JFSP Final Report Summary

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Title: Forest fire alters disinfection byproduct precursor exports from forested watersheds

Principal Investigator:

Alex Chow (PI and point of contact)
Clemson University
achow@clemson.edu; 843-546-1013

Randy Dahlgren (co-PI)
University of California-Davis
radahlgren@ucdavis.edu; 530-752-3073

Carl Trettin (co-PI)
Santee Experimental Forest
trettin@fs.fed.us; 843-336-5602

Geoff Wang (co-PI)
Clemson University
gwang@clemson.edu; 864-656-4864

Objectives:
Increase understanding of the fuel treatment practices that control the productions and exports of dissolved organic carbon (DOC) and disinfection byproduct (DBP) precursors from managed forested watersheds by addressing the following study objectives:

- Management practices: evaluate different management practices on the production and characteristics of DOC and DBP precursors.

- Landscape processes: quantify and characterize temporal variations of DOC and DBP precursor export from managed and unmanaged watersheds.

- Wildfire: evaluate the impacts of wildfire on surface water quality and treatability.

Proposed deliverables:
Referred publication
Conference presentation
Workshops
Field day
PhD Dissertation
Technical information
JFSP interim and final reports

Status of data collection and analysis
Complete
Status of deliverables/findings
Complete

Status of metadata/datasets
Complete

Notes/interesting findings
- Despite changes in fuel loading and fuel structure as a result of short-term alterations in fire frequency and fire season in longleaf pine stands, long-term, frequent prescribed fire does not appear to significantly alter forest detrital chemical composition.

- Prescribed fire in either dormant or growing season helped to reduce export of trihalomethane (THM) precursors without changing the removal efficiency of DOC or THM.

- Water exported from managed watershed had lower DOC concentration and lower formation potentials (FP) of THMs and haloacetonitriles (HANs), indicating the prescribed fire favors the reduction of DBP precursors in the source water.

- In the first rainy season following wildfire, surface water in burned watersheds contained greater portion of aromatic and nitrogen compounds, but DOC-normalized THM and HAA FP values were not significantly different among unburned, partially burned, completely burned, and repeatedly burned watersheds.

- Even a small-scale wildfire within a larger watershed could deteriorate water quality, particularly in terms of sediment load. Water utilities using the water from wildfire burned watersheds may need a greater dosage on coagulants to process source water.

- Regarding the treatability and characterization of DBP precursors, there were no differences among unmanaged and managed watersheds. Prescribed burn reduced DOC and DBP precursors but did not affect the characteristics of DOC or its treatability.

Future work:
- This study did not consider the effects of soil and hydrological conditions that exist in natural forest environments. Therefore, additional study evaluating the effects of prescribed fire in real systems is required.

Final recommendation
Project is complete