

Wildfire Impacts on Water Quality, Macroinvertebrates and Trout: An Initial Survey After the West Fork Complex Fire in the Upper Rio Grande

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Abstract. Forest fires affect water quality in the disrupted watershed, which can devastate the aquatic ecosystem including sensitive trout (*Salmonidae*) and macroinvertebrate species. The West Fork Fire Complex consumed 110,000 acres of forest in the state of Colorado during the summer of 2013. The majority (88%) of the burn area was comprised of Engelmann spruce (*Picea engelmannii*) trees killed previously by Spruce Beetle (*Ips spp.*). Damage to the soils was of moderate to high severity in the majority of the area (60%). The recent fire surrounded the Rio Grande, affecting water quality and habitat critical to insects and fish. The water quality of the Rio Grande (above and below the burn) and some of the effected tributaries is currently being monitored for both quality and quantity. Parameters important to the survival of aquatic life, such as flow, temperature, dissolved oxygen, pH, conductivity, total dissolved solids, total suspended solids, turbidity, nutrients, and suspended and dissolved metals are being monitored along the Rio Grande and in tributaries. Macroinvertebrate and fish populations are sampled in the same locations. First year observations showed the ecosystem to be relatively resilient, with stable water quality and survival of insects and fish. However, an intense monsoon season this summer is driving extensive sediments into tributaries from steep, severely burned hillslopes. These monsoon events have caused acute and dramatic fish kills, where hundreds of trout were reported killed in one tributary in a single day event. Turbidity was observed as high as 488 NTU in the impacted stream with fish kill, whereas the turbidity was 25 NTU in a neighboring tributary outside of the burn area. Salmonids can be negatively impacted by relatively low turbidity, with prior studies noting that the turbidity threshold for rainbow trout is 70 NTU. Continued monitoring of water quality, macroinvertebrate populations, and fish populations is being undertaken to determine the key drivers of the acute fish kill events. This presentation will highlight the role of burn severity and storm intensity on water quality and aquatic response of fire-impacted streams of the Upper Rio Grande.