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Widespread Prevalence of Microcystins From A Variety Of Southern California Waterbodies And Implications For Toxin Loading To Coastal Waters

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Abstract

Cyanobacterial blooms and associated toxins have become increasingly problematic globally and cause a variety of harmful effects that impair beneficial uses of waterbodies. Cyanotoxins can have far reaching effects downstream of their origin, creating issues in brackish and marine waters. Despite the health risks associated with cyanotoxins, there is no statewide monitoring program in California and relatively little is known about the prevalence of cyanotoxins in southern California waterbodies. Recent screening assessments revealed widespread prevalence of microcystins from a variety of waterbody types including streams (benthic algae), depressional wetlands, lakes, reservoirs, coastal lagoons and estuaries. Microcystins were commonly detected in most waterbodies in Southern California, and from benthic samples in one-third of wadeable stream reaches statewide. Multiple cyanotoxins (cylindrospermopsin, anatoxin-a, saxitoxin and microcystins) were detected at a subset of sites, indicating the potential for other cyanotoxins to be prevalent. These results suggest multiple terrestrial sources of cyanotoxins, including benthic cyanobacteria from wadeable streams, as potential loading sources to downstream coastal waters in Southern California. Traditional sampling approaches have been shown to miss toxic events and to be poor indicators of the temporal variability of the ecosystem. In response to this challenge, several intensive studies in San Diego will be presented that successfully used passive samplers, Solid Phase Adsorption Toxin Tracking (SPATT), to capture the prevalence of microcystins in a diverse array of waterbodies. The results from these screening assessments indicated that microcystins are pervasive, and missed by traditional sampling approaches.