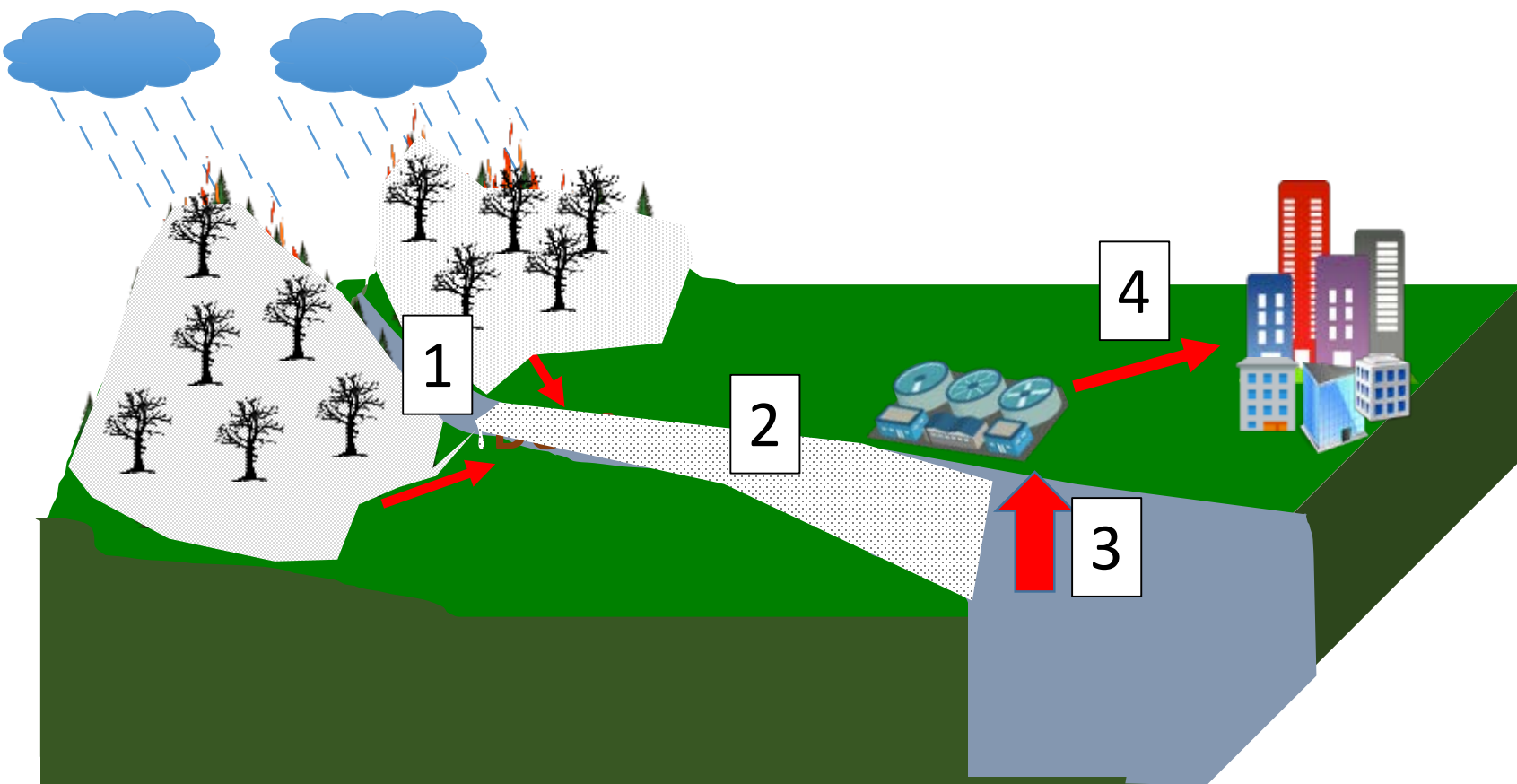


Forest Fire Alters Dissolved Organic Matter Exports from Forested Watersheds: Impacts on Water Quality & Treatability

