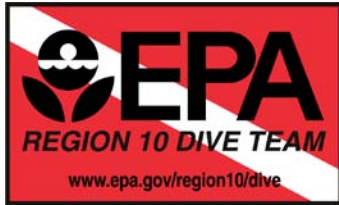


US EPA ARCHIVE DOCUMENT



[EPA Region 10 Dive Team](http://www.epa.gov/region10/dive)

Lower Duwamish Waterway Diver Assisted Bioavailability study, 2008-2009

What: The dive team deployed Solid-Phase Micro-Extraction (SPME) devices secured in protective copper tubes, and either bundled together for burial 5cm into sediment, or zip-tied into the side wall of cages. Divers also deployed minipiezometers which were used to record ground-water quality and hydrostatic head at selected locations. In addition, divers collected cores for analysis of the 15 to 30 cm depth interval in the sediments.

Why: This study by Texas A&M University (TAMU) is designed to investigate contaminant (PAHs and PCBs) bioavailability and effects in the Lower Duwamish Waterway. This work is conducted under NIEH's Superfund Basic Research Program. Partners included Washington State Department of Ecology (selecting sampling locations), Southern California Coastal Water Research Project (SCCWRP - provided equipment and analysis), and Baylor University (Baylor - conducted bioassays).

Where: [Lower Duwamish Waterway Superfund Site](#), Seattle, Washington, between River Mile 0.9 and River Mile 3.9 .

When: July 21-23, August 20 & September 24, 2008 and July 23, 30, August 17, and September 9, 2009

How: Cages were handed to divers who placed them on the sediment. Divers placed the bundle (which was secured to the cage by a short line) 5cm into the surface sediment. Divers inserted minipiezometers approximately 50-60 cm into sediment. Water-filled cores placed in a mesh bag and clipped into a core rack were taken to the bottom. Cores were 30cm long. Due to foreshortening, the cores had to be pushed in several centimeters below mudline. In 2009 Chinook fingerlings were used from the Mukilteo hatchery for 1 week exposure to look at biomarkers and check tissue concentrations.

Equipment: Support vessel, down lines, GPS, cages with SPMEs, mini-piezometers, cores, Tethered SCUBA equipment

Results: Uptake data was provided to the project manager and ORD research team.

More Details/Contact Info: Bruce Duncan, Duncan.bruce@epa.gov

[Barbee G.C., J. Barich, B. Duncan, J.W. Bickham, C.W. Matson, C.J. Hintze, R.L. Autenrieth, G-D Zhou, T.J. McDonald, L. Cizmas, D. Norton and K.C. Donnelly. 2008. *In situ* biomonitoring of PAH-contaminated sediments using juvenile coho salmon \(*Oncorhynchus kisutch*\). *Ecotoxicology and Environmental Safety* 71\(2\):454-64.](#) (attached)

[Superfund Research Brief 171, An Integrated Approach to Assess Sediment Toxicity](#) (attached)

Photos:



Transition zone water being sampled by Allison Hiltner (facing) and Gretchen Schmidt.



Hydrostatic head between surface water and groundwater being measured by use of a manometer.



