FACT SHEET

Napa Valley Post-Fire Water Quality Monitoring

Napa Valley Fires

In October 2017, the Atlas, Nuns, and Tubbs fire burned 51,436 acres in the Napa River Watershed. Surface waters within and downstream of areas affected by the fires include stressed waterbodies, endangered species habitat, and the source water for drinking water systems.

Figure 1. October 8 @ 10:14 PM. Photo obtained from October 2017 North Bay Fire Images, Sonoma Ecology Center[1]

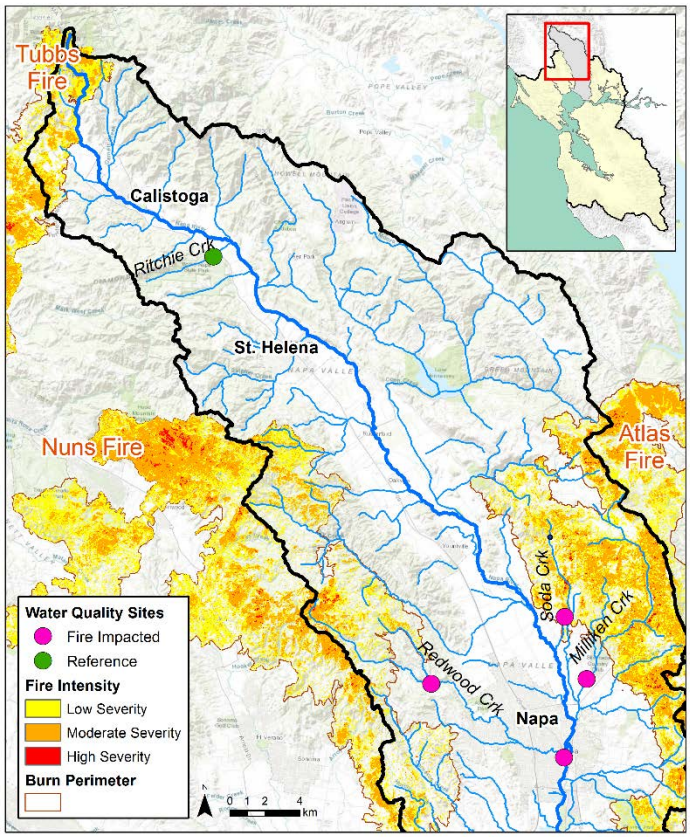

Figure 2. Post-fire water quality monitoring sites in the Napa River Watershed

Monitoring Plan

During storm events, surface waters may be affected as rain carries pollutants away from burn areas. The Water Board assessed potential impacts to the surface waters downstream of burned areas by monitoring chemical conditions during storm events. Research shows that fire affected areas in Southern California contained increased concentrations of contaminants including nutrients (e.g. nitrates and phosphorus), polycyclic aromatic hydrocarbons (PAHs), copper, zinc, mercury, lead, and other metals[2,3]. Several of these pollutants, especially metals, can be detrimental to human health and toxic to aquatic life. Many pollutants often attach to suspended particles and enter the water. Therefore, high flows can transport sediment bound pollutants to creeks and downstream to the San Francisco Bay.

Figure 3. A) Water Board Staff collecting water quality samples at the Napa River in downtown Napa. B) Erosion and drainage controls installed next to a burned structure.

The Water Board collected samples from the locations in Fig. 2 on four occasions; pre-storm (baseline), during the beginning of the first storm of the season, and again during three subsequent "qualifying" storms. A qualifying storm was defined as predicted rainfall ≥1 inch in a 24-hour period. Precipitation and flow rates for each of the four storms are depicted in Fig. 4. More information on the San Francisco Bay Water Board's post-fire monitoring plan is available **here**.

Work Cited

1. Sonoma Valley Fire Recovery. https://www.sonomaecologycenter.org/fire-recovery/. Retrieved February 5, 2018.
2. Stein, E.D., J.S. Brown, T.S. Hogue, M.P. Burke, and A. Kinoshita. 2012. Stormwater contaminant loading following wildfires. *Environmental Toxicology and Chemistry* 31: 2625–2638. doi:10.1002/etc.1994.
3. Burke, M.P., T.S. Hogue, J. Barco, C. Wessel, A.Y. Kinoshita, and E.D. Stein. 2013. Dynamics of pre- and post-fire pollutant loads in an urban fringe watershed. *Environmental Monitoring and Assessment* 185:10131–10145.