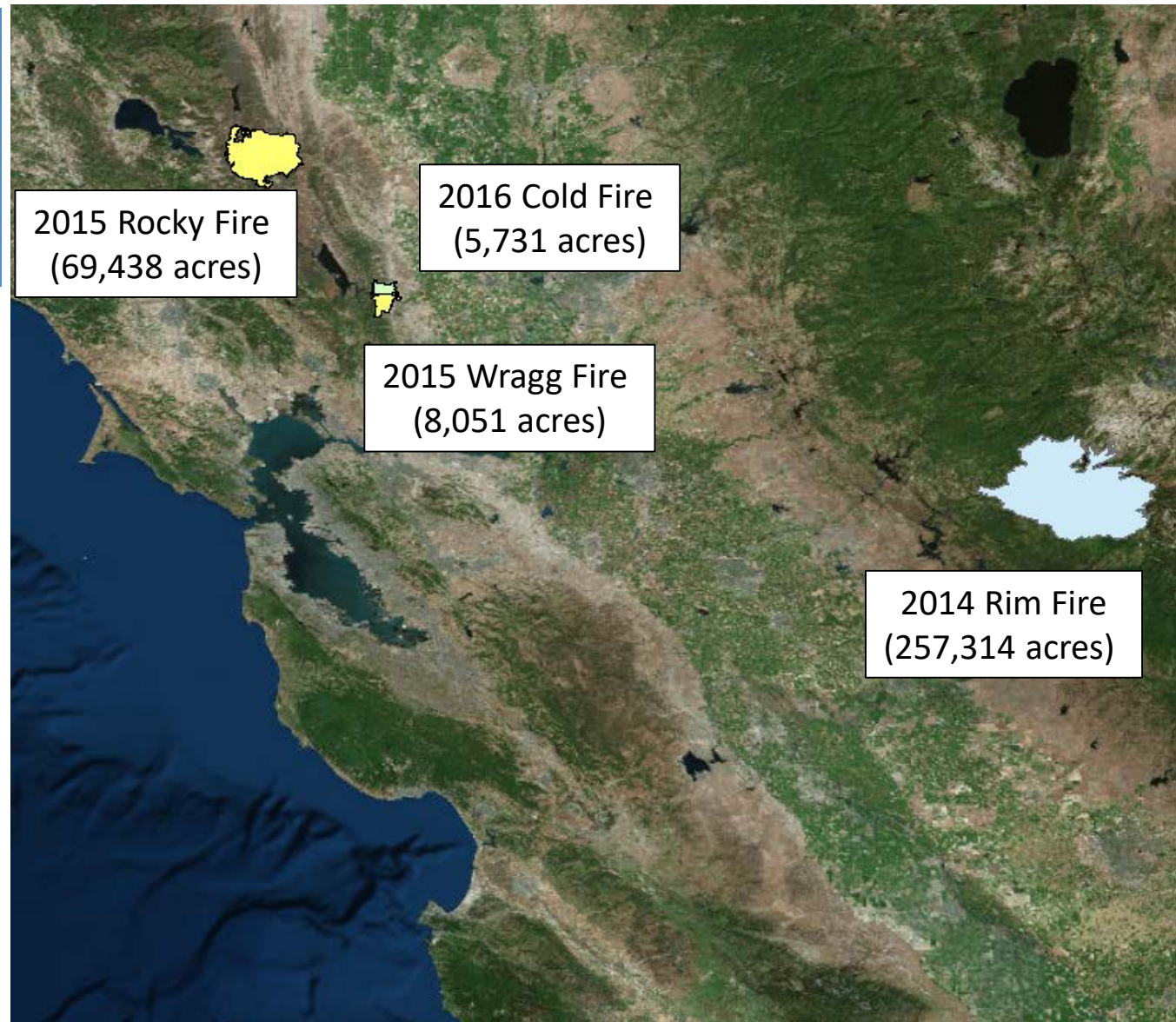
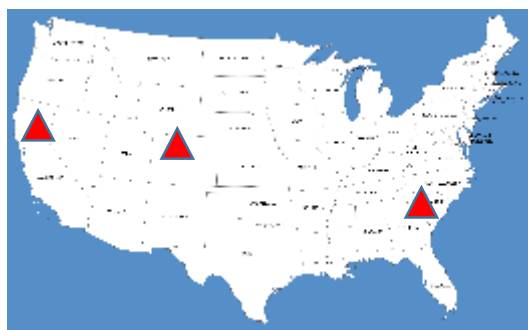


