

## Emerging Contaminants in Mine-impacted Water

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Emerging contaminants are increasingly being detected at low concentrations ( $\text{ng L}^{-1}$  to  $\mu\text{g L}^{-1}$ ) in environmental waters, and these compounds have the potential to cause adverse ecological and human-health effects. Perchlorate, derived from blasting residues, has been detected in drainage from mining and refining operations [1]. Previous studies have indicated that mining effluents contributed perchlorate at sufficient concentrations to be detected in receiving surface-water bodies [2], which makes perchlorate a practical indicator of dissolved constituents (*e.g.*,  $\text{NH}_4^+$ ,  $\text{NO}_3^-$ ,  $\text{SO}_4^{2-}$ , and dissolved metals) derived from mining activities. Other emerging contaminants, such as carbamazepine and acesulfame-K, have also been used as co-tracers of wastewater associated with anthropogenic activities [3]. In this study, water samples were collected from the surface of ten lakes in Northwest Territories, Canada in 2016, 2017, and 2018. The concentrations of target emerging contaminants, including perchlorate, pharmaceuticals, artificial sweeteners, and perfluoroalkyl substances, were determined to delineate the distribution of these compounds in watersheds receiving effluent from mine sites. The potential use of these compounds as co-indicators of anthropogenic activity was also evaluated. The results show elevated concentrations of chloride, sulfate, perchlorate, perfluoroalkyl substances PFOA and PFOS, and artificial sweetener acesulfame-K were observed downstream from mine sites. The concurrence of elevated concentrations of these compounds may indicate the influence of mining activity on receiving waterbodies. Elevated concentrations of the pharmaceutical caffeine indicate the widespread distribution of anthropogenic compounds in pristine watersheds.

[1] Bailey *et al.* (2013) *Appl. Geochem.* 36, 256-270. [2] Smith *et al.* (2015) *Environ. Sci. Technol.* 49(13), 7589-7596. [3] Liu *et al.* (2014) *Environ. Sci.: Processes Impacts* 16(12), 2789-2795.