

From *Inciweb*¹: Notes from fire management teams on temperature inversions, smoke, and their influence on the 2017 Rice Ridge and Lolo Peak Fires

Rice Ridge Fire	Lolo Peak Fire
Aug 9: Most active ² fire behavior continues in the heavy dead and down fuels. After midnight, active fire was observed above the inversion layer.	
Aug 10: Fire activity picked up around noon. Strong surface burning has been observed throughout the night above the inversion layer. Fire spread on east side is greatest when slope and wind align. Winds from isolated thunderstorms yesterday caused torching and spotting.	
Aug 15-16: Fire burns almost all night in thermal belt above 5,600'. This may put the fire at critical ridge top locations. Multiple tree torching overnight.	Aug. 16: Winds today will be from the west, with gusts of up to 20 mph. An inversion kept humidity low last night in the thermal belt - on mid and upper slopes, so we have a dry start to the day. After the inversion breaks, winds will increase. Fire will continue to spread steadily, with uphill runs and torching or crowning expected.
	Aug. 17: Significant fire growth occurred yesterday afternoon and evening, when westerly winds moved the fire approximately 4 miles to the east. The fire continued to burn actively overnight in the thermal belt (mid and upper slopes - due to inversion) and was very visible from both the highway 12 and 93 corridors. Today, fire behavior is expected to be similar to yesterday, including active fire into the evening hours. The inversion is forecast to lift around noon, resulting in a longer, active fire period.
Aug 23-25: Fire will continue to spread to the west, north, and east where fuels, winds, and topography align. The development of thermal belts will keep fire burning actively at higher elevations.	

¹ These notes have been extracted from full "209" reports in the Incident Command System archives.

² "Active" fire behavior refers to flaming and rapid spread.

<p>Aug 26-30: Another warm, dry day. Highs ranged from the mid to upper 70s on the ridge tops to the mid to upper 80s in the lower elevations. Minimum humidity dropped to near 10 percent. Smoke remained trapped in the valleys under a strong surface inversion and is expected to remain trapped in the lower elevations. Very poor humidity recovery³ is expected on the mid to upper slopes, where thermal belts will keep fire burning actively at higher elevations.</p>	
<p>Aug 31: Last night outflows from thunderstorms caused several hours of east winds on the fire, which gusted over 15 mph. That ended before 2300, and then the inversion set in with terrain-driven winds. Humidity recovered to around 40% in the thermal belts.</p>	<p>Aug 31: Hot, dry weather is predicted to continue with high temperatures even on high ridgetops. Today, operations were suspended when afternoon winds increased safety concerns south and east of the fire area. Fire continued to back southwards, crossed a deep valley, and is now moving up the opposite slope. An inversion layer limited the fire's spread rate.</p>
	<p>Sep 4: The fire was very active overnight in the thermal belt, due to a strong inversion, in which cold air pooled in the valleys and warm air blanketed the mid-slopes. Torching on the western edge of the fire caused spot fires that grew into a 300 acre burning area outside of the primary containment line.</p>
<p>Sep 5-6: Intensifying thermal belts tonight and tomorrow night will cause poor humidity recoveries, and this will cause active fire behavior in steep, difficult terrain. This will further hamper suppression activities. Valley inversions with dense smoke continue to impact the entire area.</p>	<p>Sep. 5-6: Winds are expected to subside today, and the inversion is expected to keep air stable for the next 2 days or so. The inversion reduced visibility, so air operations could not be used. However, satellite imagery was used to locate hot spots along the western and southern portions of the fire. Since air support was not available, firefighters used trucks to spray retardant directly on the ground in preparation for future burnouts. Today, air support will be limited or unavailable because the inversion limits visibility.</p>
	<p>Sep. 7: A stagnant weather pattern with heavy inversions is forecast for the next two days. A low pressure system over southern Canada could bring strong westerly winds in 2-3 days.</p>

³ "Humidity recover" refers to the expectation that, as temperatures drop during the night, relative humidities will increase – that is, "recover."

	The inversion and low visibility due to smoke halted air operations yesterday and likely again today.
Sep 8: Valley inversions of dense smoke continue to impact the entire area. Unstable weather moving into the fire area will greatly increase the potential for erratic fire behavior and large fire growth.	Sep 8: We have had a stagnant weather pattern causing the heavy inversions. Should begin to change this afternoon. Strong westerly winds are expected today and tomorrow.
Sep 9-10: Valley inversions of dense smoke will abate to some extent today as stronger winds scour the area. However, these winds will continue to pose containment issues for line personnel and will continue to pose a threat to communities and infrastructure. Forecast is for continued hot, dry conditions and the return of stable atmospheric conditions, which will cause valley inversions and mid-slope thermal belts.	Sep 9-10: Strong westerly winds are predicted for today and tomorrow, with gusts up to 30 mph. The inversion and smoke kept visibility low in the valley.
Sep 11: Strong inversions in valley bottoms and thermal belts on mid-slope areas of the fire will return after dark. Active fire behavior can be expected in these areas throughout the night.	
Sep 14: Rain is expected today and tomorrow. This will reduce fire behavior in heavier fuel concentrations to smoldering and creeping. In areas of lighter fuels, the fire may be extinguished completely. Although active fire behavior and fire spread will be slowing and/or coming to an end over the next week, some resource needs remain high due to the large logistical operation needed to consolidate equipment and supplies and begin fire rehabilitation work.	