From Headwater to Household Tap Continuum



1. Runoffs / Exports from Watersheds
2. DOM in Source Water
3. Water Intake of Utilities
4. Treated water delivered to end users

Studies on Wildland Fires



2015 Rocky Fire
(69,438 acres)

2016 Cold Fire
(5,731 acres)

2015 Wragg Fire
(8,051 acres)

2014 Rim Fire
(257,314 acres)

2003 Hayman Fire in CO
(138,114 acres)

2016 Table Rock Fire in SC
(2,579 acres)

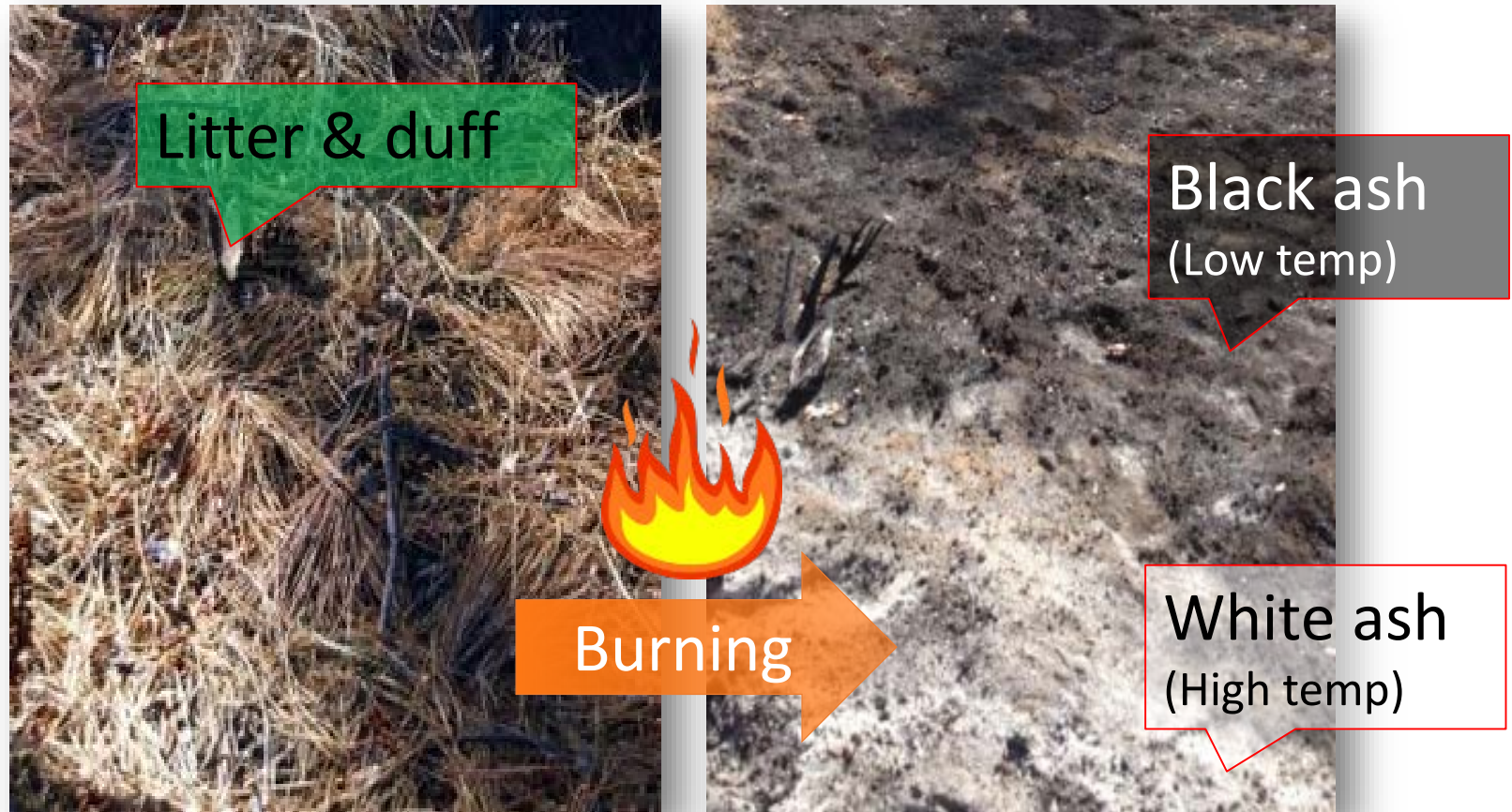
Prescribed Burned

2018 Sagehen Creek near
Lake Tahoe in CA

2016 Francis Marian
National Forest in SC

2015 Yawkey Wildfire
Reserve in SC

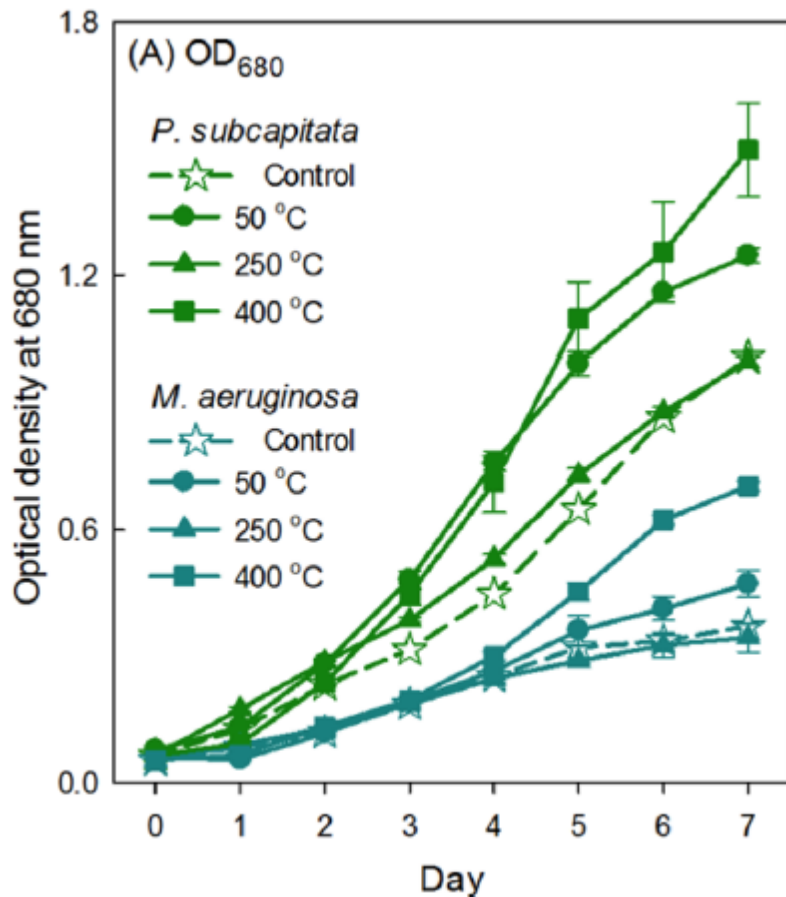
Fact I: Fire alters detritus materials in forest floor



Wang JJ, Dahlgren RA, and **Chow AT** (2015) Controlled burning of forest detritus altering spectroscopic characteristics and chlorine reactivity of dissolved organic matter: Effects of temperature and oxygen availability. *Environmental Science & Technology* 49: 14019-14027.

Wang JJ, Dahlgren RA, Ersan M, Karanfil T, **Chow AT** (2015) Wildfire altering terrestrial precursors of disinfection byproducts in forest detritus. *Environmental Science & Technology* 49: 5921-5929.

Fact II: Algal Blooming after Wildland Fire



Tsai KP©, Uzun H©, Karanfil T, and **Chow AT*** (2017) Dynamic changes of disinfection byproduct precursors following exposures of *Microcystis aeruginosa* to wildfire ash solutions. *Environmental Science & Technology* 51(15): 8272-9292.

Tsai KP© and **Chow AT.** (2016) Growing algae alter spectroscopic characteristics and chlorine reactivity of dissolved organic matter from thermally-altered forest litters. *Environmental Science & Technology* 50(15): 7991-8000.

