

Abstract Title:

An integrated approach to detecting and monitoring chemicals of biological concern in Great Lakes ecosystems

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Abstract:

Chemical monitoring strategies are most effective for those chemicals whose hazards are well understood and for which sensitive and cost effective analytical methods are available. Unfortunately, such chemicals represent a minor fraction of those that may currently occur in the environment and impact biological systems. However, in cases where specific types of biological perturbation have been plausibly and/or empirically-linked to adverse outcomes (i.e., adverse outcome pathways have been characterized), effects-based monitoring approaches can serve as a powerful complement to analytical environmental chemistry for exposure monitoring and diagnostic risk assessments. This presentation describes an integrated research strategy that was employed in five different Great Lakes Areas of Concern (AOCs). The strategy used a combination of *in situ* exposures with fathead minnows (*Pimephales promelas*), *in vitro* bioassay-based screening of surface water samples, and analytical quantification of over 150 analytes in surface water and sediment samples to characterize contamination at selected sites within the five AOCs. On-going research includes the application of unsupervised analyses (e.g., transcriptomics) as well as construction of chemical-gene interaction networks as a means to aid selection of biological endpoints for future effects-based monitoring at these sites. *The contents of this abstract neither constitute nor reflect official US EPA policy.*