Bioassay- versus Analytically-Derived Estrogen Equivalents: Ramifications for Monitoring.

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Due to concern for possible endocrine-related effects on aquatic vertebrates, environmental estrogens (EEs) are a growing focus of surface water contaminant monitoring programs. Some efforts utilize measurement of a targeted set of chemicals known to act as estrogen receptor (ER) agonists, while others have used bioassay-based approaches to provide integrated measures of "estrogenic activity" at a given site. As part of an ongoing effort to develop effects-based monitoring tools suitable for routine use, studies were conducted at several Great Lakes Areas of Concern (AOCs), including the Detroit River (MI), Maumee River (OH), lower Fox River/Green Bay (WI), Milwaukee River/Estuary (WI) and St. Louis River/Duluth Harbor (MN). These sites feature a variety of point and non-point inputs of contaminants, including wastewater treatment plants (WWTP), which are a well established source of EEs. A number of methods were used to assess the occurrence of EEs, including determination of targeted gene expression (e.g., vitellogenin, ERα) in caged fish, *in vitro* measurement of estrogenic activity of water using a T47D-KBluc assay, which employs a cell line stably-transfected with a human ERα-luciferase reporter gene construct, and analytical quantification of known EEs (e.g., estriol, estrone, 17β-estradiol, 17α-ethinylestradiol, bisphenol A, nonylphenol, octylphenol) in grab and composite water samples. Samples from different locations within the AOCs frequently exhibited estrogenic activity in vitro (often in the vicinity of the WWTPs). Bioassay-based activity was compared with detectable concentrations of EEs, which varied substantially across the sites/locations. The results highlight the need for monitoring programs to integrate biological and analytical approaches for the effective detection of EEs. *This abstract does not necessarily reflect EPA policy.*