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Monitoring Multiple HAB Toxins Across The Freshwater-Marine Continuum In Coastal California

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Abstract

The conventional focus of HAB monitoring programs has been to analyze toxins according to the waterbody type sampled, either as marine toxins or freshwater toxins, but not both. However, recent studies have shown that cyanotoxins have far reaching-effects downstream of their freshwater origin in brackish and marine waterbodies. Cyanotoxins produced in and transported by multiple inland waterbodies in California (lakes, reservoirs, streams, rivers, wetlands and lagoons) provide many under-recognized sources of toxins to downstream receiving waters. This presentation will focus on several aspects of HAB monitoring across the freshwater-marine continuum, including recent monitoring results, challenges encountered (and solutions), and the development of an integrated, multi-toxin HAB strategy.

Recent monitoring and assessment studies have detected multiple toxins simultaneously, as well as chronically (months and seasons), indicating multiple physiological stressors that are persistently present. The influence of toxic cyanobacterial blooms pose a much more complex mix of stressors than presently recognized and challenge existing paradigms that need to be reexamined in order to improve management of HABs across the land-sea interface. These studies underscore the importance of inland waters as potential conduits for transfer of freshwater toxins to the marine environment, and highlight the importance of a comprehensive, multi-toxin approach to monitoring throughout the freshwater-marine continuum.