

## **Title:** Post-Fire Run-Off Water Quality Monitoring Studies Conducted in Riverside County

### **Authors:**

Rebekah Guill

1995 Market Street, Riverside CA 92501

Riverside County Flood Control and Water Conservation District

Garth Engelhorn

1155 Sportfisher Dr. Suite 202, Oceanside CA 92054

NV5

In recent years, the Riverside County Flood Control and Water Conservation District (District) undertook the coordination of post-fire preparation and response for parts of the county where District facilities were used to prevent or minimize impacts from post-fire debris flows. In coordination with NV5, with feedback from the stakeholder groups, and following the guidance included in the Southern California Stormwater Monitoring Coalition (SMC) Post-Fire Water Quality Monitoring Plan, the District developed post-fire monitoring studies to assess the potential water quality impacts of the 2018 Holy Fire and the 2019 Tenaja Fire. Although no regional agency is responsible for conducting post-fire water quality monitoring, the District undertook the development and implementation of the studies to assess the effects of the fires on the hydrologic response, and sediment and pollutant loads in post-fire storm runoff.

The Holy Fire burned approximately 23,000 acres of the Cleveland National Forest in August 2018. The steep slopes and high-to-moderate burn severity of the once forested lands created all the ingredients for post-fire debris flows. Loss of vegetation, hydrophobic soils, changes in soil erosiveness, and a greatly altered landscape stability meant that mud and debris flows were a real and imminent concern for not only the safety of the community, but the potential water quality impact to downstream waterbodies. To add insult to injury, next came the 2018-2019 winter storms which did their part with above average rainfall combined with large high-intensity storms of size and duration that have not been seen for nearly a decade. The result was damaging debris and mud flows, creating increased safety concerns, and rapid mobilization needs.

The Tenaja Fire burned approximately 2,001 acres in the Santa Margarita River Watershed Management Area in September 2019. Although it was a smaller fire, the District conducted monitoring in the watershed to evaluate the water quality impacts to the downstream waterbody. This second fire has allowed the District to evaluate differences or similarities based on the scale of these fires.

The District's sampling design focused on addressing management question #1 from the SMC Post-Fire Water Quality Monitoring Plan, how does post-fire runoff affect contaminant flux? These studies were designed to assess contaminant concentration and flux by sampling stormwater runoff from the terminal end of burned catchments and comparing the data to reference sites. The goal was to assess the effects of the fires on the hydrologic response, sediment loads, and contribution of pollutant loads (metals, nutrients, and organic contaminants) from post-fire runoff to downstream receiving waters. In a region where storms are difficult to predict and average annual precipitation varies from 10 inches to 14 inches, monitoring implementation takes creative thinking and planning. To successfully target the capture of post-fire storm flow the mobilization criteria required real-time modifications of the approach.

This presentation will present the findings as relevant to the study questions regarding pollutant loading and flux. Data presented will show measurable changes between storms and in general provide insight on the impacts of storm water discharge quality from the burn of forestry lands. This presentation also describes the challenges of conducting post-fire monitoring in terms of mobilization, safety, adapting to the unknowns of post-fire runoff, and following the SMC Post-fire monitoring guidance.