Impact of Wildfires on Water Quality and Treatment

Fernando L. Rosario-Ortiz, D.Env.

Department of Civil, Environmental and Architectural Engineering

Environmental Engineering Program
University of Colorado, Boulder
Background

- Approximately two thirds of municipalities in the US rely on water from forested watersheds
- Wildfires can abruptly and adversely impact watersheds which generally provide high quality source water
- The effects of wildfires on a watershed are complex and long lasting
Wildfires and Water Sources

Extent of wildfires Summer 2021

US Forest Service Forest to Faucets Map
Impacts to Water Resources

Hohner et al., Accounts of Chemical Research, 2019
Impacts to Water Resources

- Turbidity (cloudiness in the water)
- Increased concentrations of nutrients, metals, and organic carbon
- Impact treatment operations, including potential impacts to infrastructure
- Impact on the formation of disinfection byproducts

Hohner et al., Accounts of Chemical Research, 2019
Hohner et al., 2016
Rhoades et al., 2018
Impacts to Water Treatment

TREATMENT CHALLENGES EXPECTED FROM WILDFIRES

Short-term Impacts
Issues that may occur in the weeks and months after an event are mostly due to increased turbidity due to ash and spikes in NOM and pH and alkalinity changes.

1. INCREASED SOLIDS LOADINGS from ash fallout.
2. TURBIDITY RUNOFF from soils due to loss of groundcover.
3. INCREASES AND CHANGES in the concentration and character of NOM.*

* Increased turbidity from loss of vegetation and changes in NOM can continue for years after an event.

Long-term Impacts
Two parameters – TURBIDITY and NOM – drive the design and operation of water treatment plants. These other water quality parameters, however, can also influence process selection and plant operations.

Becker, et al., JAWWA 2018
Issues with WUI Fires
Issues with WUI Fires

- Organic compounds such as benzene and benzoic acid derivatives
- Inorganic (metal) compounds such as arsenic and zinc

Thank you!
Resources


Questions

• What is one thing media is doing well and what needs to be improved?

• What is one take home message for the reporters?