Session H4: Emerging Contaminants in Fish

Room A107-109
8:00 – 9:30 am

0190
H4-1

Passive Samplers: Considerations to Help Make your Study a Success

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Passive sampling techniques are rapidly becoming an accepted means of sampling organic and inorganic chemicals in environmental monitoring studies. In general, the use of these devices involves the same planning process that is required for collecting a traditional grab sample. However, there are details specific to individual passive sampler types which must be considered that inexperienced users may not be aware of. The most important aspect of any field collection is that the sample obtained will answer the questions dictated by the study. Passive samplers can provide different types of data depending on the type of sampler used, the status of the development of the sampler, and the environmental conditions during the field work. This presentation will discuss many of the important aspects of passive samplers from designing a study, to picking a laboratory, to understanding what the data means.

0259
H4-2

Emerging and Legacy Contaminants in POCIS, SPMDs, Sediments, and the Largescale Sucker (*Catostomus macrocheilus*) in the Lower Columbia River – USGS ConHab Project

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An interdisciplinary study, USGS Columbia River Contaminants and Habitat Characterization (ConHab) project, investigates transport pathways, chemical fate and effects of polybrominated diphenyl ethers (PBDEs) and endocrine disrupting chemicals (EDCs) in aquatic media and the foodweb in the lower Columbia River. Polar organic chemical integrative samplers (POCIS) and semipermeable membrane devices (SPMDs) were co-deployed at each of 10 sites to provide a measure of the dissolved concentrations of select PBDEs, chlorinated pesticides, and other EDCs. PBDE-47 was the most prevalent of the PBDEs detected. Numerous organochlorine pesticides, both banned and current-use, were measured at each site including hexachlorobenzene, pentachloroanisole, dichlorodiphenyltrichloroethane (DDT) and its degradates, chlorpyrifos, endosulfan, and the endosulfan degradation products. EDCs commonly detected included a series of polycyclic aromatic hydrocarbons (PAHs), fragrances (galaxolide), pesticides (chlorpyrifos and atrazine), plasticizers (phthalates), and flame retardants (phosphates). The site near Columbia City tended to have the highest concentrations of contaminants in the Lower Columbia River. Resident largescale suckers (*Catostomus macrocheilus*) were collected. Brain, fillet, liver, stomach, and gonad tissues were analyzed. Concentrations of halogenated compounds in tissue samples ranged from <1 to 400 ng g^{-1} wet tissue. PBDEs, organochlorine pesticides, DDT and its degradates, and polychlorinated biphenyls (PCBs) were detected at all sites in nearly all organs tested. Concentrations in tissues and in sediments increased moving downstream from Skamania to Columbia City to Longview. For the tissue samples, chemical concentrations were highest in livers, followed by brain, stomach, gonad, and lastly, fillet. PBDE congeners most frequently detected and at the highest concentrations were BDE47 > BDE100 > BDE154 > BDE153. These results support the hypothesis that contaminant concentrations in the environment correlate to bioaccumulation in the foodweb. The fish concentrations will be compared to concentrations in other levels of the foodweb and to biomarker results also determined as part of the ConHab project to improve understanding of bioaccumulation and effects of these contaminants in the lower Columbia River.

0430
H4-3

A Demonstration of the WERF Trace Organic Compounds Database Management System for Analyzing Impacts of Trace Organic Compounds on Aquatic Populations and Communities

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A variety of organic chemicals (pharmaceuticals, personal care products, surfactants, pesticides, flame retardants, and other largely unregulated organic chemicals) have been found in trace amounts in surface waters and fish tissue. Identifying or predicting ecological effects of these chemicals is challenging, requiring of the use of sophisticated epidemiological tools and a database that allows one to query, display, and assess monitoring data at local, regional, and national scales. The Water Environment Research Foundation (WERF) Trace Organic Compounds (TOrCs) database is designed to manage and screen high priority trace organic compound exposure and effects data. The database can help develop a screening framework that can be used to assess whether impacts on aquatic populations or communities are caused by, or could be caused by these compounds of concern.

The TOrCs database and associated tools are available on-line by connecting through a web browser. Data are organized by project or research paper and can be queried using a standard word search or by the interactive map interface. Data may be queried and retrieved at varying levels from the project or research paper to specific compound or taxonomic names. Data may be easily uploaded from or downloaded to a spreadsheet file. We will demonstrate how to use a number of the more commonly used tools and features of the database.

The data management and analysis tools included in the WERF TOrCs database are based on 15 years experience working with tribal, state, and federal agencies engaged in managing and analyzing water quality data. WERF TOrCs database includes standardized biological, chemical, and toxicological data elements for reporting water quality results as recommended and defined by the National Water Quality Monitoring Council (NWQMC) and Environmental Data Standards Council (EDSC). The data elements and metadata in WERF TOrCs provide the who, what, when, where, why, and how required for complete and known quality data. Other selected key features and capabilities of WERF TOrCs include a map based interface to allow users to view sites and summary data on maps; data import and export tools; and improved data quality control through dynamic data completeness and validation.

0191
H4-4

Analysis of Fish Tissue in the National Rivers and Streams Assessment Focusing on a National Assessment of Organo-Halogen Compounds in Fish from US Rivers

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The US Environmental Protection Agency (EPA) collected fish tissue from over 600 randomly-selected river sites (fifth order and larger) throughout the lower 48 states in 2008 and 2009. Homogenates of fillet composites from five similarly-sized adult fish of a single species that are commonly consumed by humans were collected from those sites, and they have been analyzed for a suite of persistent, bioaccumulative, and toxic (PBT) compounds, including selected brominated flame retardants, persistent chlorinated organic compounds (including PCBs and pesticides), and mercury. At a subset of those 600 sites, samples from 150 urban river sites were also analyzed for contaminants of emerging concern (CECs) in surface water and fish. Analytes in fish fillet composites include up to 30 pharmaceutical compounds (work in progress) and selected synthetic musk compounds, and analyses have been completed for 13 perfluorinated compounds (PFCs), including PFOA and PFOS. In addition, surface water grab samples have been analyzed for 54 pharmaceutical compounds and the 13 PFCs.

The presentation will provide an overview of these combined studies being conducted collaboratively by the Office of Science and Technology (OST) and the Office of Wetlands, Oceans, and Watersheds (OWOW) within EPA's Office of Water (OW), along with the Office of Research and Development (ORD) National Exposure Research Laboratories (in Cincinnati, Ohio and Las Vegas, Nevada) and National Health and Environmental Effects Research Laboratory (in Corvallis, Oregon). Analytical results now available for PFCs (urban river sites) and for mercury are presented in posters by co-authors at this conference. Analytical results for the organo-halogen compounds (all sites) are presented and characterized in this session, and to the extent possible in the time since the data became available, factors affecting the distribution of these compounds nationally will be discussed. Opportunities for analysis of the distribution of these compounds relative to potential and historical sources will be explored: (PCBs- industrial; PBDEs-WWTP-domestic, commercial; pesticides-agricultural).