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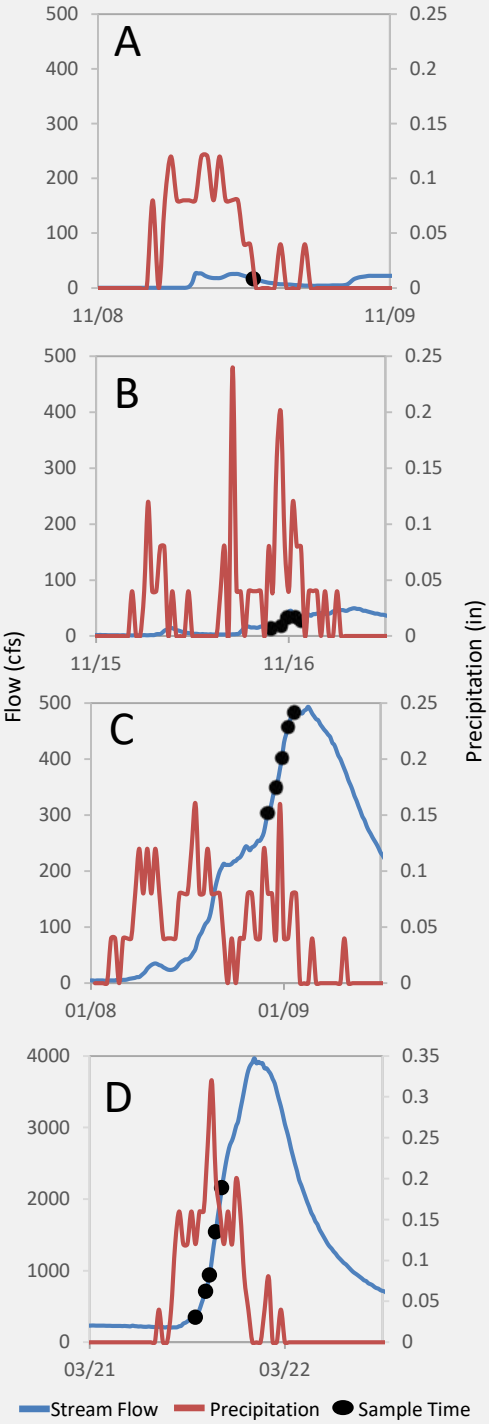


Figure 4. Precipitation, flow, and collection time for samples collected on A) Nov. 8-9, 2017 for a 1.44" storm; B) Nov. 15-16, 2017 for a 2.36" storm; C) Jan. 8-9, 2018 for a 3.28" storm; D) March 21-22, 2018 for a 3.60" storm. Flow data from Napa River at St. Helena, USGS Gage #11456000. Hourly precipitation data from California Data Exchange Center (CDEC) St. Helena Station SH4. Only one site was sampled during Storm A due to low predicted rainfall in Napa.

Data Evaluation

Evaluation guidelines for protection of aquatic life and human health were determined from SF Bay Regional water quality objectives, U.S. EPA criteria, or Regional Water Board environmental screening levels. Data for burned sites was compared to baseline data and a reference site in the watershed. The full data set is available **here**.

- Eighteen of 816 samples exceeded chronic objectives for selenium, aluminum, iron, manganese, or pH. Six of these exceedances occurred at the unburned reference site.
- Observed increases in metals and nutrients are likely a natural increase that occurs during storms and not related to the fire.
- The small increase in metals and nutrients between baseline and storm flows was similar for burned watersheds and the reference, unburned watershed.
- In contrast, metal concentrations from burned areas in Southern California were often hundreds of times higher than burned areas in this study (Figure 5).

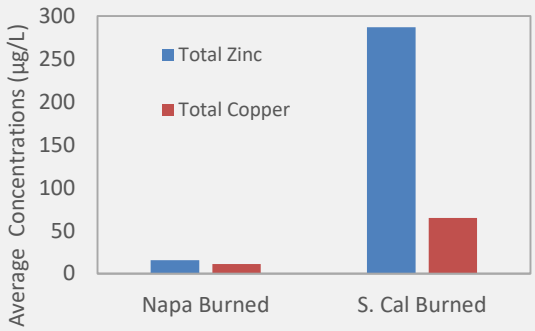
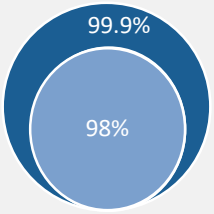


Figure 5. Comparison of metal concentrations in post-fire storm samples for Napa River and Southern California (Stein et al., 2012).

Conclusions

Results from this study indicate water quality was not impacted by the fires.

- The 2017-2018 winter was dry. Storm magnitude and intensity may not have been high enough to mobilize all burned material.
- Slope stabilization, erosion and drainage controls, and other similar practices may have prevented burned material from entering the creeks.
  - Along with local, state, and federal partners, Napa County provided site assessment, hazardous debris removal, and erosion control supplies to those impacted by fires.
  - More information is available on Napa County's Erosion Control and Watershed Protection webpage.



815 of 816 (99.9%) pollutant measurements were below acute toxicity objectives. The single aluminum exceedance was observed at the unburned reference site.

798 of 816 (98%) pollutant measurements were below chronic toxicity objectives.

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