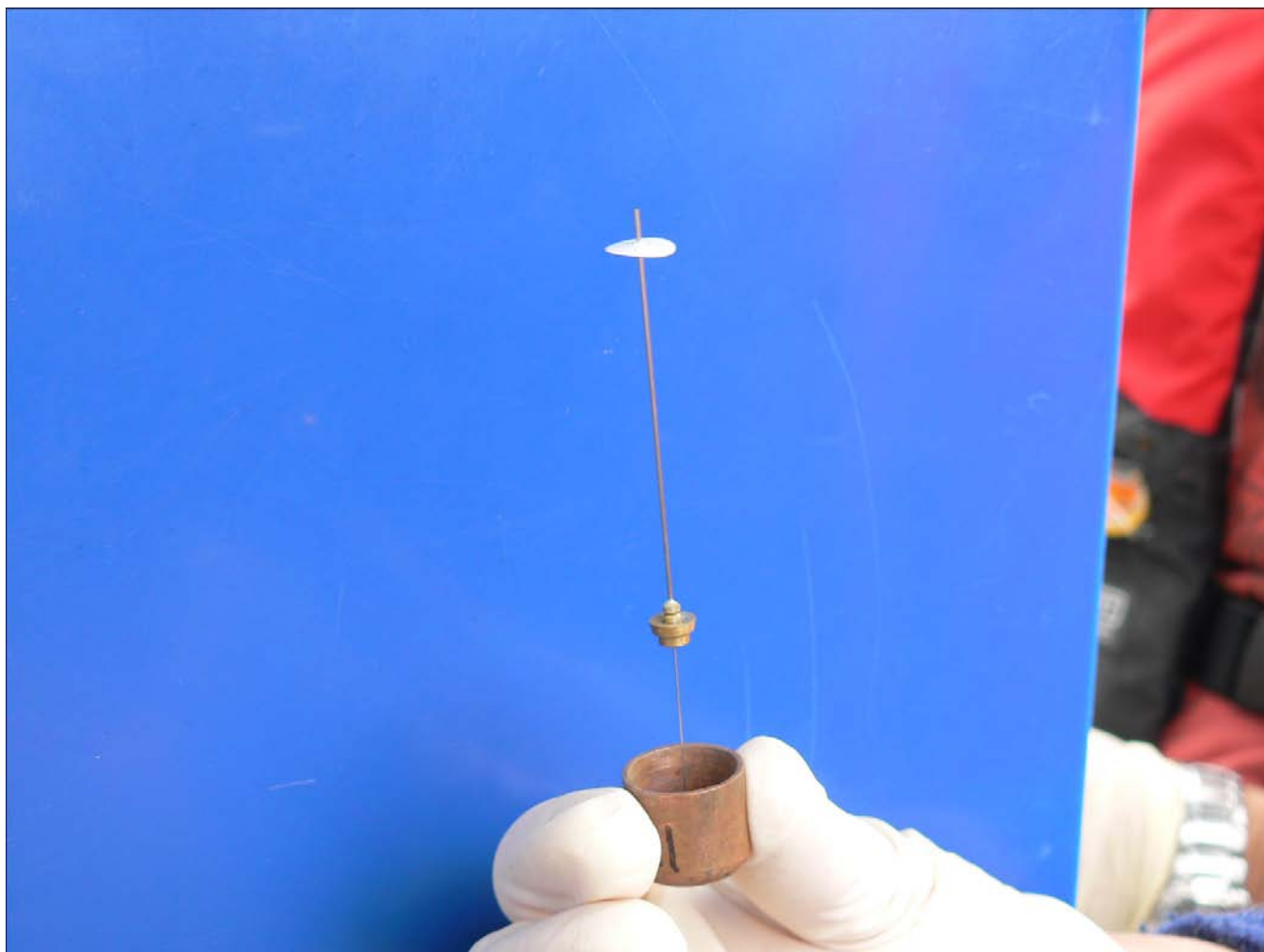
Cores collected from the Paccar site by diver Schulze and handed to diver Rau.



Diver's utilized tethered SCUBA, to enhance ability to do search patterns as needed for cages and equipment. Note the tender's hands are gloved to avoid inadvertent contact with bottom sediments.



