UWRL faculty member Belize Lane monitoring hydrologic response at Grizzly Creek Fire burn scar amid multiple debris flow events | College of Engineering

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July 8, 2021—Heavy rains this past week have triggered flash floods and multiple debris flows in the Grizzly Creek Fire burn scar area, causing extended safety closures along I-70 through Glenwood Canyon, Colorado, and diverting traffic. These debris flow events on June 26, 27, and July 3 impacted hundreds of feet of road and were reported to be nearly 10 feet deep. Although debris flows happen suddenly, they are not unexpected in this post-wildfire system.

PhD student Haley Canham and postdoc Justin Stout measuring soil infiltration rates in Glenwood Canyon.

The Grizzly Creek wildfire ignited on August 10, 2020 in Glenwood Canyon, east of Glenwood Springs, Colorado. While burning, the Grizzly Creek Fire was one of the nation’s top priority fires because of the critical infrastructure threatened including I-70, the Shoshone Power Plant on the Colorado River, railroad, and numerous recreation opportunities. The fire was not fully contained until nearly 4 months later in December 2020 after burning 32,631 acres. But, the dangers of the Grizzly Creek fire didn’t stop when the fire was extinguished; it left the landscape changed and vulnerable to the exact scenarios Colorado experienced this week.

UWRL and CEE faculty member Belize Lane and PhD student Haley Canham are part of the team picking up where the firefighters left off. As part of Dr. Lane’s NSF RAPID Grant, she and her students are monitoring the post-wildfire hydrologic response to track changes in streamflow and sediment dynamics in the Grizzly Creek Fire burn scar. Numerous flow gaging stations have been installed on the mainstem Colorado River and burned tributaries within Glenwood Canyon to monitor post-wildfire streamflow in response to precipitation events.

Dr. Lane collecting streamflow data with grad student Haley Canham and undergraduate student Missy White.

“Soil in a burned area has a decrease in organic matter and increase in ash, which results in a hydrophobic and loose soil that repels water” Lane explained. “As a result, infiltration decreases and runoff increases. When intense rain storms occur in a burned landscape, such as those seen within the past week at Grizzly Creek Fire, the runoff can result in flash floods and debris flows, which are fast-moving landslides that can endanger life and property. This increase in streamflow may also increase the rate and volume of sediment that is transported downstream, where it can cause flooding, reduce reservoir storage, and damage aquatic habitat and water resources infrastructure. Understanding how the runoff and sediment response vary for different burn severities (high to low) and landscape conditions (i.e. watershed size, slope, aspect, and vegetation) will help natural resource managers manage post-wildfire risk and plan for a future with more fire.”

Dr. Lane and her team are collaborating with a broader group of scientists from Watershed Sciences at USU, Simon Fraser University, Virginia Tech, and the USGS Landslide Hazards Program to model impacts of wildfire on sedimentation in Utah. Dr. Lane and team will continue to monitor and make field visits to the Grizzly Creek Fire area for the remainder of the year to improve understanding of hydrology in burned landscapes and mitigate future risks.
Related Research:

Dousing the Flames: USU Investigates how Wildfires Impact Utah’s Water Supply Reservoirs

With record-breaking temperatures and the drought intensifying in Utah and throughout the west, fire activity is expected to significantly increase this year. USU and UWRL researchers are conducting research using traditional, bathymetric, and remote sensing topography data to calculate what effect forest fires are having on stream sedimentation, which is already one of the leading concerns for water security across the western United States.

Contact:

Belize Lane, belize.lane@usu.edu, 650-520-4584