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Monitoring Multiple Hab Toxins At The Land-Sea Interface In Coastal California

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Abstract

The conventional focus of HAB monitoring 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 unanticipated sources of toxins to downstream receiving waters. This presentation will focus on several aspects of HAB monitoring at the land-sea interface, including recent monitoring results, challenges encountered (and solutions), and the development of an integrated, multi-toxin HAB strategy.

Monitoring, assessment and intensive targeted studies were conducted to evaluate the transfer of cyanotoxins from fresh waterbodies to estuarine waterbodies, to determine the prevalence of cyanotoxins, and to identify predominant toxin producing cyanobacteria species. Multiple cyanotoxins were detected simultaneously in some systems indicating multiple physiological stressors in those ecosystems. The persistent detection of cyanotoxins temporally (months and seasons) and spatially (multiple systems and regions) indicates a low-level, chronic presence of these toxins. Our findings indicate a high risk for bioaccumulation of multiple HAB toxins into marine food webs and that the influence of toxic cyanobacterial blooms pose a much more complex mix of stressors than presently recognized. 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 multi-toxin approach to monitoring at the land-sea interface.