

# Research Brief



## WEST FORK COMPLEX FIRE: IMPACTS ON WATER QUALITY AND AQUATIC LIFE

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In 2013, the West Fork Complex Fire consumed 110,000 acres of forest in the Upper Rio Grande. The majority of the area was moderate to severely burned, where vegetation was removed and the heat from the fire altered soils and increased the potential for erosion. A team of researchers from the Colorado School of Mines (CSM) partnered with RWEACT (Rio Grande Watershed Emergency Action Coordination Team) to evaluate the fire's impacts on water quality, aquatic insects and fish.



The goal of the study is to better understand forest fire impacts on water quality and aquatic ecosystem in order to learn and prepare for future fires.

The study is currently in its third year with CSM researchers still monitoring water quality, insects and fish populations along the Rio Grande and four of its tributaries. Overall, the Rio Grande appears resilient and remains healthy, though some segments continue to receive higher sediment loads and experience turbid water below the burn scar. When the water has been turbid on the main-stem of the Rio Grande, fish have been able to move away from areas with poorer water quality. Currently, trout populations continue to grow and achieve Gold Medal trout water status as designated by Colorado Parks and Wildlife in much of the Rio Grande. Insect populations in the Rio Grande suffered the initial year after the fire but have now recovered.



**Rio Grande Watershed**  
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A few of the Rio Grande's tributaries were impacted more severely by the fire. Fish are unable to escape water quality impacts in smaller tributaries.

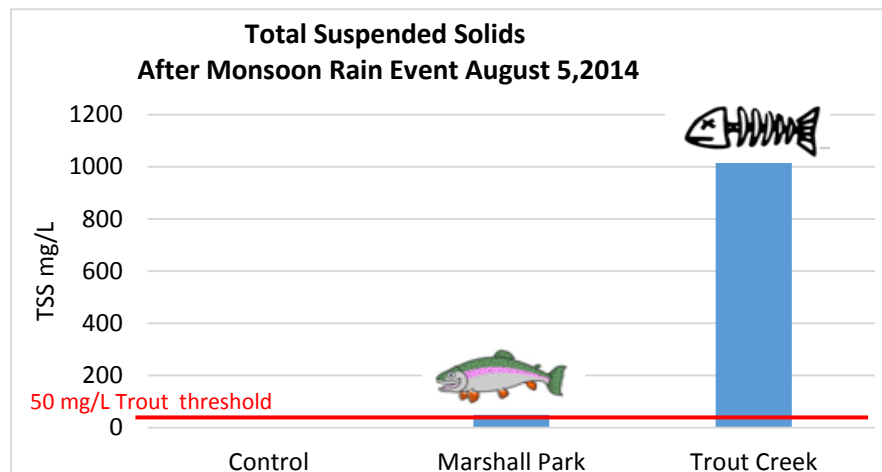


Figure 1. An example of suspended solid concentrations in the water of a control site (an area that was not burned) a site in the middle of the fire scar on the Rio Grande in Marshall Park, and a fire impacted tributary, Trout Creek.

Some of the fire impacted tributaries experienced fish kills the summer after the fire (2014) due to high sediment loads driven by monsoon rain events. Trout suffocate and die when exposed to suspended solid concentrations above 50 mg/L for an extended time. A hillside above Trout Creek slid due to

erosion from the fire and caused a fish kill in immediate downstream waters (Fig. 1).

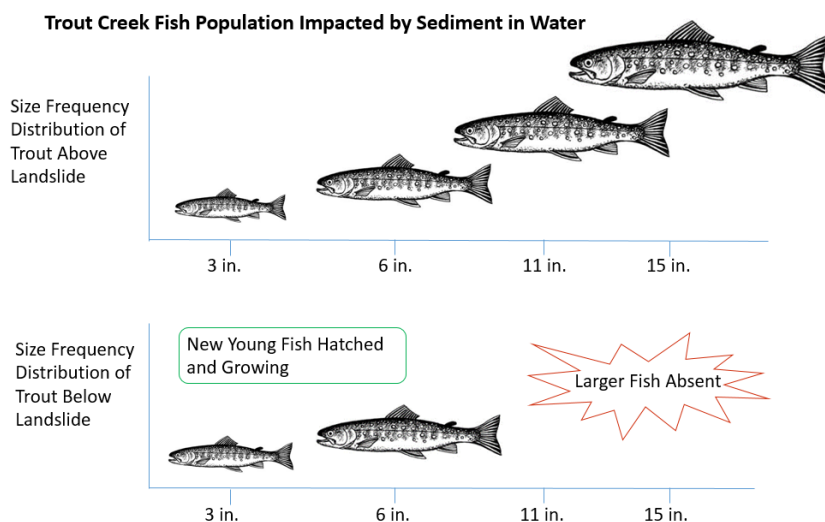


Figure 2. Trout population 1 year after the erosion event on Trout Creek.

CSM researchers continue to monitor the streams; three years after the fire fish and insect populations are recovering with new fish born and surviving (Fig. 2).

The work continues - the Colorado School of Mines RWEACT study will produce a risk map to identify vulnerable downstream receiving waters for future fires as well as publish scientific

papers about the West Fork Complex Fire impacts. Other research by the Hogue Research Group at CSM includes utilizing remote sensing satellite images to identify vegetation recovery in the Upper Rio Grande and evaluating long-term changes in basin water budget and regional water supply.

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