

BAER Specialists Assess Radford and Fairview Burned Areas

After a large wildfire, special actions are often necessary to provide for public safety and protect critical cultural and natural resources. Some fires create situations that require special efforts to prevent additional damage after the fire is contained. Loss of vegetation exposes soil to erosion; water runoff may increase and cause flooding, sediments may move downstream and damage houses or fill reservoirs and put endangered species and community water supplies at-risk.

A Forest Service Burned Area Emergency Response (BAER) team is assessing federal lands burned in the Radford and Fairview Fires, with the goal of keeping visitors and employees safe while recreating and working in the San Bernardino National Forest (NF). BAER team assessments focus on emergency actions that are necessary to protect human life and safety, property, critical cultural resources, and critical natural resources such as soil productivity, hydrologic function, and water quality. Emergency actions are intended to minimize any further damage during rainstorm events.

BAER hydrologists, soil scientists, geologist, road engineers, recreation specialists, biologists, botanists, archeologists, and GIS specialists are currently assessing the condition and response of the watersheds within the burned areas. These BAER scientists and specialists evaluate other critical values that could be at risk during major rainstorm events such as forest roads and trails, campgrounds, and other forest infrastructure.

This photo below shows Forest Service BAER specialists Kim Boss, Edgar Martinez, and Stacey Wellman preparing to begin field assessments for the Fairview burned area.



BAER soil scientists evaluate the burned watersheds to determine post-fire effects to soil and watershed conditions. This includes testing whether the soil is hydrophobic – aka repels water, the amount of soil cover left, soil structure damage, and organic matter left in the soil. Post-fire burned areas of hydrophobic (water repellent) soils along with destruction of soil structure can act as a “tin roof” by reducing the infiltration capacity of soils, enhanced overland flow, and accelerated soil erosion.

This is important because the amount of hydrophobicity and soil structure damage are important components to determining how much increased water runoff we can expect after a fire. The hydrophobic layer is the result of a waxy substance that is derived from

plant material burned during a hot fire. The waxy substance penetrates the soil as a gas and solidifies after it cools, forming a waxy coating around soil particles. Hydrophobicity repels water from soil and is considered when mapping watershed response to rainstorms after a wildfire.

Water repellency is only one of the many changes with the topsoil that happens in moderate and high soil burn severity. The biggest driver is lack of soil cover and soil structure. This is “why” soil burn severity is so important and “why” hydrophobicity is only one of the contributing factors. Soil texture also plays a role, coarse-grained soils allow hot gasses to penetrate deeper and tend to have deeper water repellent layers where fine-textured soils pore space is tight and does not allow gases to penetrate readily thus causing only surface water repellency.

In this photo below, Forest Service Soil Scientist Serena Kuczarski assesses soil hydrophobicity (water repellency), changes to soil structure, and maps the soil burn severity (SBS) in the Radford burned area.



BAER Engineers and Hydrologists evaluated the conditions of roads and watersheds within the Radford and Fairview burned areas for potential threats from flash flooding, sediment flows impacting drainage crossings and the overall infrastructure due to increased erosion, sedimentation, and water flows. They determined whether road culverts and other drainage structures within the burned areas have sufficient capacity to pass post-fire modeled increased water and debris flows—in particular, they look to see if they are clogged, collapsed, or could get clogged after major rainstorm events. Roads are BAER critical values that need to be assessed for these threats. The BAER team recommends emergency stabilization treatments and actions to minimize those threats.

Critical drainage crossings are identified by BAER assessment team road engineers and hydrologists. They evaluate the condition of existing drainage structures and road conditions for their BAER assessment report. The specialists also evaluate the burned area road culverts for risk of plugging during fall/winter storms. They inspect these crossings to prescribe the most effective BAER treatment to protect the road prisms from washing away during major storm events.

These two photos below are Forest Service 2N06 Road in the Radford burned area.



This photo shows a recent debris flow that initiated during the September 12, 2022, rainstorm event and deposited debris on the crossing of Forest Service Road 2N06 in the Radford burned area.



In the photo below, Forest Service hydrologist Andy Stone assesses the point where drainages cross a Forest Service Road within the Radford burned area.



BAER hydrologists model post-fire watershed responses under typical storm conditions to determine if there is a risk of flooding or increased water flows that could undermine or damage the roads and/or result in dangerous situations for Forest visitors or employees.

Below is a watershed drainage that crossed a road in the Radford burned area that the BAER hydrologists evaluated and included in their assessment report.



The photo below shows a road culvert that had been damaged and no longer functioned as a drainage structure.



This photo shows fresh surface failures, slopes and channels loaded with un-consolidated sediments of all sizes of rocks and sediment available to be transported during rainstorms in the Fairview burned area. The photo also shows recent flows in the Bautista Creek following the September 11, 2022, rainstorm event.



Along with roads, trails are also a BAER critical value that are assessed for potential threats from flash flooding, debris flows impacting drainage crossings and the overall trail prisms and infrastructure due to increased erosion, sedimentation, and water flows. Forest Service Recreation Specialists assessed trails within the Radford and Fairview burned areas.

The last photo below shows a portion of Skyline trail along a ridge in the Radford burned area that was evaluated for the BAER assessment team report along with BAER emergency stabilization treatment recommendations to minimize threats from potential rainstorm threats.



BAER SAFETY MESSAGE: *Everyone near and downstream from the burned areas should remain alert and stay updated on weather conditions that may result in heavy rains and increased water runoff. Flash flooding may occur quickly during heavy rain events – be prepared to act. Current weather and emergency notifications can be found at the **National Weather Service** websites: www.weather.gov/sto/ and www.weather.gov/eka/.*