study areas, and research natural areas.

Lakeview District

The Lakeview District prepared stabilization and rehabilitation plans for the Ana, Coglan, Macs Draw, McCarty, and Wildcat fires covering a total of 5,897 acres. The Ana Fire affected 3,977 acres of lands managed by the BLM in the Picture Rocks PAC while the other fires affected sage-grouse general habitat management areas, a wilderness study area, and habitat for pronghorn and mule deer. Concerns were especially high for the Ana Fire since the Picture Rocks PAC had crossed an adaptive management threshold for sage-grouse populations contained in the BLM's 2015 Approved Resource Management Plan Amendment for management of sage-grouse, and for the Mac's Draw Fire which affected an area that burned in 2001 and was rehabilitated then. Stabilization and rehabilitation needs for all fires included invasive plant control and closure to livestock grazing. The Ana Fire plan identified seeding and both Coglan and McCarty fire plans identified fence repair and replacement.

Prineville District

The Prineville District developed plans for the Hampton and Horn Butte fires, which collectively burned 4,020 acres. The Hampton Fire affected a portion of the 12 Mile/Paulina/Misery Flat PAC, sage-grouse general habitat management area, and a wilderness study area. The Horn Butte Fire burned a designated area of critical environmental concern for long-billed curlew nesting habitat. Both fires identified seeding and invasive plant control needs. The Hampton Fire also included repair or replacement of fences while the Horn Butte Fire identified closure to livestock grazing.

Spokane District

The Spartan and Sutherland Canyon fires, which burned at the same time, needed plans from the Spokane District. Both fires affected habitat for greater sage-grouse, with the Sutherland Canyon Fire affecting the Moses Coulee PAC. The Sutherland Canyon Fire also burned within the recovery emphasis area for the endangered Columbia Basin pygmy rabbit, prompting efforts to retrieve several rabbits from the burned-over landscape. Both fires also affected habitat for special status species, including an area of critical environmental concern established for Whited's milkvetch. The Sutherland Canyon Fire also burned 1,709 acres that had burned one or more times in recent years. Both stabilization and rehabilitation plans identified needs for invasive plant control, planting sagebrush, repair/replacement of fences, and closure to livestock grazing. The Spartan Fire plan also included seeding.

Vale District

The Vale District prepared plans for the Bowden, Hawk, Horse Cross, Little, and Morgan Creek Fires, covering 27,692 acres. The Hawk Fire burned entirely within the Cow Lakes PAC, which tripped a hard trigger for the combination of sage-grouse habitat and population. The Horse Cross Fire affected the Folly Farm/Saddle Butte PAC and Little Fire burned in the Louse Canyon PAC, which is also a designated sagebrush focal area. The Bowden Fire burned within the perimeter of the 2012 Long Draw Fire in a wilderness study area that was not rehabilitated at that time. Other resources affected by these fires included special status plant species, bighorn sheep habitat, sage-grouse general habitat management areas, big game winter range, pygmy rabbit, golden eagle habitat, and around lava tubes used by western big-eared bat. All but the Little Fire stabilization and rehabilitation plan identified invasive plant control needs and all but the Horse Cross Fire plan identified closure to livestock grazing. Both the Bowden Fire and Little Fire plans included fence repair or replacement and the Hawk and Little Fire plans included planting sagebrush. Only the Bowden Fire plan included seeding.

Coos Bay District

At the time the emergency stabilization and rehabilitation plan for the Chetco Bar Fire was prepared, the fire had burned approximately 6,500 acres on lands managed by the Coos Bay District. Although the plan was prepared before the fire was fully contained, the fire was not expected to burn additional lands managed by the BLM. Resource concerns within the burned area include infestation of noxious weeds and loss of habitat for federally threatened northern spotted owl, marbled murrelet, and Coho salmon. The Pacific fisher, a species of concern, has also been documented in the area. Proposed treatments include warning signs, road drainage improvement, hazard tree removal, invasive plant control, and planting trees.

Roseburg District

The Horse Prairie Fire burned an estimated 7,630 acres of lands managed by the Roseburg District. The SBS identified 669 acres of high severity, 2070 acres of moderate, 1817 acres of low, and 3074 acres of very low or unburned. Resource concerns within the burned area include spread of invasive plants and loss of habitat for federally threatened northern

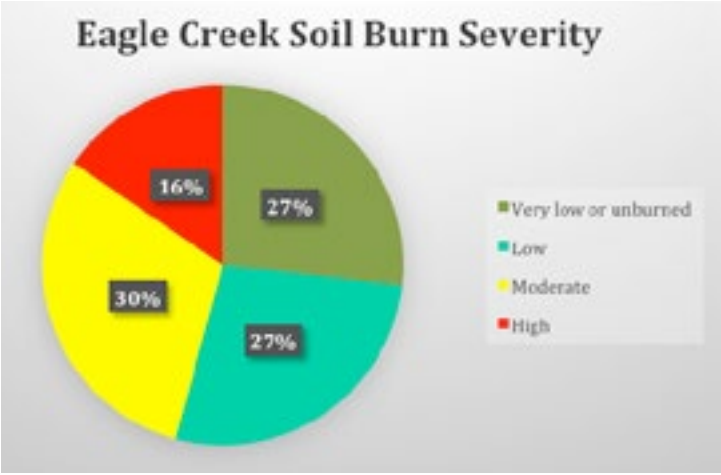


Figure H-1. Soil burn severity ratings across all ownerships within the Eagle Creek Fire perimeter.

Figure H-3. Burn severity for all large fires assessed within the Rogue River-Siskiyou National Forest.

Figure H-2. Percent of basal area mortality for the Eagle Creek Fire across all ownerships.

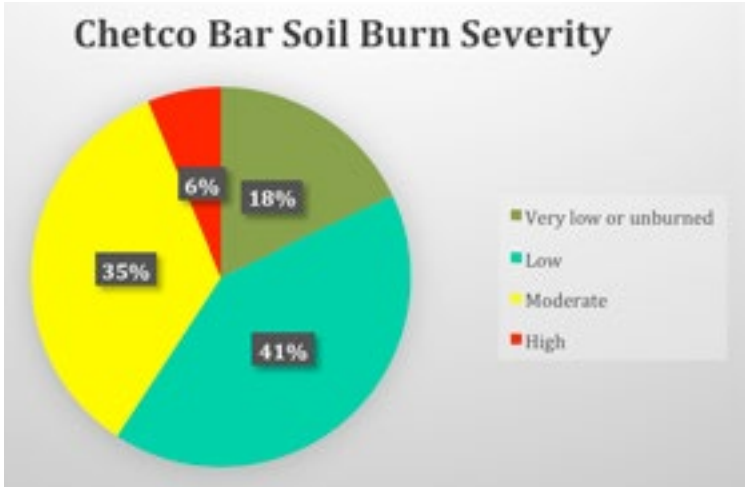


Figure H-4. Burn severity for all ownerships within the Chetco Bar fire perimeter.

spotted owl, marbled murrelet, and Coho salmon. Proposed treatments include warning signs, road drainage improvement, hazard tree removal, archaeological site protection, invasive plant control, and planting trees.

Forest Service

Eagle Creek Fire

A BAER team consisting of scientists and experts in soils, geology, hydrology, engineering, botany, recreation, archaeology, and fisheries, along with GIS support and public information officers responded to the Eagle Creek Fire. The team conducted a rapid assessment emergency stabilization needs starting September 25. Approximately 16 percent of the fire area had high soil burn severity and over half the area was considered low severity, very low severity, or unburned. Approximately 30 percent of the fire area had high burn severity for vegetation, based on the definition of high severity used by LANDFIRE, with 75 percent or greater tree mortality.

Treatments recommended and approved for immediate implementation within the fire included rockfall protections at Multnomah Lodge, trail stabilization and drainage improvement, limited removal of hazard trees along road edges

Figure H-5. Percent of basal area mortality for the Chetco Bar Fire across all ownerships.

and near facilities, emergency closure and hazard warning signs, and invasive plant treatments. There was no Rapid Assessment Team assigned for the Eagle Creek Fire due to the land use allocations that the fire burned in (administratively withdrawn lands and wilderness) that do not permit timber salvage. Additional rehabilitation needs included trail reconstruction, trail bridge replacement, and repairs to the Eagle Creek water system.

The Forest Service hosted the Eagle Creek Fire Response partnership meetings in Cascade Locks on October 4 and November 1 where local organizations and partner agencies began the discussion and planning for long-term recovery efforts. Local partners and cooperators expressed interest in trail maintenance and repair, ecological restoration, environmental education, creative and emerging volunteer roles, coordination and communication, funding, invasive species. The recovery efforts provide a unique opportunity to strengthen ties with cooperators and nontraditional partners through coordinated recovery efforts.

Rogue River-Siskiyou National Forest Fires

The Rogue River-Siskiyou National Forest assembled four BAER teams over the course of the 2017 fire season. The BAER team for the Chetco Bar Fire assembled in late September for two weeks to complete that assessment. The Chetco Bar Fire had less than 6 percent high severity. Treatments authorized for the Rogue River-Siskiyou BAER include over 100 miles of road work, several miles of trail stabilization, limited hazard tree treatments, hazard signage, invasive plant treatments, and cultural resource protections.

The Chetco Bar Fire burned across approximately 170,000 acres of National Forest System lands, with 48 percent of the fire occurring in wilderness, 33 percent in Late Successional Reserve, and 17 percent in the matrix land use allocation. There were some larger patches of high severity crown fire runs, with 45 percent of the burned area experiencing 50 percent or greater overstory tree mortality, and 37 percent experiencing high severity using LANDFIRE's definition of high severity as 75 percent or greater vegetation mortality.

Forest managers continue working to reopen around 300 miles of roads impacted by the fire by felling roadside danger trees within the Chetco Bar Fire perimeter and about 100 miles of additional roadside danger tree removal within the perimeters of High Cascades and Miller complexes. Forest managers are also considering options for commercial timber salvage within the matrix lands of the Chetco Bar Fire along the private land boundaries in order to reduce fuel loadings along those boundaries, to assist in future fire management options, and to recoup some economic value from the burned trees. Additional rehabilitation needs include road stabilization, repair/replacement of road and trail structures, trail signage, repair/replacement of wildlife guzzlers and fish habitat structures, tree planting, fence replacement and repair of other damaged range improvements, and cultural resource protection.

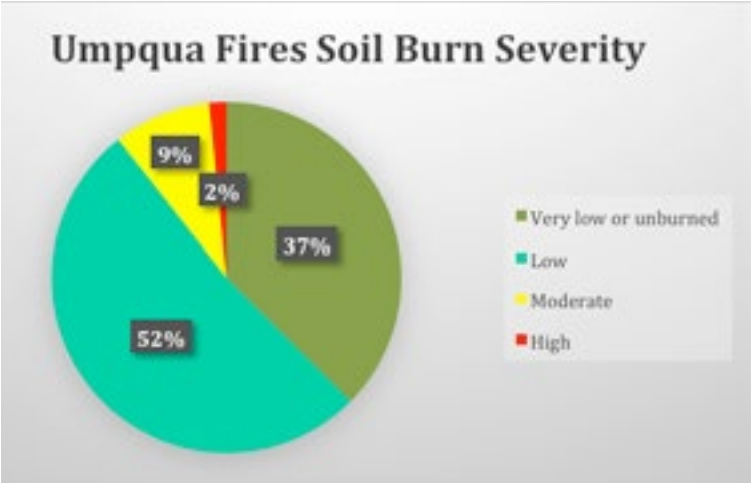


Figure H-6. Soil burn severity for all large fires assessed within the Umpqua National Forest.

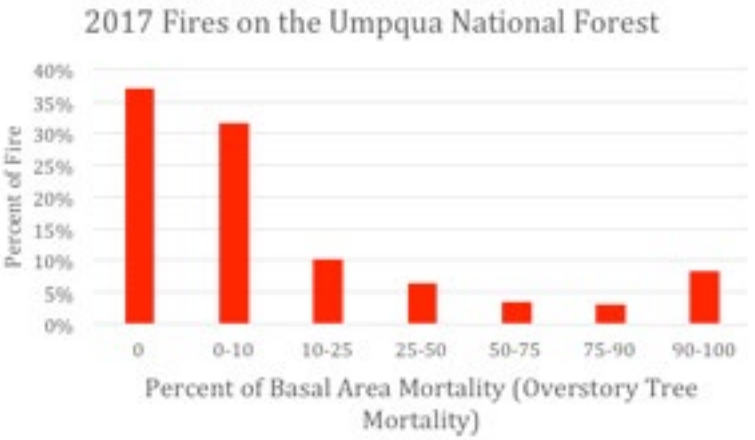


Figure H-7. Percent of basal area mortality for all of the 2017 fires on the Umpqua National Forest.

Umpqua National Forest Fires

The Umpqua National Forest also convened multiple BAER teams over the course of the fire season to address the post-fire emergency needs. The majority of fires on the Umpqua showed high percentages (89 percent) of low to very low soil burn severities and therefore had a lesser need for post-fire emergency funding. The BAER treatments approved for the Umpqua National Forest include road and trail drainage upgrades, emergency hazard signage, cultural resource protections, and invasive plant treatments.

The Umpqua National Forest experienced fires scattered across three Ranger Districts totaling approximately 65,000 acres. These fires mostly burned at very low severities, with about 79 percent of the burned acres experiencing less than 25 percent overstory mortality. The Forest is working to reopen around 300 miles of roads impacted by the fires by felling roadside danger trees within the fire perimeters. Staff on the Umpqua are also considering options for commercial timber salvage on two fires that burned within matrix land allocations on the Tiller

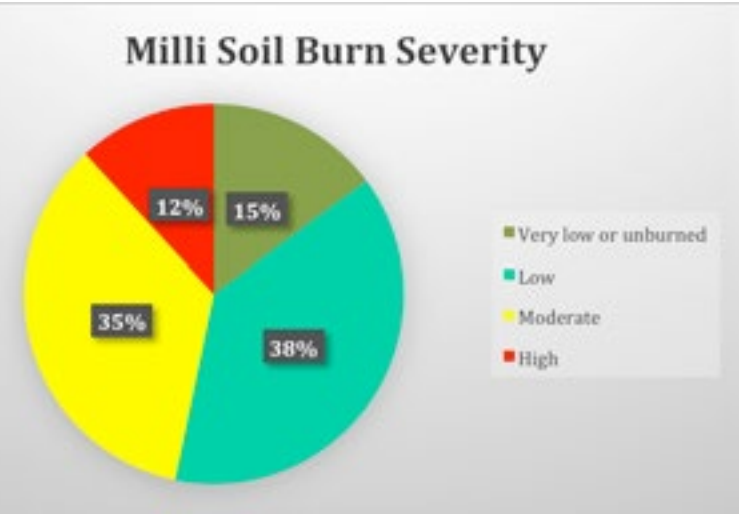


Figure H-8. Soil burn severity ratings within the Milli Fire perimeter.