Fact III: WQ Impacts in First Few Rainstorm Runoffs



Total Suspended Solid

➔ **Chemical Demands**

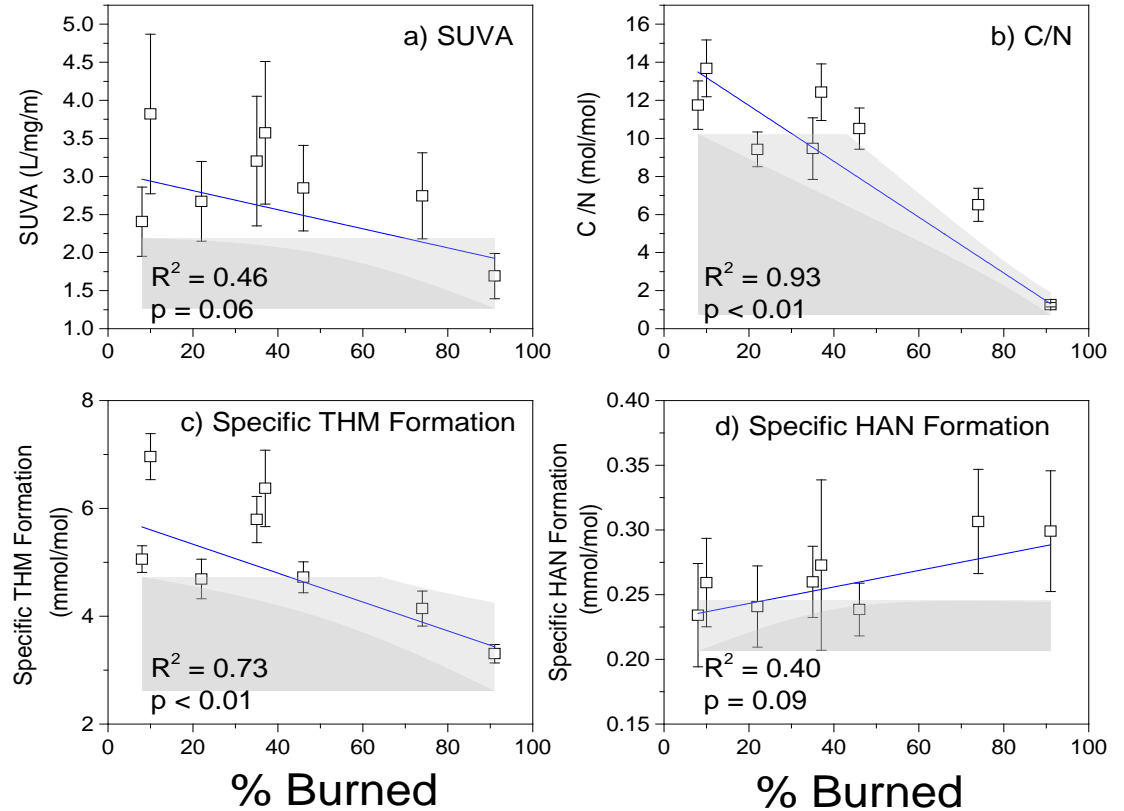
Bromide

➔ **Brominated DBPs**

Total Dissolved Nitrogen ➔ **Algal Bloom / Nitrogenous DBPs**

Wang JJ, Dahlgren RA, Ersan M, Karanfil T, Chow AT (2016) Temporal variations of disinfection byproduct precursors in wildfire detritus. *Water Research* 99: 66-73.

Fact IV: Impacts could last over decade




Rhoades C, Chow AT, Covino T, Fegel T, Pierson T, and Rhea A (Under Review) The legacy of a severe wildfire on stream nitrogen and carbon in headwater catchments. *Ecosystems*.

Acknowledgement

Join Fire Science Program: 14-1-06-19

National Priorities: Water Scarcity & Drought - USEPA Grant Number: R835864

| Collaborators | | Roles |
|--|--|--|
| US Forest Service Carl Trettin |  | Forest Management & Ecology Prescribed Fire Management |
| University of California, Davis Randy Dahlgren |  | Field Sampling California Wildfire |
| Clemson University Tanju Karanfil |  | Water Treatability DBP Formation & Coagulation |

| Post-doc Scholars | Roles |
|-------------------|------------------------------|
| Habibullah Uzun | Water Quality & Treatability |
| Mahmut Ersan | Water Quality & Treatability |
| Chris Olivares | In-situ sensor |
| Huan Chen | In-situ sensor / sampling |
| Hamed Majidazdeh | Hydrology / Biogeochemistry |