SIPPO LAKE SEDIMENT QUESTIONS

Flint Water Crisis
GIS Effort Maps City’s Lead Pipes

Ohio Stream Monitoring
A Visit To The National Center For Water Quality Research

Tradeoffs To Green Infrastructure
Do Constructed Wetlands Do More Harm Than Good?
A few years back, the Environmental Monitor covered the environmental sample processor (ESP) as it embarked on an effort to study the microbial life of the Columbia River Estuary. But now, the push to put in place new technology to monitor harmful algal blooms during the late summer season.

Harmful algal blooms – a common Pacific harmful algal species – travel to and in a known transport path where offshore Pseudo-nitzschia blooms. The ESP was placed 13 miles offshore in the Olympic Coast National Marine Sanctuary. It is near the Juan de Fuca eddy that can contaminate shellfish. It facilitates timely decision-making on shellfish harvesting opportunities and closures. Coastal managers will use the early warning data from the Environmental Sample Processor (ESP) as it embarked on an effort to study the microbial life of the Columbia River Estuary.

Scientists helped install the ESP that will beam results back to shore three times a week for six weeks. The research team will collect chemical samples of water, to a lab for analysis. The trouble with this method is that the sample is from a single point in time and may not represent fluctuations in the contaminant that occur over weeks or months. Additionally, collecting water and shipping it to a lab for analysis can be expensive and something of a hassle.

Researchers at Arizona State University have tried their hand at addressing this issue. They have developed a sampling device that integrates some of the same equipment used in the lab to enhance the signal of low-level chemical compounds; it is a device capable of collecting the chemicals directly from water, without collecting the water itself.

One of the key features of the device, aside from its ability to capture chemicals from water, is its unique ability to sample contaminants in bulk water and the sediment pore water (e.g., in a lake) simultaneously. The device was recently used in water-ways of the U.S. Southwest to assess the occurrence of the pesticide fipronil, which may play a role in the plight of honeybee populations in the United States.

The device is called the In Situ Sampler for Biphasic water assessment (IS2B), and uses solid phase extraction (SPE) technology in its design to concentrate the analytes directly in the stream of interest. SPE involves passing water through a cartridge filled with a selected resin matched to the chemicals of interest. The resin adsorbs the chemicals, effectively precipitating them out of the dissolved phase. The cartridge is subsequently taken back to the lab, the contaminant extracted from the resin using standard analytical methods, and then analyzed. The initial investigation of the device’s utility, led by Dr. Samuel Supowit while a graduate student at Arizona State, showed that the approach produces reliable results.

“We’ve taken that technology and put it into a sampler so that it is done in the field. That technology is very common and as a mature technology, cartridges and resins can be purchased commercially,” said Erin Driver, a graduate research associate at Arizona State University’s Biodesign Institute.