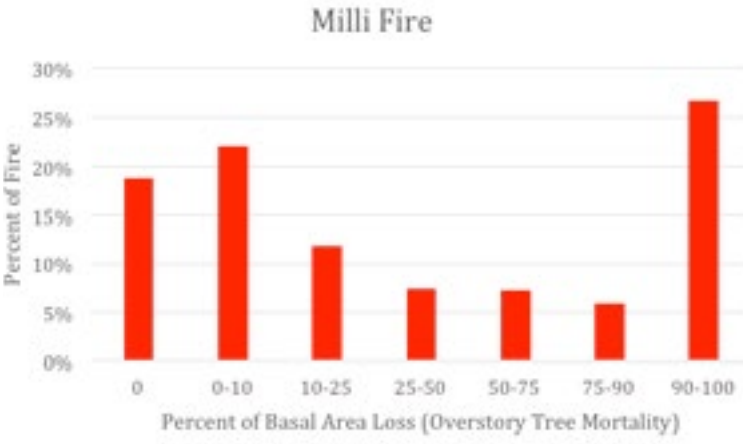


Figure H-9. Percent of basal area mortality for the Milli fire on the Deschutes National Forest.

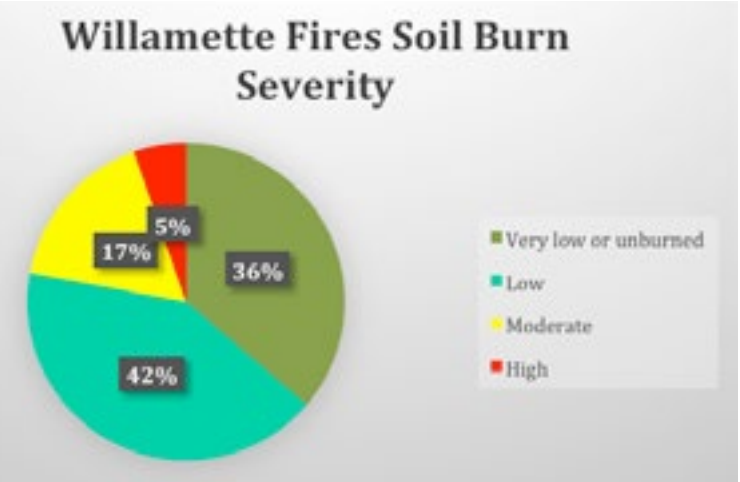


Figure H-10. Soil burn severity for all large fires assessed on the Willamette National Forest.

Ranger District. These salvage units are expected to be less than 250 acres each. Additional rehabilitation needs include stabilizing affected roads, repair/replacement of road and trail infrastructure, trail reconstruction, invasive plant control, repair of the Horseshoe Bend water system, replacing burned or damaged signs, tree planting, and cultural resource site protection.

Milli Fire

The BAER team for the Milli Fire completed its assessment in mid-September. The Milli Fire had one of the highest soil burn severities of the Oregon fires with 27 percent of the area rated as moderate and high severity. The BAER treatments in the Milli Fire included road and trail treatments, hazard signs, cultural site protections, and invasive plant treatments.

The Milli Fire on the Deschutes National Forest burned across approximately 24,000 acres of NFS lands, primarily in wilderness (39 percent) and late successional reserves (39 percent) with about 12 percent of the fire occurring in the matrix land allocation. Due to two days of rapid fire growth, about 40 percent of the fire acres had greater than 50 percent overstory mortality. The Forest has focused on treating roadside danger trees to reopen roads to allow safe public access. They are not pursuing area salvage at this time.

Willamette National Forest Fires

Three BAER teams assessed fires on Willamette National Forest over the course of the fire season. Like the Umpqua National Forest fires, the majority of the soil burn severities were low to very low. Several BAER treatments approved for these fires include road and trail work, including the Pacific Crest Trail, hazard warning signs, and invasive plant treatments.

The Willamette National Forest had 17 fires for a total of approximately 70,000 acres. The Separation Fire was primarily in wilderness (91 percent), while the Whitewater Fire (about 11,500 acres) burned in wilderness (56 percent) and late successional reserves (44 percent). The Whitewater Fire had the highest amount of tree mortality with 37 percent of the total fire experiencing greater than 50 percent overstory mortality. The other fires across the Willamette primarily had low severity impacts to the overstory, with over 50 percent of the total burned area experiencing less than 10 percent mortality. The Willamette National Forest is reopening the approximately 88 miles of roads affected by the 2017 fires by removing roadside danger trees. Additional rehabilitation needs include stabilizing affected roads, repair/replacement of trails and trail structures, invasive plant control, tree planting, and repairing damage to developed recreation sites.

Okanogan-Wenatchee National Forest Fires

Two BAER teams assessed multiple fires on the Okanogan-Wenatchee National Forest in October 2017. The BAER teams found a much higher soil burn severity on

these fires, potentially a reflection of repeated fires on the landscape. The BAER treatments included hazard signage, road and trail treatments, recreation facility protections, and invasive plant treatments.

The Okanogan-Wenatchee National Forest had nine large fires that burned over 175,000 acres within the Forest; about 130,000 acres were within designated wilderness. Two of the largest fires with portions outside of wilderness were the Jolly Mountain and Norse Peak fires, and their overstory mortality is displayed in Figure H-15. Since most of the wildfire acres on the Okanogan-Wenatchee National Forest were in wilderness, the Forest is not planning large-scale roadside danger tree treatments and they are not pursuing area salvage. They did not identify any post-fire recovery items beyond the emergency treatments funded in the BAER process.

State Summaries

Collectively, fires that burned on National Forest System lands in Oregon saw only seven percent high burn severity in soils with 68 percent of soils experiencing low or very low severity. Impacts to soils in Washington were higher with 17 percent high severity and 52 percent low to very low severity. Washington also saw higher overstory mortality than Oregon for all categories from 10 percent overstory mortality and higher.

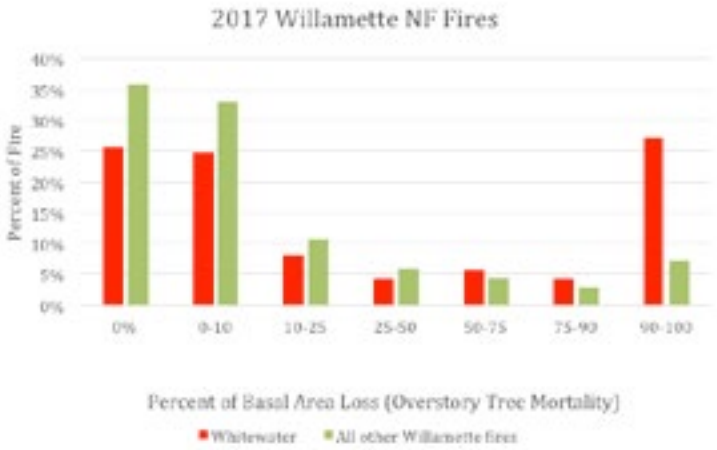


Figure H-11. Percent of basal area mortality for the Whitewater fire and then all other fires combined during the 2017 fire season on the Willamette National Forest.

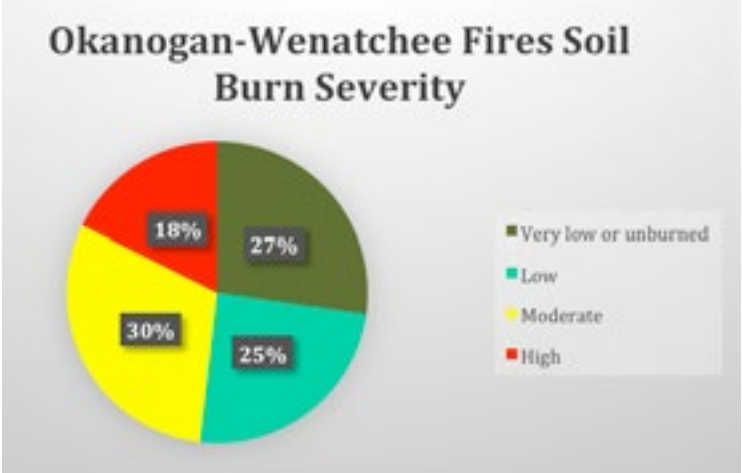


Figure H-12. Soil burn severity within all large fires assessed on the Okanogan-Wenatchee National Forests.

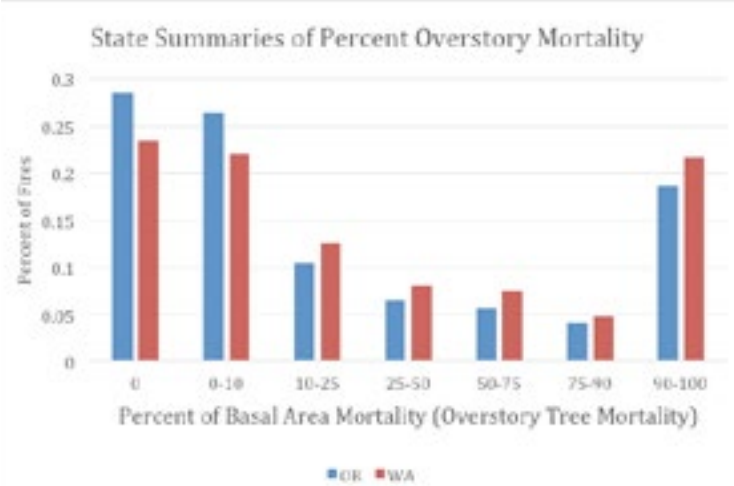


Figure H-15. Combined basal area mortality for all fires assessed in 2017 in Oregon and Washington.

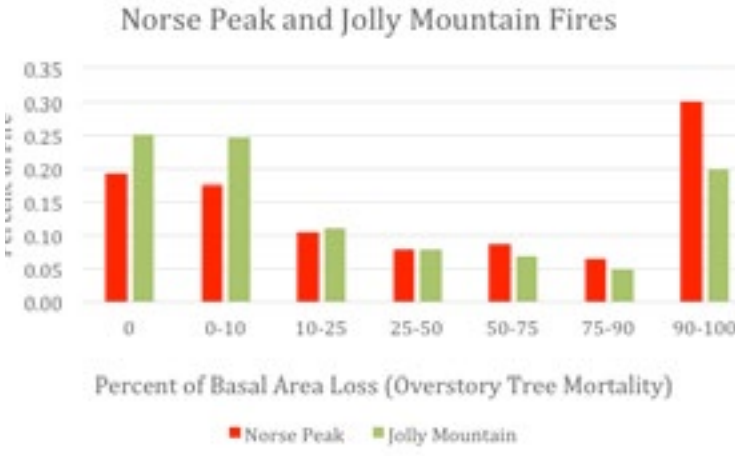


Figure H-13. Percent of basal area mortality for the Norse Peak and Jolly Mountain Fires on the Okanogan Wenatchee National Forest.

Appendix I: Eclipse Report

ECLIPSE REPORT

Pacific Northwest Fire Prevention Education Teams | August 28, 2017

> *One of the most notable successes was in fire prevention with no known human caused incidents evolving into any fires of significance.*
>
> Portland National Incident Management Organization, August 23, 2017

For the past year, federal and state agencies and land managers in Oregon have been preparing for the 2017 solar eclipse. This event was expected at the peak of Oregon's wildfire season, bringing an estimated one million visitors to the state during August's hot, dry and unstable conditions. Fire managers expressed concerns about conditions that are hard to quantify and hazards that are difficult to calculate. This theme continued through various stages of planning and preparedness, as it's difficult to quantify numbers for such an unprecedented event.

In the weeks and days before the event, indicators suggested that worst-case scenarios were imminent. Oregon was expecting most visitors in the narrow 70-mile strip of the path of totality, in rural towns and counties that lacked the infrastructure to support large scale emergencies, as well as the capacity to host the amount of expected visitors. The state was already experiencing several large lightning-caused wildfires with evacuations with highway and area closures in effect. Emergency services personnel expressed concerns about potential ignitions and fast moving fires in areas with many eclipse visitors. The logistical complexity to evacuate and account for the public, and transport fire responders quickly to fires during times with high traffic congestion added to these concerns.

The Whitewater Fire near Mt. Jefferson closed miles of trails, including 30 miles of Pacific Crest Trail and hundreds of acres of forest and wilderness, potentially pushing more visitors to central and eastern Oregon each time the area and road closures increased. In the southern portion of the state, the Chetco Bar Fire was doubling and tripling in size the days before the eclipse, one day making a five-mile run towards the coastal town of Brookings. On August 12th, the Pacific Northwest Region went into Preparedness Level 5 and campfire restrictions were in place across the state at this time.

Interagency personnel prepared fire prevention messages, and included the "Know Before You Go" and "Leave No Trace" campaigns. Multi-agency efforts focused on preparing as much as possible, yet understanding that the variety of human and environmental factors could not ever be fully taken into account. As the eclipse event drew near, fuel shortages were reported in central and eastern Oregon and traffic was backed up for 50 miles in parts of central Oregon.

Following the event, the Pacific Northwest remains at the top of the National Situation Report. The PNW is now managing the nation's highest priority incident, the Chetco Bar Fire, now categorized as a megafire, with 100,000+ acres consumed. The town of Brookings and adjacent lands have experienced level 1, 2, and 3 evacuations all at once.

As visitors continue to leave the state, indications are that fire prevention and education efforts were a success. No worst-case scenarios played out. Land management agencies report that overall, human impacts were less than expected. Finally, perhaps the best unit of measurement: no known human caused ignitions evolved into any fires of significance. The following report gives a more detailed picture about the planning and preparation that went into addressing the Oregon Eclipse Fire Prevention Education effort.

2017 Oregon Fire Prevention: Cooperation and Early Preparedness

The Pacific Northwest Wildfire Coordinating Group's Communication Investigation Prevention Committee (PNWCG CPIC) began work in 2016 on interagency wildfire prevention campaigns and shared messages focused on the anticipated 1,000,000 visitors to witness Oregon's Total Solar Eclipse. All PNWCG partners shared concern for human-caused wildfires at the peak of wildfire season. The committee agreed to a 2017 summer schedule of PNWCG CPIC press releases with key messages targeting specific fire causes. The group continued work on shared messages and partnerships leading up to Wildfire Preparedness Month in May, the summer recreation season, and various eclipse-related topics, such as coordinated fire restrictions.

In February, public affairs staff from three national forests in eastern Oregon contacted the State Office/Regional Office (SORO) requesting Fire Prevention Education Teams (FPETs) to help prepare prevention materials and conduct eclipse outreach. Soon after, other units began to inquire about hosting an FPET for the eclipse. Based on these initial requests, SORO's Fire Mitigation Education Specialist began to develop a seasonal FPET strategy. The goals included pre-planning for the eclipse event to support and mitigate anticipated issues stemming from high visitor numbers and expected human-caused wildfires, developing materials and distribution/outreach strategies, and providing for oversight and prevention support to field units during the eclipse event.

In June, a five person Fire Prevention Education Team assembled in Bend and worked for two weeks to refine this strategy. The team developed a communication plan with key wildfire concerns, messages, and strategies. It created an eclipse logo with internationally recognized Smokey Bear to unite the wildfire prevention message across all agencies and organizations. Team members engaged various field-going personnel and partners in brainstorming prevention education products and additional messages. It established criteria to filter funding and development priorities, and designed and ordered products through the Government Publishing Office (GPO). This included prevention education products targeting specific human fire causes, user groups and customers. The team also reviewed electronic resources on the SORO fire prevention FTP site, and created additional electronic prevention education resources for local adaptation in 2017, including more Spanish translations. A social media campaign was designed with graphics and seasonal messages and scheduled for the PNWFAC Twitter account. Work was done with field units requesting FPETs to begin draft delegations of authority, and to coordinate on team logistics and focus areas. The June team also worked with the Confederated Tribes of Warm Springs and the Regional Prevention Coordinator for the Bureau of Indian Affairs to support shared prevention graphics and messages and on preparing for a BIA-sponsored FPET at Warm Springs.

