An inexpensive, temporally-integrated system for monitoring occurrence and biological effects of contaminants in the field (Poster)

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Poster presentation

Kahl, Michael//Villeneuve, Daniel L//Stevens, Kyle//Jensen, Kathleen//Holmen, BA//Durhan, Elizabeth//Cavallin, Jenna//Berninger, Jason//Eid, EP//Schroeder, Anthony L//Ankley, Gerald T

Assessing potential biological impacts of complex mixtures of contaminants in aquatic environments is an ongoing challenge for ecotoxicologists. Instrumental analysis of site waters alone can identify contaminants but provides only limited insights as to possible adverse effects, due to factors such as the presence of unknown/unmeasured chemicals, mixture interactions and uncertainties in bioavailability. As a consequence, it is necessary to complement analytical determinations of the occurrence of contaminants with different measures of possible biological effects. Our lab currently is conducting studies associated with the Great Lakes Restoration Initiative (GLRI) to develop effects-based methods for assessing the effects of contaminants at different Great Lakes Areas of Concern (AOCs). A component of this work involves caged fish (fathead minnow) exposures. Previous caging studies with the fathead minnow have used a wide variety of test systems, depending on variables such as study objectives, water body characteristics, available materials, etc. For our GLRI studies we wanted to develop and implement a relatively standardized test system suitable for the wide range of habitat/deployment situations encountered at Great Lakes AOCs. In addition to a caging system for the fish, we sought to develop an automated device for collection of composite water samples which could be simultaneously deployed with the cages, and would reflect a temporally-integrated exposure of the animals. The water samples then could be used for targeted analysis of specific chemicals of interest, and/or determination of biological “activities” of concern (e.g., estrogenicity) using *in vitro* systems. A description of the *in situ* caging systems and a relatively simple and inexpensive (<500 USD) time-integrated water auto-sampler will be presented. The fundamental design, construction and use of the composite sampler, along with cage and sampler performance, fish survival and recovery, site conditions and adaptability will be discussed.