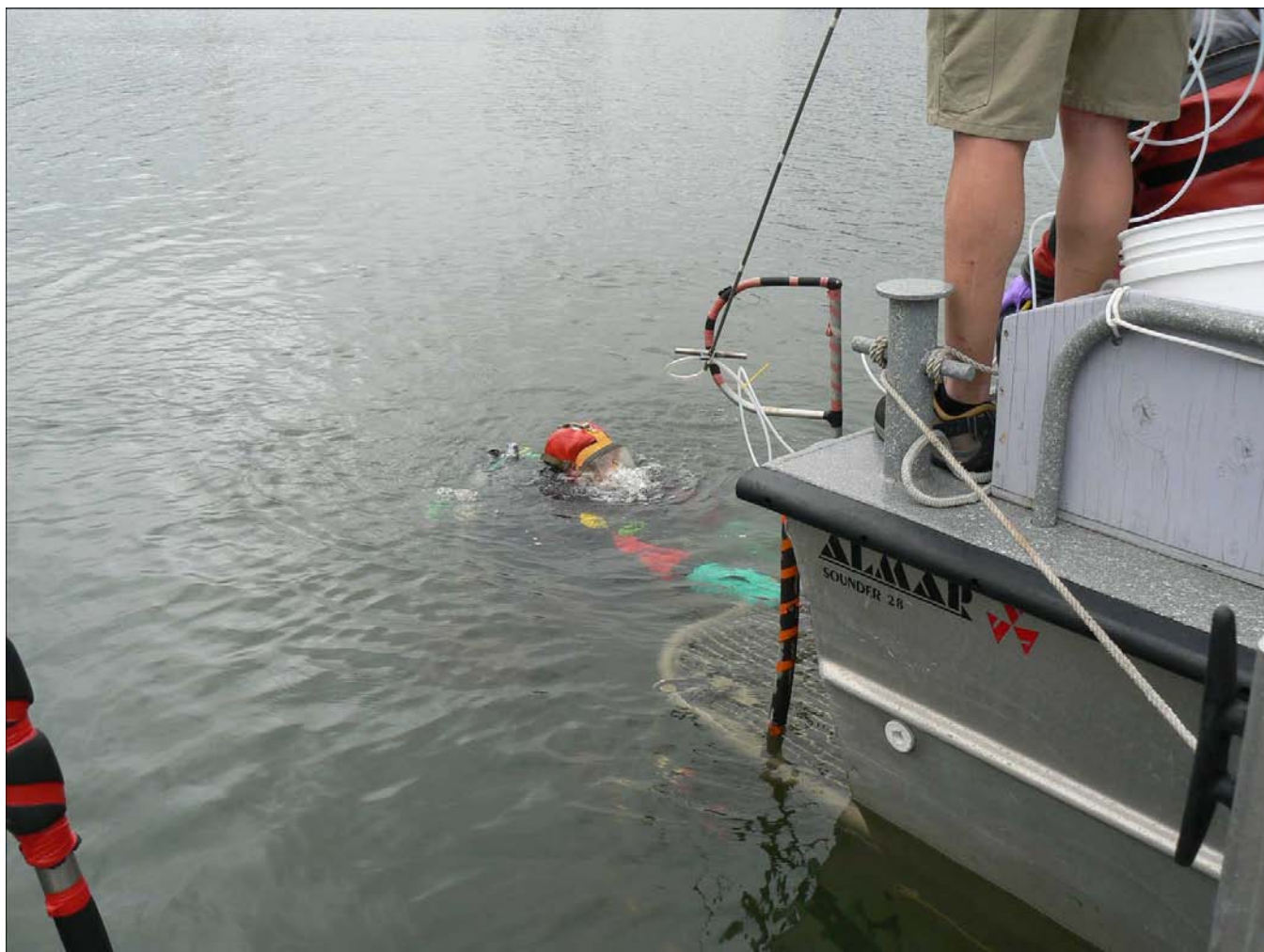
Samplers Curt Black and Brent Richmond collecting groundwater from 50 centimeters into the sediment via piezometers to analyze for chemicals of concern from upland groundwater plumes migrating into the Duwamish River. The diver (Tim Siwiec) that placed the piezometer is in the water in the background, to stay cool due to record heat during 2009 sampling deployments.



Close up of SPME



Divers Siwec, Duncan, and Rau setting up piezometer at Kellogg Island.



Diver is handed piezometer to take down to the bottom.

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