Graphics, materials, and translations

In the month before the eclipse, a short team worked with the GPO team in SORO to amend, finalize and submit additional product orders, coordinate delivery and plan for dissemination of products. The short team coordinated logistics: travel, hotels and housing, particularly during the limited availability of accommodations on the days before and after the eclipse. Field FPET preparation also included work to finalize in-briefing dates, submitting resource orders, assembling welcome packets, and coordinating the allocation and transportation of numerous products. The field teams received their first batch of products that included table tents, rack cards, patrol cards, road signs, large and small banners, wooden trading coins, and stickers. As other products trickled in, the teams received 'no fire' campfire pin-flags, trash bags with fire prevention messaging, and bumper stickers. Products were distributed equitably among the teams, and shared with our cooperating Warm Springs team.

Public Service Announcements in Spanish

In addition to the field teams, a Fire Prevention Education Team (FPET) was deployed in Portland to support the three field Fire Prevention Education Teams in NE Oregon, Central Oregon and NW Oregon. The Portland FPET (PDX FPET) coordinated product delivery locally to the Columbia River Gorge National Scenic Area, Mt. Hood National Forest, the State Office/Regional Office (SORO), and the National Incident Management Organization (NIMO) team coordinating Eclipse efforts. The Northwest Coordination Center (NWCC), Multiagency Command (MAC) also received product samples at this time. In addition to the products ordered, supplementary fire prevention materials were available for local customization through the FTP website. These products were used by the Washington Office and sent out through the Regional Prevention Coordinator List.

Additional requests were received from the Washington Office to expand the eclipse fire prevention campaign. The PDX FPET created adaptations based on the original Oregon eclipse logos for 12 states within the path of totality. These products were updated to include the USFS and USDA logos for broader application.

As a final product, the PDX FPET revised and updated a set of 10 sage grouse educational trading cards to incorporate changes recommended by the USFS Regional Wildlife Ecologist. The changes include updated, high-resolution images, secured with permission from the Oregon Flora Project. The team edited the wording on the text to match age appropriate fire prevention messaging.

The team supported the region by providing Spanish translations for daily briefings and press releases for fires in Oregon and Washington. The FPET collaborated with the Region 6 Fire PAO to produce Public Service Announcements (PSAs) explaining evacuation levels in Spanish. These PSAs were distributed via a link on the InciWeb homepage, and to Incident Management Teams (IMTs), through a PAO and PIO mailing list. The full repertoire includes a three-minute video, a condensed 60 second audio file, accompanying scripts, and formatted text documents for print. The full scope of PSA related products can be found here: http://ftp.nifc.gov/incident_specific_data/pacific_nw/!SORO/Prevention/Bilingual_Materials/2017_Spanish_PSA_Soto/

Capacity building in the Pacific Northwest

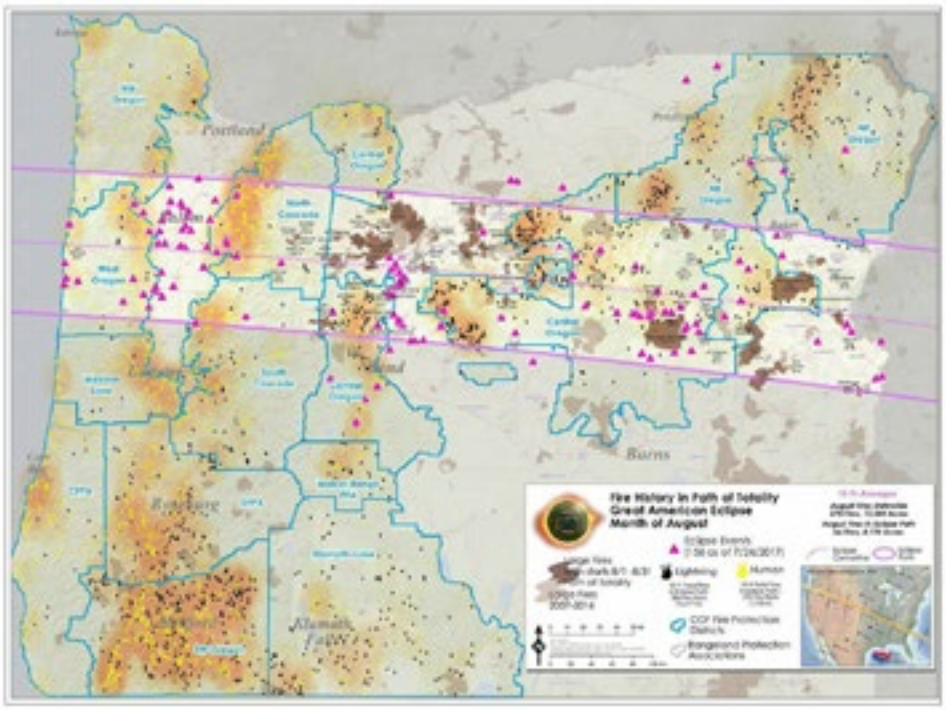
In 2014, the fire season in the Pacific Northwest was precedent-setting, as established by record weather and persistent fire occurrence in early spring. Fire Prevention Education Teams were deployed almost continuously through September. The demand for teams revealed a clear and persistent shortage of qualified and available Fire Prevention Education Team Leaders, Team Members and Public Information Officers within the Pacific Northwest. A capacity-building strategy was prepared outlining the needs and mitigation measures. As a result, in 2015 and 2016, Fire Prevention Education Team Member (P-310) courses were taught on a virtual course delivery platform, with locations in Tucson and Boise, each including pods in seven western states. The Pacific Northwest and Alaska contributed cadre, pod locations and students. In addition to this formal training, enhanced recruitment efforts were made to bring in talent by referral and interest in the FPET program through networking, at conferences and workshops, and assignments to other regions, such as the extensive deployment of FPETS in the fall of 2016 to the Southern Region. As a result of these efforts, two PNW/AK employees attended Team Leader training in the fall of 2014, and 22 employees completed Team Member Training. The Pacific Northwest has offered significant team training opportunities, deploying seven FPETs each in 2014 and 2015, three FPETs in 2016 and six in 2017, including the team hosted by the Warm Springs Reservation.

2017 Pacific Northwest Fire Season

Leading up to the August 21 Solar Eclipse, the Pacific Northwest experienced extreme fire danger indices and record temperatures. Lightning storms moved through the area the week prior, igniting several fires in Oregon and Washington. Beginning with one of the earliest fires west of Mt Jefferson, a location expected to see at least one group of 1,000 hikers, agencies began to receive inquiries from potential visitors concerned that the smoke would 'still be there' during the Eclipse. Many of these fires continued to grow into project fires, with residents and visitors heavily impacted by smoke, highway closures and evacuations in the days just prior to August 21.

As fire danger escalated, land managers implemented public use restrictions limiting campfires, smoking, off-road vehicle use, etc. Industrial regulations were advanced as well, closing down most operations without specific waivers limiting use to certain times of day, and with extra precautions. By August 15, campfires were banned in nearly all of Oregon's federally and state-protected wildlands. Because of the media attention related to these wildfires, meteorology predictions about visibility, the resultant smoke, and risk of wildfire, the actual Eclipse visitation was reduced.

Beginning on August 19th, the crowds began to move to planned events, the largest of which was expecting 30,000 participants. Over 70,000 actually arrived. Other areas such as portions of the Coast and Northeast Oregon received less than expected visitation, with crowds shifting to other areas.



Fire Prevention Education Team Highlights

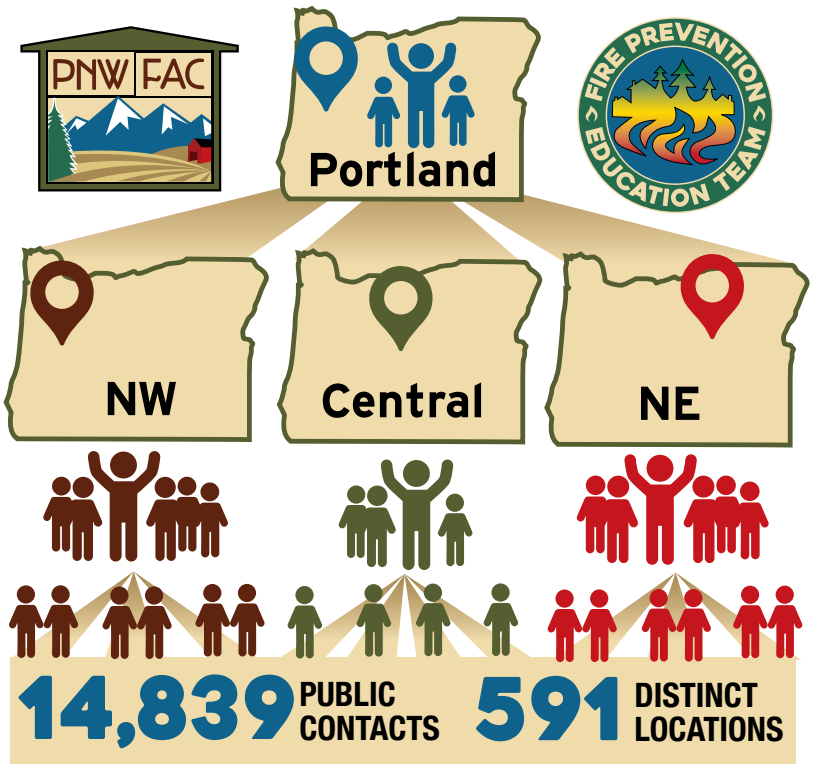
The three field teams were made up of 16 people total, tasked with implementing fire prevention messaging in and across nine national forests, grasslands, and Bureau of Land Management (BLM) and state protected lands in and near the path of totality. In the western part of the state, one team worked for the Willamette National Forest, Siuslaw National Forest, and the Northwest Oregon BLM District. In central Oregon, a team worked for the Deschutes National Forest, the Ochoco National Forest, and Prineville BLM District. Finally, in northeast Oregon, a team served the Malheur National Forest, the Wallowa-Whitman National Forest, and the Umatilla National Forest. The Warm Spring Reservation also hosted an FPET. The field teams focused on providing information along roads and gateways into the path of totality. They targeted messaging along roadsides, information portals and info stations, at events and public gathering places, and in and near campfire pits. By the time the teams demobilized, they had made 14,839 public contacts in 591 distinct locations and covered thousands of miles of Oregon roads.

Fire Prevention Education Team locations

Fire Prevention Education Team Highlights

Photo by Mark Stone/University of Washington

Memorable events included numerous county fairs, and local events. At Warm Springs, the prevention education team, along with Smokey Bear, sponsored a prevention booth at a National Aeronautics and Space Administration (NASA) Program for Youth from thirteen tribes including a project to launch and track giant weather balloons containing sensors and carrying culturally significant items. This was the largest effort involving Native American tribes during the eclipse. The program's goal was to bring STEM-related (Science, Technology, Engineering and Math) topics to students in culturally relevant ways.



Oregon/Washington human-caused fire website

Following three seasons of informally accessing data provided through the Forest Service Rocky Mountain Research Station to provide incoming FPETs with interagency human fire-cause data, the SORO Fire Mitigation and Education Specialist worked with Forest Service Region 6 Data Resource Management staff to develop an application for Oregon and Washington for prevention personnel and interagency partners to access and work together to address common human wildfire causes. This application is in "beta testing." Incoming FPETs were asked to provide their feedback on the application. It follows:

The NW Oregon Team conducted beta-testing of the "Human Caused Fire Activity Application for Oregon and Washington, 2000-2015." Initial observations include a strong correlation between the priority coverage areas and human-caused fire history. Their findings re-assured the team their efforts we were concentrated in the appropriate area. The team continued to work with the application during their assignment. The Portland Team experienced difficulties opening the web addresses on an Apple Ipad. After numerous tries with the web address provided, it would not open on the device. The NE Oregon Team tested the website and was unable to get in when the long link was typed into the browser. The tester backed the web address up to the web app viewer ending and was able to open the site and look at the options. The zoom in/out feature worked well, the view could be changed and the site located the team. Other features were not available. Testing and modification on this application will continue.

Appendix J: Science and Technology

Introduction

Development of new technology has taken fire modeling from paper to geospatial layers of natural, cultural, and infrastructure resource complexities. The advent of LANDFIRE, a program that provides a series of data layers for vegetation, greatly facilitated the development of a number of fire behavior, smoke dispersion, and fire effects tools used to support decisions made during and after a wildfire.

Wildland Fire Decision Support System

The Wildland Fire Decision Support System (WFDSS) represents the current state-of-the-art technology that calculates fire behavior, such as rate-of-spread, flame length, and fire spread potential. WFDSS also serves to document the incident goals and objectives and tracks fire management and agency administrator decisions.

Most recently, WFDSS has added links to near real-time geospatial information stored in the WILDCAD dispatching system. This link allows fire managers to incorporate topographic maps and provides a web-based common operating picture to multiple levels of management simultaneously.

WFDSS has four levels of geospatial fire behavior projections:

- Basic Fire Behavior – estimates fire behavior based on weather and fuel moisture inputs and analyzes potential fire behavior like flame length, crown fire potential, and fine fuel moisture variance.
- Short-Term Fire Behavior – depicts fire spread pathways and arrival time of a fire over a period of hours using wind and fuel moisture inputs to estimate the rate of spread.
- Near-Term Fire Behavior – estimates fire spread and fire behavior using weather and wind data over a period of three to seven days to determine potential growth given the weather forecast for that period.
- Fire Spread Probability, or FSPro – produces multiple simulations of fire spread using weather and long-

term climate records. The analyst can adjust spotting potential, use terrain to modify windspeed and direction, and alter fuel models to better reflect actual conditions.

Each time the fire behavior analyst updates a WFDSS run, a new risk assessment can be prepared, allowing the decision-maker and the incident management team to see how risk is changing over time on a given fire. The relative risk rating evaluates values at risk and their proximity to the fire along with other social and political concerns, hazards posed by fuel conditions, expected fire behavior, the potential for fire growth, seasonal barriers to fire spread, and current seasonal severity relative to a "normal" fire season.

Lastly, WDFSS creates a recommended incident organization based on the relative risk rating, the difficulty in implementing the course of action described, and social-political concerns related to the fire, such as mixed ownerships. The result is a recommended incident organization, such as a Type 2 or Type 1 incident management team.

Smoke Forecasting

Fire managers and air quality regulators now have access to a number of smoke modeling tools to assess expected smoke production, transport, and dispersion in near-real time. To help incident management teams, fire agencies, and the public make use of these new tools, we now have Air Resource Advisors.

Air Resource Advisors have technical expertise in air quality monitoring, smoke modeling, pollutant health thresholds, and communicating smoke risks and potential mitigation measures. When dispatched to a wildfire, their specific tasks include:

- Providing, installing, and operating air quality monitors and interpreting the resulting data for fire camps and communities as needed,
- Summarizing information about current air quality conditions, comparing them to national health thresholds and communicating those findings to partner agencies and the public,
- Using and interpreting national smoke models and running fire specific models to provide forecasts of future air quality impacts,
- Assisting Safety Officers and others in addressing firefighter impacts from smoke,
- Advising on how to reduce risks and mitigate smoke exposure of the public and firefighters,
- Supporting incident management teams in public meetings and in media such as Inciweb, AirNow, and smoke blogs, and
- Coordinating with public health agencies and air quality regulators to address their concerns about smoke impacts on the public.

