Molecular Characterization of Cyanobacteria from A Wildfire Impacted Drinking Water Supply in Fort McMurray, Alberta, Canada

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Fort McMurray, Alberta, Canada, experienced a severe wildfire during the summer of 2016 that resulted in evacuation of ~90,000 people and loss of ~600,000 hectares of forest cover. As a result, the Regional Municipality of Wood Buffalo (RMWB) drinking water treatment plant has experienced ash and nutrient transport into the drinking water reservoirs, leading to annual toxic cyanobacterial proliferation. In the summer of 2023, systematic sampling of the RMWB water supply was conducted with the objective to characterize and monitor shifts in cyanobacterial community composition, identify potential toxin producers, and link communities to water quality parameters. The DNA from filtered water was extracted and 16S rRNA amplicon sequencing was conducted to characterize cyanobacteria in QIIME2 using a SILVA classifier and processed in RStudio. There were 1,232 cyanobacteria ASVs with a total frequency of 573,710 sequences, with the most dominant genus being *Cyanobium*. Potential bloom-forming and toxin producing genera observed were *Planktothrix*, *Microcystis*, and *Aphanizomenon*. An NMDS plot indicated cyanobacterial communities from the same location were generally similar in composition. An RDA analysis indicated that cyanobacterial communities were positively associated with temperature, total phosphorus, and total nitrogen. Results demonstrate that legacy impacts of the wildfire can potentially induce toxic cyanobacteria blooms.