In 2017, Air Resource Advisors were used on the Diamond Creek Fire, Central Washington Fires Support, Eagle Creek Fire, Whitewater Fire, East Cascades fires, Blanket Creek Fire, North Umpqua and High Cascades Complexes, Chetco Bar Fire, and the Miller Complex. A typical smoke outlook produced by an Air Resource Advisor describes the current fire activity, expected smoke impacts, and the expected Air Quality Index for nearby communities. Because of the duration of the fires where Air Resource Advisors were used, most fires had several advisors over the summer and sometimes two advisors were assigned. For example, the Blanket Creek Fire had five Air Resource Advisors with overlapping advisors between August 20 and September 3.

Risk Management and Assistance Teams

In 2017, the Forest Service began testing the use of Risk Management Assistance Teams (RMAT) to help managers, cooperators, and the public better understand the risks posed by large and complex fires. A Forest Supervisor or District Ranger typically requests an RMAT when they need help in determining priorities between several fires or are unsure of the best approach to use on an individual fire. Using a risk assessment, the team identifies the locations and lists of values that warrant protection from fire and then uses FSPro in WFDSS to estimate the probability that the fire will reach the locations of those values. A local unit, area command, multiagency command, geographic coordination center, or agency can use the RMAT findings to prioritize fires when firefighting resources become constrained.

The RMATs in the Pacific Northwest used the 2017 draft Quantitative Risk Assessment product to inform a variety of analyses concerning long-duration fires and complex fires. The Quantitative Risk Assessment product was developed last winter and spring by refining the LANDFIRE fuels layer, identifying the high value resources and assets, developing expected changes in value should a fire reach the identified resource or asset, and ranking the relative importance of the results.

Assets can include residences, communication sites, transmission and distribution lines, railroads, major roads such as interstates and state highways, developed and dispersed recreation sites, ski areas, historical structures, seed orchards, and mills. High-value resources can include commercial timber, municipal watersheds, federally threatened or endangered species habitat, and sensitive species habitat.

In 2017, the Forest Service established three RMATs nationally. Each team consists of a line officer with experience in dealing with large fires, a fire management officer, an operations/risk management specialist such as an Operations Section Chief or a Strategic Operational Planner, a local fire behavior specialist, and two long-term fire analysts. The team can create a number of products, depending on the needs and questions concerning an individual fire or fire complex:

- Conditional Net Value Change (cNVC) Map(s) – given fuels and expected fire behavior, a map or series of maps of the expected benefits and losses for designated high value resources and assets.
- Fire Behavior Analysis – uses fire behavior modules within WFDSS to characterize expected fire behavior and spread and use additional tools to assess potential threats to values and natural resources and

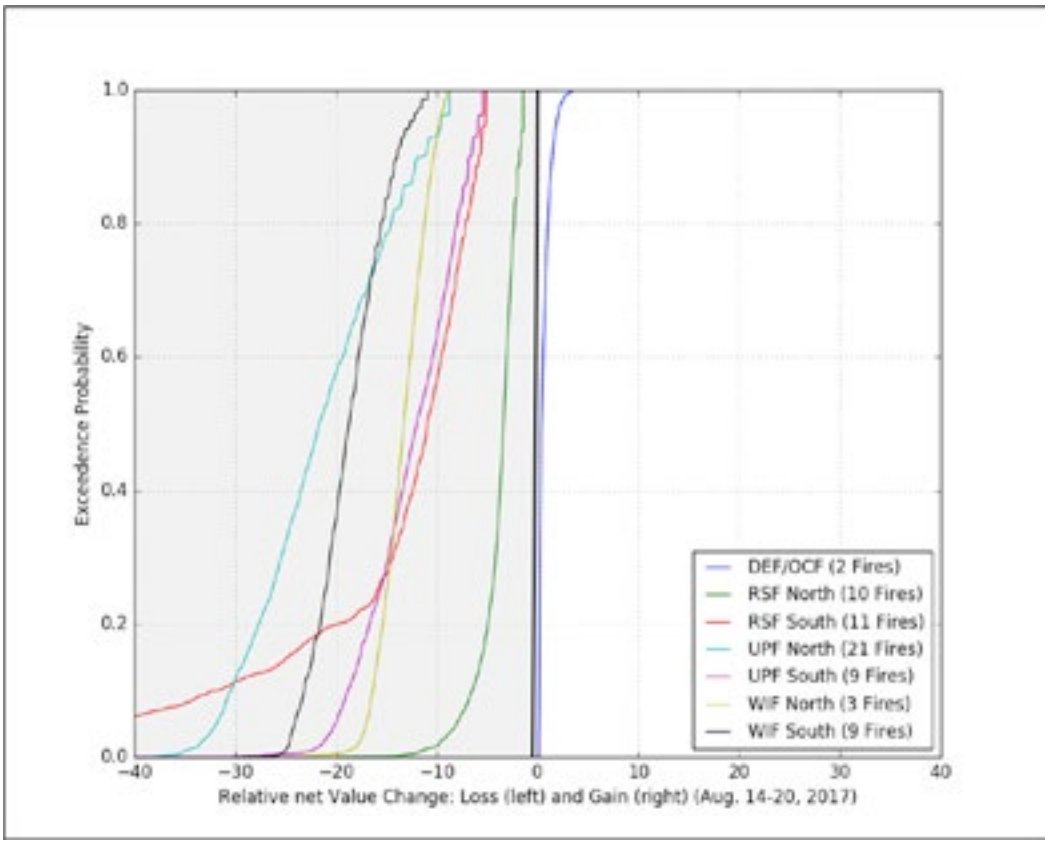


Figure J-1. Exceedance probability curves provided to NW MAC for fires in the Oregon Cascades.

to evaluate mop-up hazards in the fire area.

- Exceedance Probability (EP) Curves – compares the expected losses or benefits from a group of fires to help set priorities.
- Estimated Firefighter Evacuation Time Map – models the shortest ground transportation time in hours from any given point to a hospital. The travel time estimate begins from the moment a litter is lifted off the ground and travel begins. Does not include the time needed to prepare the injured person for evacuation or acquire the needed transportation. It estimates walking speeds as adjusted for slope and vegetation type and driving speed based on the types of roads traveled.
- Mop-up Hazard Rating Map – identifies where vegetation types and slope steepness align to create potentially hazardous conditions for firefighters during mop-up. Incident management teams and decision-makers can combine this map with infrared imagery of hotspots and areas of intense heat to prioritize areas for mop-up and avoid areas that are rated as largely unsafe or have little need for mop-up.
- Suppression Difficulty Index (SDI) Map – identifies areas with high exposure to unsafe conditions and little ability to mitigate those safety risks, taking into account potential fire behavior, access, fireline production rates, and the availability of fuel breaks created by natural features or by fuels treatments.
- Potential Control Location (PCL) Map – depicts where the landscape is highly suitable or generally not suitable for stopping the fire by identifying potential control features. It assumes that the firefighting effort is consistent with past fires in the area.
- Tree Mortality Map – identifies areas with high levels of tree mortality and, therefore, increased firefighter exposure to snags. This product also supports the Suppression Difficulty Index, Potential Control Location, and Mop-up Hazard analysis.
- Incident Timeline Graph – provides a visual depiction of the size, costs, number of personnel, percent contained and remaining to be contained, fire danger, strategies used, relative risk assessment level, organizational needs assessment level, assigned team type, structures threated and destroyed, and decision status. This product can be used to brief incoming incident management teams and as a tracking tool over the life of the fire.
- Incident Resource Use Graph – a supplement to the Incident Timeline Graph, this graph depicts the amount and type of firefighting resources assigned to the incident as well as the costs and fire size as reported on the ICS-209 form.
- Aviation Use Summary Package – summarizes and maps aviation actions on the fire such as

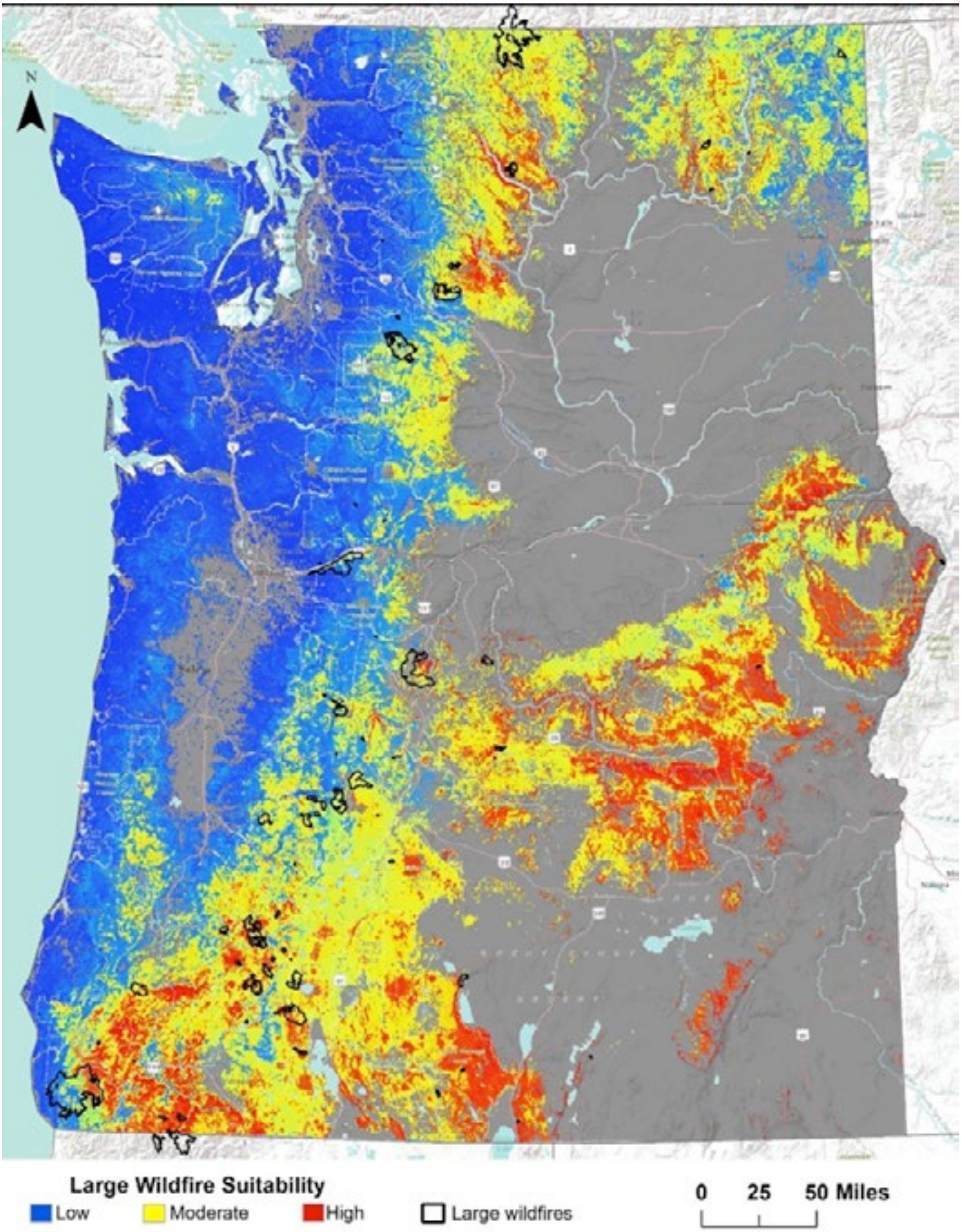


Figure J-2. Map of the "habitat" for large fires in forests. Warmer colors indicate a higher probability of a large fire developing while cooler colors indicate a lower probability. Lower probability areas can still support large fire growth under extreme conditions.

retardant and water drops from airtankers and helitankers, the exposure of aviation assets to safety hazards over time, and the number and type of aircraft assigned to the fire each day.

Some or all of the above products are used to develop a trade-off analysis where different potential firefighting strategies are evaluated against firefighter safety, public safety, and the values at risk from the fire. The RMAT uses standardized tables to develop scores for how well each alternative course of action meets the fire management objectives and protects firefighter and public safety, as well as scoring the likelihood of success and the social and political concerns with a given course of action.

In 2017, MAC Support and the Willamette, Umpqua, Rogue River-Siskiyou, and Okanogan-Wenatchee National Forests used RMATs. For MAC Support, the RMAT evaluated 65 fires on the Umpqua, Willamette, Deschutes, and Ochoco National Forests in mid-August and developed Exceedance Probability Curves. The team grouped the fires into seven clusters to evaluate the expected net loss or benefit.

This analysis indicates that the northern Umpqua (UPF North) and the Willamette (WIF North and WIF South) were most likely to see the highest net loss over the next seven days in the absence of any suppression action. The southern Umpqua (UPF South) and southern Rogue River-Siskiyou (RSF South) were expected to see mild to moderate loss, while the northern Rogue River-Siskiyou (RSF North) could see a mild loss in the absence of any suppression action. Further, the expected loss on the northern Rogue River-Siskiyou expected losses were half those expected for the southern Umpqua and southern Rogue River-Siskiyou. The Deschutes and Ochoco National Forests (DEF/OCF) were expected to see a net resource benefit from the two fires assessed (Milli and Belknap). As a result, the recommended priority for firefighting resources was:

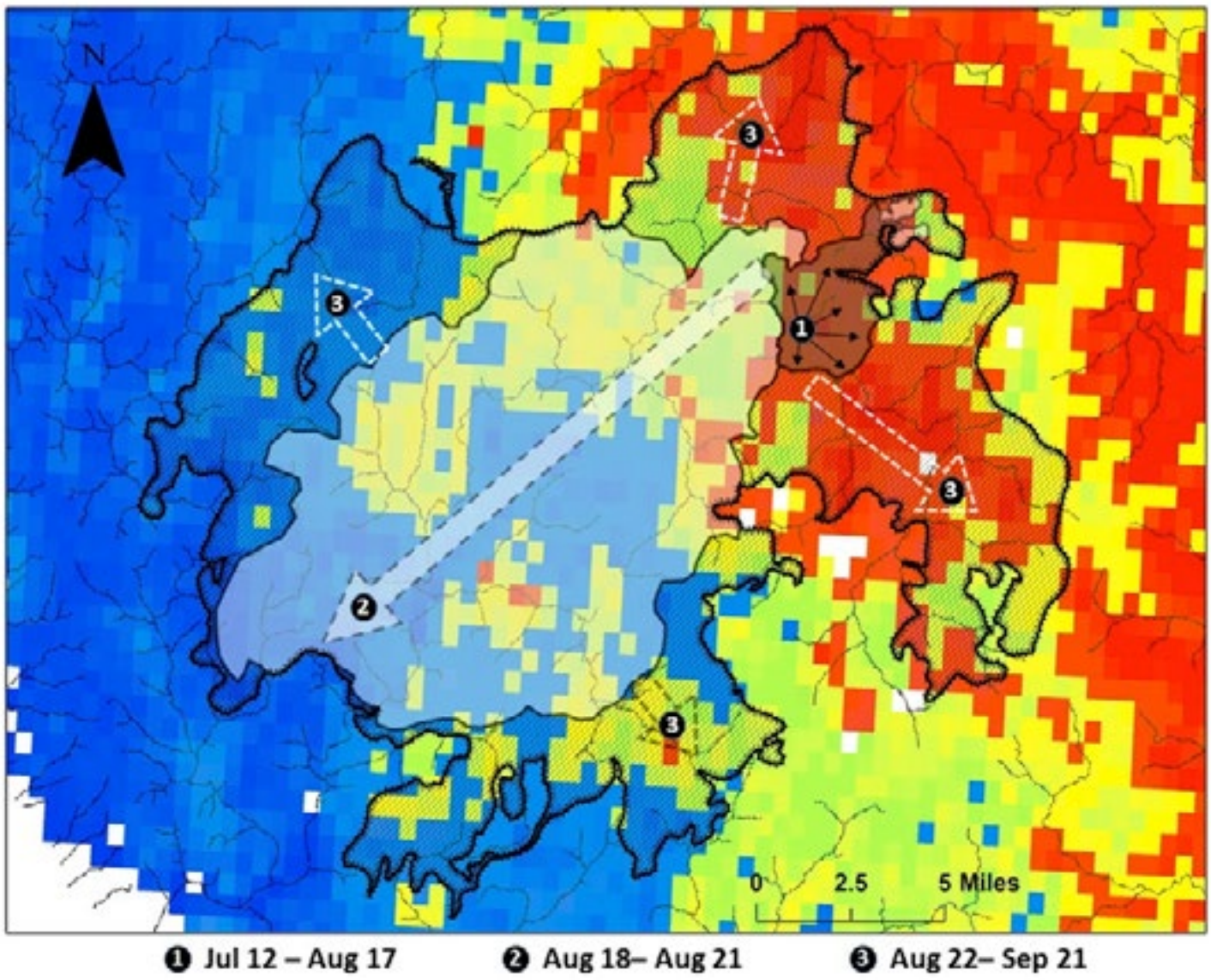


Figure J-3. Map of the "habitat" for large fires in forests. Warmer colors indicate a higher probability of a large fire developing while cooler colors indicate a lower probability. Lower probability areas can still support large fire growth under extreme conditions.

1. Umpqua National Forest North
2. Willamette National Forest South
3. Willamette National Forest North
4. Umpqua National Forest South/Rogue River-Siskiyou South
5. Rogue River-Siskiyou North
6. Deschutes/Ochoco National Forests

On the various National Forests, the team conducted trade-off analyses of selected fires and complexes to aid in selecting which strategy to use, help the incident management team prioritize resource use, and to help the Rogue River-Siskiyou and Umpqua National Forests align their strategies for several fires along their common boundary.

"Habitat" for Fire

Scientists in the Northwest have developed an experimental product that maps the "habitat" for large wildfires based on measures of climate during the main fire season, topography, distance from roads, historical lightning ignitions, and solar radiation. The model assumes that burnable fuels are highly likely to be present, so are not included. The resulting map depicts probabilities that an area would support the development of a large wildfire.

For example, the Chetco Bar Fire started in a high probability area and largely stayed within the area of warmer colors through the early part of the fire. Once the Chetco Effect wind developed, it pushed the fire into a lower probability area. After the wind subsided, the fire continued to spread in the warmer colors, including light blue areas but showed little spread in the cooler areas until the next wind event.

Infrared Mapping

Infrared, or thermal, mapping is widely used to track wildfire growth and identify heat across a fire. Infrared technology has advanced greatly in recent years. The National Interagency Fire Center in Boise manages the National Infrared Operations Unit. The unit is made up of aircraft, thermal imaging cameras, infrared interpreters, and geographic information systems. The aircraft fly over several fires, usually at night, and download the imagery to the interpreters who convert the data into maps firefighting teams can use to develop or update daily plans for managing the fire as well as tracking the size of the fire.

In 2017, two of the three aircraft normally available to the national infrared program were unavailable, resulting in the use of other sources to gather infrared data. Unmanned Aircraft Systems were one source on some fires. The military also provided some infrared mapping services. In August, two RC-26 "Metroliner" aircraft were stationed in the Northwest, one from the Washington Air National Guard which flew out of Fairchild Air Force Base in Spokane and one from the Arizona Air National Guard which flew out of Mahlon Sweet Airport in Eugene. These aircraft largely flew at night to detect new fires, map existing fires, and provide live video downlinks to fire managers as requested, known as Distributed Real-Time Infrared, or DRTI. This capability lead to the nickname "DRTI Bird." In September, a UH-72 Lakota helicopter from the Oregon Army National Guard provided daytime infrared mapping services.

Figure J-4. RC-26 Metroliner (L) and UH-72 Lakota (R) used for infrared mapping in 2017

Appendix K: Air Quality and Smoke

AQI Category	24-hour PM2.5 concentration (ug/m3)	Meaning
Good	0-12	Air pollution is considered satisfactory and poses little or no risk.
Moderate	12.1-35.4	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.
Unhealthy for Sensitive Groups	35.5-55.4	Members of sensitive groups may experience health effects. The general public is not likely to be affected.
Unhealthy (for everyone)	55.5-150.4	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.
Very Unhealthy	150.5-250.4	Health alert: everyone may experience more serious health effects.
Hazardous	250.5-500	Health warning of emergency conditions. The entire population is more likely to be affected.

The 2017 fire season had significant and lasting effects on air quality across Oregon and Washington. Smoke resulted in a number of health impacts, often affecting healthy people and impairing visibility for prolonged periods. On the worst days, visibility was limited to less than one mile. Along with impacts to human health, dense smoke resulted in temporary road closures and required people to travel at reduced speeds when roads were open.

How is Air Quality Measured?

Air quality regulators and federal agencies use the Air Quality Index (AQI) to characterize the impact of different concentrations of smoke on human health. The Environmental Protection Agency (EPA) developed the AQI to provide a simple indicator of the potential impacts of air pollution on human health. The AQI is based on particles 2.5 microns and smaller (PM2.5) and ozone. In the case of smoke, the pollutant of concern is PM2.5.

Daytime vs. Nighttime Smoke Impacts

Smoke impacts may vary based on the speed, size, complexity of fire spread, atmospheric stability, and topography. Rapidly moving fires in heavy timber produce very high volumes of smoke. In extreme cases, smoke from a large and rapidly spreading fire can affect the air quality in communities hundreds of miles away.

Warming temperatures during the day may help create wind that moves smoke around. At night, temperatures tend to cool, winds typically die down and smoke starts to flow downhill into valleys.

Topography can trap smoke into an area, particularly at night. Drainages that become wider for a short distance and then narrower tend to trap smoke in small valleys at night.

A comparison of the air quality in Oakridge and Eugene illustrates how nighttime smoke can affect the air quality in one area of a river drainage, but not another. Both communities lie on the Middle Fork of the Willamette with Oakridge located within the Willamette National Forest and Eugene in the Willamette Valley. Air quality in Oakridge was Moderate or worse through most of August while Eugene had many days of good air quality. Oakridge was affected by nighttime smoke from several fires in the central Cascades that became trapped in the small valley where Oakridge sits. That smoke never made it as far down as Eugene. The nighttime smoke concentrations grew worse as August progressed, reaching Unhealthy or worse levels by August 27 while Eugene experienced a range of air quality, including several days when the air quality was Good. On August 3, air quality was worse in Eugene than in Oakridge, suggesting that Eugene had a greater impact from daytime smoke than Oakridge did. In early September, both locations were affected by smoke as several complexes in the central Cascades experienced large growth.

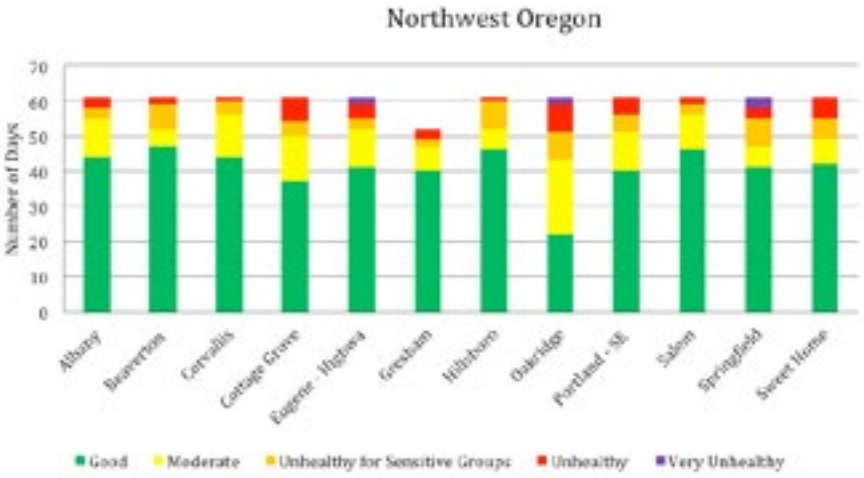
There are several locations in Oregon and Washington known for trapping smoke due to topography. Some of these are designated as non-attainment areas under the Clean Air Act. In western Oregon, the Rogue River Valley and Oakridge are the best-known smoke traps. Smoke becomes trapped in the southern Willamette Valley as well, although it happens less often in the summer than in other locations. In eastern Oregon, Sisters, Bend, Klamath Falls, Lakeview, La Grande, John Day, and Burns can become smoke traps. In Washington, the known smoke traps are in the eastern part of the state, largely because that is where the large fires typically occur. Well-known smoke traps include Yakima, Leavenworth, Chelan, Wenatchee, Omak, Winthrop, Twisp, and Republic.

Air Quality Summary

In Oregon, the air quality was generally Good until August, not clearing up in most places until mid-September when the rains came. Southwest Oregon, Central Oregon, and the southern Willamette Valley bore the brunt of poor air quality for prolonged periods. Air quality was the worse in Oregon between August 27 and September 8. September 6 was the single worst day with 31 of 39 monitoring sites reporting particulate levels high enough to rate as Unhealthy or worse. Other widespread poor air quality days were August 28, September 3, and September 5.

In Washington, air quality was also mostly Good until August. In eastern Washington, air quality degraded to Moderate or

worse over much of August and September, while in western Washington, air quality remained Good except for two periods in early August and early September. Air quality was worse in central Washington and the Spokane area than in other areas. Communities near the Canadian border, such as Omak, Twisp, and Winthrop had a number of Unhealthy days, fueled in part by the fires in British Columbia. Air quality across much of northern Washington, both west and east of the Cascades, saw a number of Unhealthy air quality days in early to mid-August. In western Washington, the period of worst air quality was in August, likely due primarily to smoke from British Columbia. In eastern Washington, September 5 through 7 were the worst days with every reporting unit experiencing Unhealthy or Very Unhealthy air quality. Hazardous air quality was not measured at any location in Washington.



Northwest Oregon

Northwest Oregon suffered from Unhealthy air quality from early to mid-August and again in early September. Smoke from four major fire complexes in the central Cascades was the main culprit in the southern Willamette Valley. Smoke from wildfires in British Columbia reached the northern Willamette Valley in August, causing degraded air quality at that time. The Eagle Creek Fire in the Columbia River Gorge was responsible for Moderate to Very Unhealthy air quality in early September in Portland and the surrounding area.

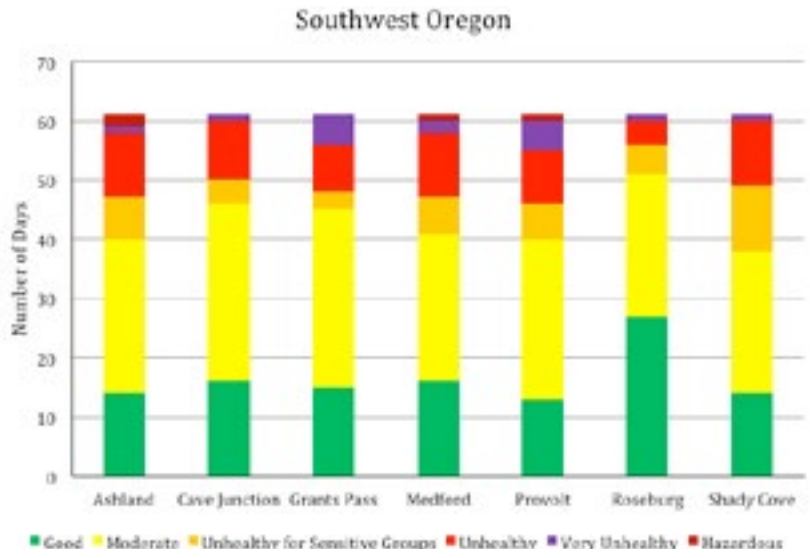
Unhealthy air quality occurred on August 2 and 3 over much of the Willamette Valley. The worst air quality occurred in the September 1 to 7 period, reaching Unhealthy and Very Unhealthy levels in much of the Valley, but quickly improving after that. However, September 16 was a day of Moderate to Unhealthy air quality in much of the area.

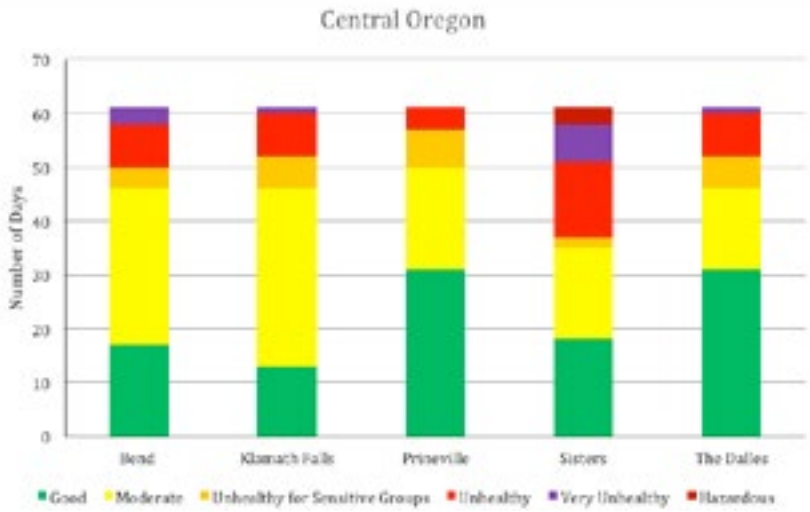
The southern Willamette Valley experienced more smoke than the northern Willamette Valley. Over the August and September period (61 days), approximately 1/3 of the days had Moderate or worse air quality in Cottage Grove, Eugene, Springfield, Oakridge, and Portland. Oakridge had 10 days with air quality rated as Unhealthy or worse, while Cottage Grove, Eugene, Springfield, and Sweet Home experienced 67 days with Unhealthy or worse air quality from smoke. In addition, Eugene, Springfield, and Oakridge had at least one day with air quality rated as Very Unhealthy. Oakridge had the fewest number of days with Good air quality in August and September, largely due to nighttime smoke impacts.

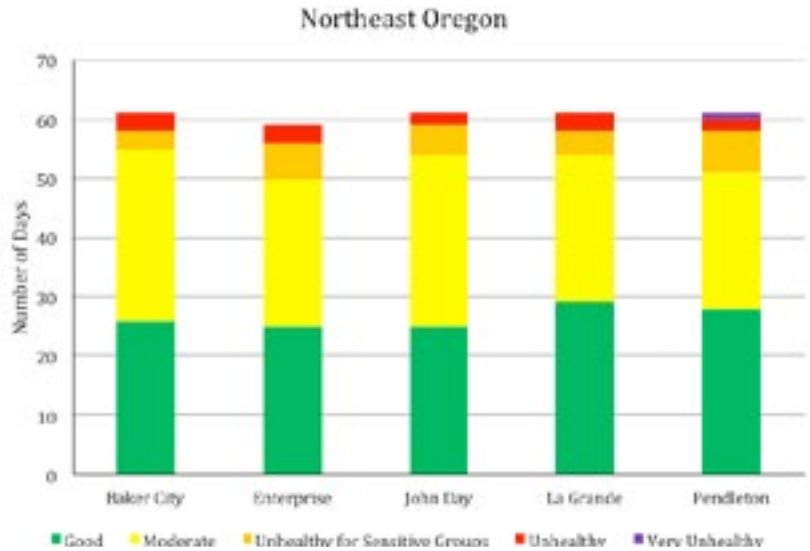
Southwest Oregon

Air quality in Southwest Oregon was degraded for most of the August through September period with the worst air quality occurring from

Date	Highway 58 Eugene/Oakridge	
8/1/2017	6.2	6
8/2/2017	14.2	31.2
8/3/2017	40.1	56.1
8/4/2017	34.2	27.1
8/5/2017	11	6.7
8/6/2017	9.7	11.8
8/7/2017	17.3	17
8/8/2017	34	34.5
8/9/2017	42.1	30.2
8/10/2017	29.3	24.1
8/11/2017	16.8	9.7
8/12/2017	12.5	2.6
8/13/2017	4.6	2.1
8/14/2017	13.1	4.2
8/15/2017	22	7.3
8/16/2017	25.6	6.2
8/17/2017	12.3	2.8
8/18/2017	25.5	2.8
8/19/2017	20.5	2.1
8/20/2017	40.7	3.2
8/21/2017	42.5	5.2
8/22/2017	43.6	5.7
8/23/2017	26.2	5.7
8/24/2017	6.7	5.4
8/25/2017	11.3	6.6
8/26/2017	39.3	9.2
8/27/2017	74.6	38.7
8/28/2017	109.6	93.2
8/29/2017	83.8	34.6
8/30/2017	24.7	5.1
8/31/2017	35.7	6
9/1/2017	83.8	8.1
9/2/2017	144.2	37.2
9/3/2017	155.5	193.5
9/4/2017	185.7	189.1
9/5/2017	145.6	122.7
9/6/2017	73.7	61.7
9/7/2017	63.9	28.6
9/8/2017	15	9.8
9/9/2017	14.5	7.1







mid-August through mid-September. Air quality was rated Moderate or worse for 45 to 48 days in the Rogue River Valley, depending on location, and for 34 days in the Umpqua River Valley due to particulates from wildfire smoke. The Rogue River Valley had 11 to 15 days of Unhealthy or worse air quality. Ashland, Medford, and Provolt each had at least 1 day rated as Hazardous, where the air quality was considered dangerous for everyone.

The Rogue River Valley was essentially surrounded by wildfires burning in the Coast Range, Cascades, and northern California, along with some fires in the valley itself. Smoke reached the Rogue River Valley from the Chetco Bar Fire, High Cascades and Miller complexes in Oregon and Northern California. No matter which way the wind blew in much of August and September, it carried smoke from somewhere into the valley, with both daytime and nighttime smoke contributing to air quality problems. Provolt, Grants Pass, and Ashland had the highest number of days rated as Unhealthy to Hazardous, followed by Cave Junction. Surprisingly, the air quality in Medford reached Very Unhealthy only one day (September 6) and Unhealthy only twice (September 3 and 5). The Umpqua Basin's smoke came from the High Cascades and Umpqua North Complexes. However, the late August-early September period still resulted in severely degraded air quality in Roseburg with September 3 reaching Very Unhealthy levels and a scattering of days rated Unhealthy before and after that.

Central Oregon

Air quality in Central Oregon (the area from Klamath Falls to The Dalles) followed much the same trend as Southwest Oregon. The entire area experienced Moderate air quality or worse for 30 to 48 days. Air quality deteriorated rapidly beginning in mid-August, especially for Sisters, Bend, and Klamath Falls, lasting until mid-September. Klamath Falls had the fewest number of days rated as Good air quality in the August through September period, but also the most number of days rated as Moderate. Prineville had the best air quality, relatively speaking, reaching no worse than Unhealthy for four days while Sisters had the worst air quality, reaching Hazardous levels on August 20 through 22. Klamath Falls, Bend, and Sisters were adversely affected by both daytime and nighttime smoke.

Northeast Oregon

The general lack of large wildfires in Northeast Oregon kept air quality from degrading severely for prolonged periods. While air quality was rated as Moderate or worse for over a month, much of that time the air quality was Moderate. The number of days rated as Unhealthy or worse ranged from two to three days, concentrated over a four-day period from September 5 to September 8. Only Pendleton reached Very Unhealthy levels and for only one day on September 6.

Unlike in most years, the Blue Mountains experienced

a relatively mild fire season, with few large fires. The most likely sources of the particulates that caused degraded air quality were smaller fires, and occasional smoke from wildfires in British Columbia, although blowing dust may have contributed to the Very Unhealthy day in Pendleton.

Southeast Oregon

As in Northeast Oregon, Southeast Oregon experienced a relatively benign fire season with respect to smoke, with few very large wildfires. Air Quality was Good to Moderate over most of the August through September period. The worst air quality was two days of Unhealthy air in Burns on September 6 and 7.

Western Washington

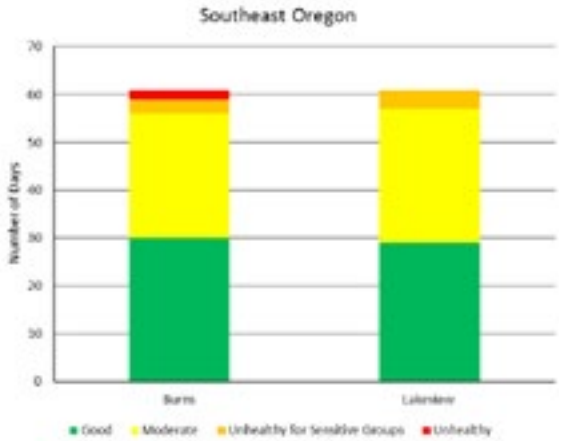
Air quality in western Washington remained Good for most of the August through September period (41 to 56 of the 61 days). Western Washington experienced two distinct periods of Moderate air quality or worse. The largest period was in early to mid-August. All but one sensor registered Moderate to Unhealthy air quality on August 2 and 3. For a short period between September 5 and 7, most sensors registered enough particulates to classify the air quality as Moderate to Very Unhealthy. Over the two-month period, North Bend had the worst air quality with 12 days rated as Unhealthy for Sensitive Groups or worse and the only location to report Very Unhealthy air quality (September 5). Cheeka Peak, Darrington, Kent, Puyallup, and the Seattle-Tacoma area had seven to eight days of Unhealthy for Sensitive Groups or Unhealthy air quality, mostly in early August.

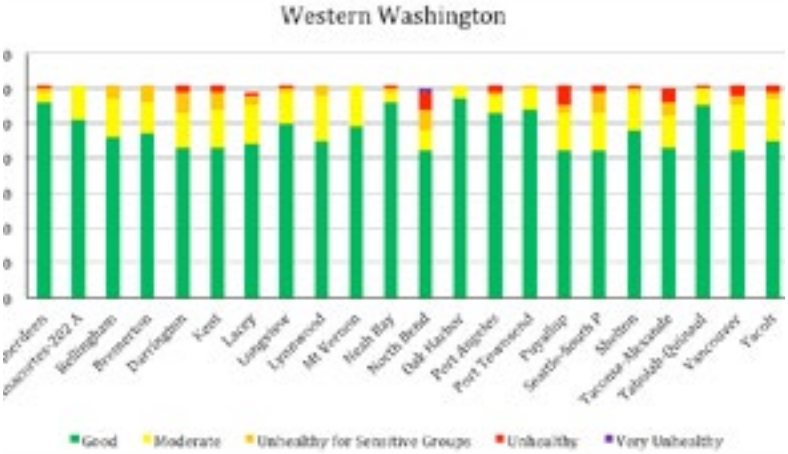
Much of the smoke in August was likely from wildfires in British Columbia. Western Washington experienced a number of smaller fires that likely contributed as well, particularly in the Seattle-Tacoma area. Smoke from wildfires in eastern Washington, such as the Norse Peak Fire, also likely affected western Washington to some degree through nighttime smoke. The Eagle Creek Fire also affected Vancouver in early September.

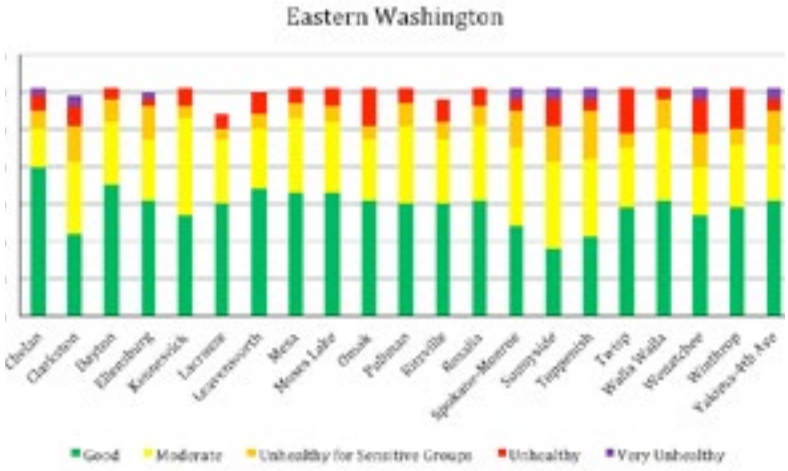
Eastern Washington

Air quality in eastern Washington was much poorer than western Washington. Air quality was rated as Good for about two weeks from mid- to late-August and after mid-September. Communities with 15 or more days rated as Unhealthy for Sensitive Groups or worse included Clarkston, parts of Spokane, Toppenish, Twisp, Wenatchee, Winthrop, and Yakima. Very Unhealthy air quality occurred in Airway Heights, Chelan, Clarkston, Ellensberg, Spokane, Sunnyside, Toppenish, Wenatchee, and Yakima for two to three days between September 5 and 7. Unhealthy air quality occurred at all other locations in that same period, with the exception of Chelan and Omak on September 5.

August 2 through 12 was another period of generally degraded air quality across eastern Washington, with Unhealthy air quality reported for much of the period in Omak, Sunnyside, Twisp, Wenatchee, and Winthrop. Other locations with at least one day rated as Unhealthy over that same period include Airway Heights, Chelan, Clarkston, Kennewick, Leavenworth, Mesa, Moses Lake, Ritzville, Spokane, Toppenish, and Wellpinit.







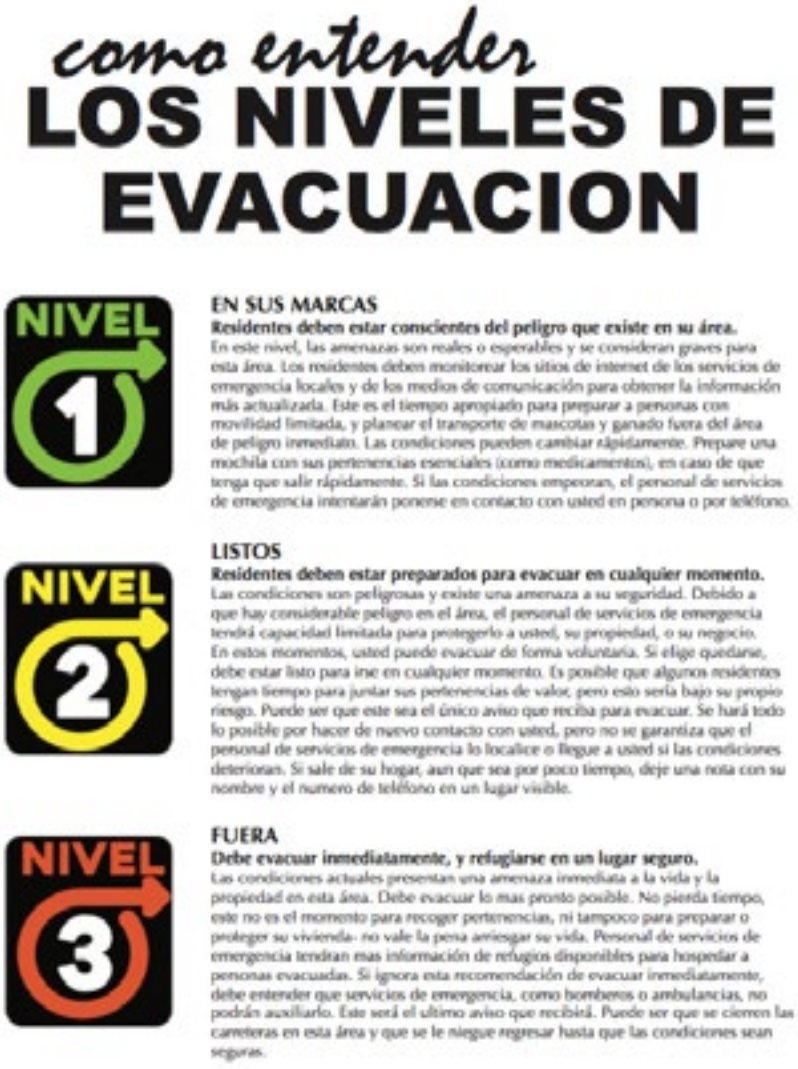
Smoke during the first half of August was likely a combination of smoke from wildfires in British Columbia and from local wildfires. For example, smoke from the Jolly Mountain and Norse Peak fires affected Yakima and the surrounding area, while Diamond Creek Fire affected the air quality in the Methow Valley. In contrast, smoke and degraded air quality in September was most likely from local wildfires, particularly in the Cascades. Poor air quality in Clarkston may also have been due to nighttime smoke from wildfires in western Montana and central Idaho that was funneled down the Clearwater River basin.

Appendix L: Spanish Outreach

Fire Prevention and Incident Management Teams expanded efforts in outreaching to Spanish-speaking visitors and residents. In the last four years, the regional fire prevention efforts have worked with cooperators and agency personnel to create and disseminate a variety of fire prevention, education, emergency evacuation, and specific campaign materials.

This year, IMTs worked with agency personnel and local community members to produce Spanish-language updates on active incidents. Spanish translations of daily updates, community meeting presentations and evacuation information (Ready-Set-Go) were produced at Chetco Bar, Eagle Creek, Indian Creek, Norse Peak, Uno Peak and at the SW Oregon Joint Information Center. Some of these materials were posted and further accessed on the national Inciweb site.

Additional materials were revised in several languages for the Matsutake Mushroom harvest community in south Central Oregon.



como entender
LOS NIVELES DE EVACUACION

NIVEL 1

EN SUS MARCAS

Residentes deben estar conscientes del peligro que existe en su área.

En este nivel, las amenazas son reales o esperables y se consideran graves para esta área. Los residentes deben monitorear los sitios de internet de los servicios de emergencia locales y de los medios de comunicación para obtener la información más actualizada. Este es el tiempo apropiado para preparar a personas con movilidad limitada, y planear el transporte de mascotas y ganado fuera del área de peligro inmediato. Las condiciones pueden cambiar rápidamente. Prepare una mochila con sus pertenencias esenciales (como medicamentos), en caso de que tenga que salir rápidamente. Si las condiciones empeoran, el personal de servicios de emergencia intentarán ponerse en contacto con usted en persona o por teléfono.

NIVEL 2

LISTOS

Residentes deben estar preparados para evacuar en cualquier momento.

Las condiciones son peligrosas y existe una amenaza a su seguridad. Debido a que hay considerable peligro en el área, el personal de servicios de emergencia tendrá capacidad limitada para protegerlo a usted, su propiedad, o su negocio. En estos momentos, usted puede evacuar de forma voluntaria. Si elige quedarse, debe estar listo para irse en cualquier momento. Es posible que algunos residentes tengan tiempo para juntar sus pertenencias de valor, pero esto sería bajo su propio riesgo. Puede ser que este sea el único aviso que reciba para evacuar. Se hará todo lo posible por hacer de nuevo contacto con usted, pero no se garantiza que el personal de servicios de emergencia lo localice o llegue a usted si las condiciones deterioran. Si sale de su hogar, aun que sea por poco tiempo, deje una nota con su nombre y el numero de teléfono en un lugar visible.

NIVEL 3

FUERA

Debe evacuar inmediatamente, y refugiarse en un lugar seguro.

Las condiciones actuales presentan una amenaza inmediata a la vida y la propiedad en esta área. Debe evacuar lo mas pronto posible. No pierda tiempo, este no es el momento para recoger pertenencias, ni tampoco para preparar o proteger su vivienda- no vale la pena arriesgar su vida. Personal de servicios de emergencia tendran mas información de refugios disponibles para hospedar a personas evacuadas. Si ignora esta recomendación de evacuar inmediatamente, debe entender que servicios de emergencia, como bomberos o ambulancias, no podrán auxiliarlo. Este será el ultimo aviso que recibirá. Puede ser que se cierren las carreteras en esta área y que se le niegue regresar hasta que las condiciones sean seguras.

Sample translation that was available for use in Oregon and Washington

Acronyms and Glossary

Acronyms: For a more complete list of acronyms used in fire management, please see the National Wildfire Coordinating Group's glossary of acronyms and abbreviations at: https://www.nwcg.gov/glossary/acronyms

ERC

Energy Release Component A relative measure of the potential available energy (British thermal units) per unit area (square foot) within the flaming fire front at the head of a fire. Conditions producing an ERC of 24 represent a potential heat release twice that of conditions resulting in an ERC value of 12. It can also be considered an indicator of the composite dryness of both live and dead fuels and of drought.

GACC

Geographic Area Coordination Center A political boundary, designated by the wildland fire protection agencies, where these agencies work together in the coordination and effective utilization of fire management resources. Each GACC provides and coordinates fire intelligence, information, ordering, and dispatch.

GeoMAC

Geospatial Multi-Agency Coordination Provides fire managers near real-time information, and daily updates of the fire perimeter based on input from incident intelligence sources such as GPS data and infrared imagery from fixed-wing and satellite platforms. Allows users in remote locations to manipulate map information displays, zoom in and out to display fire information at various scales and detail, and print hard copy maps for use in fire information and media briefings, dispatch offices, and coordination centers.

IA

Initial Attack The actions taken by the first resources on arrival at a wildfire to protect lives and property and prevent further expansion of the fire.

IAP

Incident Action Plan The plan that contains objectives reflecting the overall incident strategy and specific tactical actions and supporting information for the next operational period on an incident. The plan may be oral or written. When written, the plan may have a number of attachments, including incident objectives, organization assignment list, division assignment, incident radio communication plan, medical plan, traffic plan, safety plan, fire weather, and incident maps.

IC

Incident Commander. The individual responsible for the management of all operations at the incident site. The IC is usually in charge of an incident management team, which may be national (Type 1) or regional (Type 2) or local (Type 3) and includes a wide variety of resources and personnel.

ICP

Incident Command Post Location at which primary command functions are executed. The ICP is often co-located with the incident base or other incident facilities.

ICS

Incident Command System A standardized on-scene emergency management concept specifically designed to allow the user(s) to adopt an integrated organizational structure equal to the complexity and demands of a single or multiple incidents without being hindered by jurisdictional boundaries.

ICS 209

Incident Status Summary Report. A daily summary of the information concerning an individual fire or complex of fires such as fire start date, fire size, fire location, resources assigned, observed and expected fire weather, observed and expected fire behavior, the number of evacuations, current and expected actions taken on the fire, firefighting resource needs, values at risk, number and type of firefighter injuries, and so forth.

IMT

Incident Management Team. The Incident Commander and appropriate general staff or command staff personnel assigned to manage an incident. Teams vary in size and experience and are assigned based on availability of the teams and complexity of the incident.

MAC

Multi-Agency Coordination. A group of representatives of involved agencies and jurisdictions who come together to make decisions regarding the prioritizing of incidents and the sharing and use of critical resources. At the geographic area level it is commonly referred to as a MAC Group; at a more local level, it may be referred to as a mini-MAC. The MAC Group is not a part of the on-scene Incident Command System and is not involved in developing incident strategy or tactics.

MIST

Minimum Impact Suppression Tactics The application of strategy and tactics that effectively meet suppression and resource objectives with the least environmental, cultural, and social impacts.

NFDRS

National Fire Danger Rating System A uniform fire danger rating system that focuses on the environmental factors that control the moisture content of fuels, the potential rate of spread, and the potential flame length.

NMAC

National Multi-Agency Coordinating Group A group provides national wildland fire operations direction, prioritization, allocation, and oversight. NMAC roles and responsibilities include establishing national priorities among the Geographic Areas; directing, allocating or reallocating resources among or between Geographic Areas to meet national priorities; anticipating and identifying future national fire management resource requirements; and providing oversight of general business practices between NMAC and the Geographic Multi-Agency Coordination (GMAC) groups. NMAC membership includes the Bureau of Indian Affairs Fire Director; Bureau of Land Management Fire Operations Manager; U.S. Fish and Wildlife Service Fire Director; U.S. Forest Service Assistant Director, Operations; National Association of State Foresters' Fire Director; National Park Service Fire Director; and U.S. Fire Administration Program Specialist.

NWCG

National Wildfire Coordinating Group A group formed under the direction of the Secretaries of Agriculture and the Interior that includes representatives of the U.S. Forest Service, Bureau of Land Management, Bureau of Indian Affairs, National Park Service, U.S. Fish and Wildlife Service, and National Association of State Foresters. The group's purpose is to handle coordination and effectiveness of wildland fire activities and provide a forum to discuss and resolve issues and problems of substantive nature. NWCG is the certifying body for all training courses in the National Fire Curriculum.

NIMO

National Incident Management Organization A specialized, full-time Incident Management Team consisting of just the command and general staff (incident commander, safety officer, public information officer, planning section chief, operations section chief, logistics section chief, and finance section chief). The primary focus of this program is the management of complex wildland fire along with year-round non-incident duties such as training, quality assurance activities, fuels management, and leadership training and development.

NWCC

Northwest Interagency Coordination Center The Geographic Area Coordination Center for Oregon and Washington.

PNWCG

Pacific Northwest Wildfire Coordinating Group A group of 11 partner agencies that collaborate on wildland fire management issues in the Northwest. Members include U.S. Forest Service, Bureau of Land Management, Bureau of Indian Affairs, National Park Service, U.S. Fish and Wildlife Service, Oregon Department of Forestry, Washington State Department of Natural Resources, Washington Association of Fire Chiefs, the Oregon Fire Chiefs Association, the Oregon State Fire Marshal and the Washington State Fire Marshal.

RAWS

Remote Automated Weather Station A weather station that transmits weather observations via satellite to the Wildland Fire Management Information system and used to calculate fire danger indices.

ROSS

Resource Ordering and Status System A national system that provides automated support to interagency and agency dispatch and coordination centers. The system provides the status of resources available to support incidents, enables dispatch offices to exchange and track resource ordering information electronically, and enables dispatch offices to rapidly and reliably exchange mission-critical emergency electronic messages. By coordinating the movement of personnel and equipment across bureaucratic lines, it makes state and federal resources look more like a single pool of equipment and staff.

SEAT

Single Engine Air Tanker A modified crop duster used to drop retardant on wildfires, primarily in rangelands and other light fuels.

VLAT

Very Large Air Tanker Modified DC-10 and Boeing 747 jets that can carry up to 11,600 gallons (DC-10) or 19,600 gallons (747) of retardant; limited to level or gently rolling terrain due to flight characteristics of the aircraft.

WFDSS

Wildland Fire Decision Support System A web-based tool that assists fire managers and analysts in making strategic and tactical decisions for fire incidents. The process is linear, scalable, and progressively responsive to changing fire complexity. The system provides land management direction with respect to fire, incident management objectives, values at risk, potential fire behavior, an assessment of incident complexity, and a recommendation for what level of incident management team may be appropriate.

Glossary: For a more complete list of terms used in wildland fire management, please see the National Wildfire Coordinating Group's glossary at https://www.nwcg.gov/glossary/a-z.

A

Aerial Fuels All live and dead vegetation in the forest canopy or above surface fuels, including tree branches, twigs and cones, snags, moss, and tall shrubs.

Aerial Ignition Ignition of fuels by dropping incendiary devices or materials from aircraft.

Aerial Reconnaissance Use of aircraft for detecting and observing fire behavior, values at risk, suppression activity, and other critical factors to assist command decisions on strategy and tactics needed for fire suppression. Often called "aerial recon" or just "recon".

Agency Any federal, state, or county government organization with jurisdictional responsibilities.

Agency Administrator The official with authority to make decisions, also known as a line officer.

Air Attack The deployment of fixed-wing or rotary aircraft on a wildland fire to drop retardant or suppressant, shuttle and deploy crews and

supplies, or perform aerial reconnaissance of the overall fire situation. Can also refer to the person functioning as air attack officer and directing aerial operations.

Air Tanker A fixed-wing aircraft equipped to drop fire retardant or suppressant.

Anchor Point. An advantageous location, usually a barrier to fire spread, from which to start building a fire line. An anchor point is used to reduce the chance of firefighters being flanked by fire.

Area Command An organization established to: 1) oversee the management of multiple incidents that are each being handled by an Incident Management Team organization; or 2) to oversee the management of a very large incident that has multiple Incident Management Teams assigned to it. Area Command has the responsibility to set overall strategy and priorities, allocate critical resources based on priorities, ensure that incidents are properly managed, and that objectives are met and strategies followed.

B

Backburn A nebulous term that can either refer to a backfire or to a burn out.

Backfire A fire set along the inner edge of a fire line to consume the fuels in the path of a wildfire or to change the direction of force of the fire's convection column. An indirect attack tactic that requires approval of the Incident Commander. (see also Burn Out)

Blowdown Trees that are knocked down during a wind event.

Blow-up A sudden increase in fire intensity or rate of spread strong enough to prevent direct control or to upset control plans. Blow-ups are often accompanied by violent convection and may have other characteristics of a fire storm. (See "Flare-up".)

Brush A collective term that refers to stands of vegetation dominated by shrubby, woody plants or low-growing trees, usually of a type undesirable for livestock or timber management.

Bucket Drops The dropping of fire retardant or suppressant from a specially designed bucket slung beneath a helicopter.

Burn Out Setting fire inside a control line to widen it or to consume fuels between the edge of the fire and the control line. A direct attack tactic that can be initiated by a crew boss or engine boss.

Burning Period That part of each 24-hour period when fires spread most rapidly, typically from about mid-morning to sundown.

C

Chain A unit of linear measurement equal to 66 feet, often used in describing the length of fire line built or yet to be built.

Cold Front The leading edge of a relatively cold air mass that displaces warmer air. The heavier cold air may cause some of the warm air to be lifted. If the lifted air contains enough moisture, the result may be cloudiness, precipitation, and thunderstorms. If both air masses are dry, no clouds may form. Following the passage of a cold front in the Northern Hemisphere, westerly or northwesterly winds of 15 to 30 mph or more often continue for 12 to 24 hours.

Command Staff The command staff consists of the information officer, safety officer, and liaison officer. They report directly to the incident commander (IC) and may also have assistant staff.

Complex Two or more individual fire incidents located in the same general area which are assigned to a single incident commander or unified command.

Confinement The strategy employed in appropriate management responses where a fire perimeter is managed by a combination of direct and indirect actions and use of natural topographic features, fuel, and weather factors.

Contained The status of a wildfire indicating that a control line has been completed around the fire and any associated spot fires, which can reasonably be expected to stop the fire's spread.

Controlled A status of a wildfire indicating that a control line has been completed around the fire, any spot fires, and any interior islands to be saved; all unburned areas adjacent to the fire side of the control line have been burned; and all hotspots that are immediate threats to the control line have been cooled down or suppressed, such that the control lines can reasonably be expected to hold under the foreseeable conditions.

Control Line All built or natural fire barriers and treated fire edge used to control a fire.

Cooperating Agency An agency supplying assistance including, but not limited to direct tactical or support functions or resources to the incident control efforts, such as the Red Cross, law enforcement agency, telephone company, and so forth.

Crew Boss A person in supervisory charge of a crew—usually 16 to 21 firefighters—who is responsible for their performance, safety, and welfare.

Crown Fire The movement of fire through the crowns or tops of trees or shrubs more or less independently of the surface fire. A fire is said to be "crowning" when the flames get up into the tops of trees and spreads.

D

Defensible Space An area—either natural or human-made—where material capable of causing a fire to spread has been treated, cleared, reduced, or changed to act as a barrier between an advancing wildland fire and resources or lives at risk. In practice, defensible space is generally defined as an area of 30 feet or more around a structure that is cleared of flammable brush or vegetation or other fuels.

Dip Tank A large container of water that may have hard or soft sides, but which holds enough water with a sufficiently large opening to allow helicopters to fill their buckets while hovering.

Direct Attack Any treatment of burning fuels, such as by wetting, smothering, or chemically extinguishing the fire—or by physically separating burning fuels from unburned fuels.

Dispatch The implementation of a command decision to move a resource or resources—such as crews, dozers, engines, or aircraft—from one place to another.

Dispatch Center A facility from which resources are directly assigned to an incident.

Dispatcher A staff person who receives reports of discovery and status of fires, confirms their locations, receives orders for resources and takes action to provide people and equipment needed for control, and sends them to the designated locations.

Division Geographical areas of operation on an incident. Divisions are established when the number of resources exceeds the span-of-control of the operations chief. In the Incident Command System organization, a Division is located between the Branch and the Task Force or Strike Team.

Dozer Any tracked vehicle with a front-mounted blade used for exposing mineral soil or constructing fire line or safety zones.

Dozer Line Fire line constructed by a dozer.

Drought Index A number representing the net effect of evaporation, transpiration, and precipitation in producing cumulative moisture depletion in deep duff or upper soil layers.

Dry Lightning Storm Thunderstorm in which negligible precipitation reaches the ground. Also called a "dry storm".

E

Engine A ground vehicle providing specified levels of pumping, water, and hose capacity.

Engine Crew Firefighters assigned to an engine. The Fire Line Handbook defines the minimum crew makeup by engine type.

Escape Route A pre-planned and understood route firefighters can take to move to a safety zone or other low-risk area, such as an already burned area (commonly called "the black"), a previously constructed safety area, a meadow that won't burn, or a natural rocky area that is large enough to provide refuge without being burned.

Evacuation Orders Instructions issued that inform residents of what level of preparation or leave-taking is warranted; issued by local law enforcement agencies, such as a county Sheriff. The levels of evacuation orders include:

Level 1 Evacuation Order: "Be Aware of the Situation—BE READY".

Level 2 Evacuation Order: "BE SET to Evacuate—You Must Prepare to Leave at a Moment's Notice".

Level 3 Evacuation Order: "Evacuate Immediately—GO".

Extended Attack Actions taken on a wildfire that has exceeded the initial attack.

Extreme Fire Behavior A level of fire behavior characteristics that ordinarily precludes methods of direct control action. One or more of the following are usually involved: high rate of spread, prolific crowning or spotting, presence of fire whirls, a strong convection column. Predictability is difficult because such fires often exercise influence on their environment and behave erratically, sometimes dangerously.

F

Facilitated Learning Analysis Interagency reports developed and shared on the Wildland Fire Lessons Learned Center site after an incident, accident, or near miss with the goal of developing and nurturing a high reliability organization through a learning culture.

Fire Behavior The manner in which a fire reacts to the influences of fuels, weather, and topography. Usually measured factors such as by how fast the fire is spreading, flame length, and whether the fire is starting spot fires, among other measures.

Fire-Adapted Ecosystem/Species An ecosystem or species with the ability to survive and regenerate in a fire-prone environment.

Fire-Adapted Community A human community consisting of informed and prepared residents collaboratively planning and taking action to safely co-exist with wildland fire.

Fire-Dependent Ecosystem/Species An ecosystem or species that requires fire in order to persist.

Fire Behavior Forecast A prediction of probable fire behavior, usually prepared by a Fire Behavior Analyst, in support of wildfire management or prescribed burning operations.

Fire Behavior Analyst A person working for the Planning Section Chief for establishing a weather data collection system and for developing fire behavior predictions based on fire history, fuels, weather, and topography.

Fire Break A natural or constructed barrier used to stop or check fires, or to provide a control line from which to work. Also known as a Fuel Break.

Fire Front The part of a wildland fire in which continuous flaming combustion is taking place. Unless otherwise specified, the fire front is assumed to be the leading edge of the fire perimeter. In ground fires, the fire front may be mainly smoldering combustion.

Fire Intensity A general term relating to the heat energy released by a fire, often measured in terms of flame length.

Fire Line A linear fire barrier that is scraped or dug to mineral soil after being cleared of all vegetation.

Fire Perimeter The entire outer edge or boundary of a fire, which may contain within it substantial areas of unburned fuels.

Fire Severity The impact of a fire on a particular resource. Depending on the resource assessed, fire severity can differ on same acre.

Fire Storm Violent convection caused by a large continuous area of intense fire. Often characterized by destructively violent surface in-drafts near and beyond the perimeter and sometimes by tornado-like whirls.

Fire Weather Weather conditions that influence fire ignition, fire behavior, and management of a given fire or group of fires.

Flanks of a Fire The parts of a fire's perimeter that are roughly perpendicular to the main direction of spread.

Flare-up Any sudden acceleration of fire spread or intensification of a fire. Unlike a "blow-up", a flare-up lasts a relatively short time and does not radically change control plans.

Fuel Combustible material, including vegetation such as grass, leaves, ground litter, plants, shrubs, and trees that feed a fire. Dead Fuel are fuels with no living tissue in which the moisture content is governed almost entirely by absorption or evaporation of atmospheric moisture. Live Fuel consists of living plants, such as trees, grasses and shrubs, in which the seasonal moisture cycle is controlled by internal physiological mechanisms in combination with the amount of water available in the soil.

Fuel Moisture The quantity of moisture in fuels expressed as a percentage of the weight when thoroughly dried at 212 degrees Fahrenheit.

Fuels Reduction Manipulation, including combustion or removal of fuels, to reduce the likelihood of ignition or to lessen potential damage and resistance to control. Often includes thinning or prescribed burning.

G

Geographic Area A political boundary, designated by the wildland fire protection agencies, where these agencies work together in the coordination and effective utilization of fire management resources. Each Geographic Area includes a Geographic Area Coordination Center (GACC) that handles fire intelligence, information, ordering, and dispatch.

Ground Fire A fire that is spreading primarily in organic material beneath the surface litter, such as peat.

H

Haines Index An atmospheric index used to indicate the potential for wildfire growth by measuring the stability and dryness of the air over a fire.

Hand Line A fire line built with hand tools.

Head of a Fire The portion of the fire having the fastest rate of spread.

Heavy Fuels Fuels of large diameter—such as snags, logs, and large limb wood—that ignite and are consumed more slowly than small diameter fuels.

Helibase The main location within the general incident area for parking, fueling, maintaining, and loading helicopters. The helibase is usually located at or near the incident base.

Helispot A temporary landing spot for helicopters.

Helitack The use of helicopters to transport crews, equipment, and fire retardant or suppressant to the fire line during the initial stages of a fire. Helitack can also refer to personnel, as in "helitack crews".

Helitack Crew A group of firefighters trained in the technical and logistical use of helicopters for fire suppression.

Holding Actions Planned suppression actions required to achieve wildland fire management objectives.

Holding Resources Firefighting personnel and equipment assigned to do all required fire suppression work following fire line construction but generally not including extensive mop-up.

Hose Lay Arrangement of connected lengths of fire hose and accessories on the ground, beginning at the first pumping unit and ending at the point of water delivery.

Hotshot Crew A highly trained and experienced fire crew used mainly to build fire line by hand on the hotter parts of the fire. Hotshots—also called "Interagency Hotshot Crews" or "IHCs"—are national resources and considered a Type 1 crew.

Hotspot A particular active part of a fire.

Hotspotting Reducing or stopping the spread of fire at points of particularly rapid rate of spread or special threat, generally the first step in prompt control, with emphasis on first priorities.

I

Incident A human-caused or natural event, such as a wildland fire, tornado, hurricane, or major flood that requires emergency service action to prevent or reduce the loss of life or damage to property or natural resources.

Incident Management Team The Incident Commander and appropriate general staff or command staff personnel assigned to manage an incident. Teams vary in size and experience and are assigned based on availability of the teams and complexity of the incident.

Incident Objectives Statements of guidance and direction necessary for selection of appropriate strategy or strategies, and the tactical direction of assigned resources. Incident objectives are based on realistic expectations of what can be accomplished when all allocated resources have been effectively deployed.

InciWeb The interagency all-risk incident web information management system that provides publicly available information on on-going and recent incidents. Available at http://inciweb.nwcg.gov/.

Infrared Detection The use of heat sensing equipment to detect heat sources that are not visually detectable by the normal surveillance methods of either ground or air patrols.

Initial Attack The actions taken by the first resources on arrival at a wildfire to protect lives and property and prevent further expansion of the fire.

L

Large Fire A wildfire that is at least 100 acres in forests or 300 acres in grass or brush.

Lead Plane Aircraft used to make dry runs over a target area to check wind and smoke conditions and topography and to lead Air Tankers to targets and supervise their drops.

M

Mobilization The process and procedures used by all organizations—federal, state, and local—for activating, assembling, and transporting all resources requested to respond to or support an incident.

Mop Up Extinguishing or removing burning material near control lines, felling snags, and trenching logs to prevent rolling after an area has burned, to control the fire or reduce residual smoke. Mop up is one word when used as a noun (the crew will do mopup) and two words if used as a verb (the crew will mop up the fire) or adjective (The mop up crew will work in Division A today).

Mutual Aid Agreement Written agreement between agencies or jurisdictions in which they agree to assist one another upon request by furnishing personnel and equipment.

O

Operational Period The period of time scheduled for execution of a given set of tactical actions as specified in the Incident Action Plan. Operational periods can be of various lengths, although usually are not more than 24 hours.

Oregon Fire Service Mobilization Plan A plan to carry out the direction in Oregon's Emergency Conflagration Act and other emergency response laws. The Emergency Conflagration Act is a state law that allows the Oregon Office of the State Fire Marshal to assist and support the Oregon fire service during major wildfire emergency operations. Only the Governor is authorized to invoke this act and only for fires that involve or threaten life and structures. See also http://www.oregon.gov/osp/SFM/docs/2017_MobPlanFinal.pdf

Overhead People assigned to supervisory and support positions, including Incident Commanders, command staff, general staff, directors, supervisors, and unit leaders.

P

Plume-Dominated A wildland fire whose activity is determined by its convection column.

Point Protection Placing firefighting personnel and equipment at specific high-value locations, such as individual or clusters of structures, power and communication infrastructure, etc.

Preparedness Levels Increments of planning and organizational readiness dictated by burning conditions, fire activity, and resource availability. Response and support to non-fire incidents requiring a significant commitment of resources, such as responding to a hurricane during the main wildfire season, may also affect preparedness levels. The five Preparedness Levels range from "I" to "V", with "V" being the highest level. Each Preparedness Level has specific management directions. As the Preparedness Levels rise, more federal and state employees become available for fire mobilization if needed.

Preparedness Level I - Minimal large fire activity is occurring nationally. Most Geographic Areas have low to moderate fire danger. There is little or no commitment of national resources.

Preparedness Level II - Several Geographic Areas are experiencing high to extreme fire danger. Wildland fire activity is increasing and large fires are occurring in one or more Geographic Areas. Minimal mobilization of resources from other Geographic Areas is occurring. There is moderate commitment of national resources with the potential to mobilize additional resources from other Geographic Areas.

Preparedness Level III - Two or more Geographic Areas are experiencing wildland or prescribed fire activities requiring a major commitment of national resources. Additional resources are being ordered and mobilized through the National Interagency Coordination Center. Type 1 and Type 2 Incident Management Teams are committed in two or more Geographic Areas and crew commitment nationally is at 50 percent.

Preparedness Level IV - Three or more Geographic Areas are experiencing incidents requiring Type 1 and 2 Incident Management Teams. Competition exists between Geographic Areas. Nationally, 60 percent of Type 1 and 2 IMTs and crews are committed.

Preparedness Level V - Geographic Areas are experiencing major incidents which have the potential to exhaust all agency fire resources. Eighty percent of Type 1 and Type 2 Incident Management Teams and crews are committed, as well as the majority of other national resources.

Prevention Activities directed at reducing the incidence of fires, including public education, law enforcement, personal contact, and reduction of fuels hazards.

R

Rappelling The technique of landing specially trained firefighters from hovering helicopters; involves sliding down ropes with the aid of handheld friction-producing devices called "Genies." Rappellers are often deployed into remote areas where access is difficult (such as areas without roads or helicopter landing spots)—or too remote to allow effective deployment of firefighters without extended hiking time.

Rate of Spread The relative activity of a fire in extending its horizontal dimensions—expressed as a rate of increase of the total perimeter of the fire, as rate of forward spread of the fire front, or as rate of increase in area—depending on the intended use of the information. Rate of Spread is usually expressed in "chains" or acres per hour for a specific period in the fire's history.

Red Flag Warning Alert issued by fire weather forecasters to warn personnel about an ongoing or imminent critical fire weather situation.

Relative Humidity The ratio of the amount of moisture in the air to the maximum amount of moisture that the air would contain if it were saturated—the ratio of the actual vapor pressure to the saturated vapor pressure.

Resource Order An order placed with Dispatch for firefighting or support resources, often initiated by the Incident Management Team on a fire.

Resources 1) Personnel, equipment, services, and supplies available, or potentially available, for assignment to fires or other incidents. 2) The natural resources of an area, such as timber, wildlife habitat, grasslands, watershed values, and recreational and other values.

Retardant A substance or chemical agent that reduces the flammability of combustibles. Retardant application is generally via fixed-wing air tankers or helicopters, and is used to slow or retard the flames, often for pretreatment of fuels prior to ground attack or other suppression activities or for slowing the spread or potential for spread of the fire.

S

Safety Zone An area cleared of flammable materials used for escape in the event the fire line is outflanked or in case a spot fire causes fuels outside the control line to render the line unsafe. In firing operations, crews maintain a safety zone close at hand. Safety zones may also be constructed as integral parts of fuel breaks. They are greatly enlarged areas which can be used with relative safety by firefighters and their equipment in the event of a blow-up in the vicinity.

Severity Funding Suppression funds used to increase the level of presuppression capability and fire preparedness when predicted or actual burning conditions exceed those normally expected due to severe weather conditions.

Single Resource An individual, a piece of equipment (such as an engine) and its staff, or a crew or team of persons with an identified work supervisor.

Situation "Sit" Report A report issued by the National Interagency Fire Center detailing the number of active incidents, resources assigned, increases in fire size and total number of acres burned by geographic area and agency for both wildfires and prescribed fires, and including the total hectares burned to date in Canada. During the main fire season, the report is issued daily.

Size Up To evaluate a fire to determine a course of action for suppression.

Slash Debris left after logging, pruning, thinning, brush cutting, or other vegetation management activities, including material such as logs, chips, bark, branches, stumps and broken understory trees or brush.

Slop-over A fire edge that crosses a control line or natural barrier intended to contain the fire.

Smokejumper A firefighter who travels to fires by aircraft and parachutes into the fire area. Smokejumpers are national resources considered as Type 1.

Snag A standing dead tree or part of a dead tree from which at least the smaller branches have fallen.

Spot Fire A fire ignited outside the perimeter of the main fire by flying sparks or embers.

Spot Weather Forecast A special forecast issued to fit the time, topography, and weather of a specific fire. The National Weather Service issues these forecasts upon request of the user agency and are more detailed, timely, and specific than regular zone forecasts.

Spotting Behavior of a fire producing sparks or embers that are carried by the wind and start new fires beyond the zone of direct ignition by the main fire.

Staging Area Locations set up at an incident where resources can be placed while awaiting a tactical assignment on an available basis. The Operations section manages staging areas.

Strike Team Specified combinations of the same kind and type of resources, such as a group of staffed engines, with common communications and a leader.

Surface Fire A fire that burns primarily in loose debris on the soil surface such as litter, grass, dead branches, and low vegetation.

T

Torching The ignition and flare-up of a tree or small group of trees, usually from bottom to top.

Type (Type 1, Type 2 etc.) An indication of resource capability. A Type 1 resource provides a greater overall capability due to power, size, capacity, training, or similar factors than would be found in a Type 2 resource. Resource typing provides managers with additional information in selecting the best resource for the task and can apply to equipment, personnel, and teams.

U

Unified Command A team effort which allows all agencies with jurisdictional responsibility for the incident, either geographical or functional, to manage an incident by establishing a common set of incident objectives and strategies without losing or abdicating authority, responsibility, or accountability.

W

Washington State Fire Services Resource Mobilization Plan A plan developed and used by the state of Washington to provide personnel, equipment, and other logistical resources from around the state when a wildland fire or other emergency exceeds the capacity of local jurisdictions. Only the fire chief of the local fire protection jurisdiction or fire chief's authorized representative has the authority to request this state fire services resource mobilization. The Washington State Patrol Fire Protection Bureau Office of the State Fire Marshal coordinates statewide fire service resources to support local firefighting efforts. See also http://www.wsp.wa.gov/wp-content/uploads/2017/11/mobeplan_cover_all-sections.pdf

Water Tender A ground vehicle capable of transporting specified quantities of water, generally used to supply engines or support helicopter dip tanks.

WFDSS

WildCAD A GIS-based Computer-Aided Dispatch [CAD] system.

Wildland Fire Any non-structure fire, other than prescribed fire, that occurs in a wildland area.

Wildland-Urban Interface The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.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