

Citizens for a Clean Columbia

Our mission: to advocate for a clean Columbia River ecosystem
NEWSLETTER JANUARY 2019

Who are we?

Citizens for a Clean Columbia (CCC) is a volunteer organization focused on advocating for the health of the Upper Columbia River (UCR) and Lake Roosevelt. Visit at www.cleancolumbia.org. We now have a facebook page so check us out: <https://www.facebook.com/groups/315230442457913/>

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News in Brief

Phase 3 Sediment Study

- Several pilot studies were conducted of sampling devices for obtaining sediment and porewater.
- A freeze grab sampling method was partially successful in collecting sediment in areas dominated by gravel but less successful in areas dominated by cobble.
- A pilot study confirmed that the Trident probe could be used to obtain porewater samples.

Soil Amendment Technology Evaluation Study

- Phase 1 baseline results were reported on soil from test plots on three tribal allotments, with 99% completeness achieved for all analytes.

Residential Soils Voluntary Removal Action Conducted in 2018

- Teck America Incorporated (TAI) conducted voluntary residential soil removal activities in August and September 2018 on three properties.

Technical Advisor Update

- Joe focused on the phase 3 sediment toxicity pilot studies, soil amendment technology evaluation (SATES) study, aerial delineation study, and the wildlife toxicity reference value report.

Phase 3 Sediment Study

As noted in our July 2018 newsletter, this study is part of the Remedial Investigation/Feasibility Study (RI/FS) and has 5 elements:

- Sediment bed mapping to identify locations of sediment texture classes and depositional areas
- Nature and extent of sediment chemical and physical properties
- Sediment porewater to characterize concentrations of bioavailable metals to which sediment organisms are exposed
- Toxicity identification evaluations (biological effects on benthic species of representative surface samples in the laboratory
- Characterization of benthic invertebrate communities in sediment

To address difficulties in obtaining surface sediment samples with a clamshell bucket grab sampler in areas of the UCR containing finer sediments intermixed with gravel and cobble, a freeze grab sampling method was tested. Freeze grab sampling is a modified version of freeze core sampling and was tested using a device consisting of a metal pan with multiple 5-inch-long rods protruding from the bottom to extract heat from the sediment (see below). Frozen sediment adheres to the device and, once retrieved, is placed into plastic bags or steel bowls until thawed. This method had not been tested before and innovations in the field were required to address some of the difficulties encountered.



The study demonstrated that the freeze grab sampler was successful for obtaining samples in areas dominated by gravel but not for those areas where the surface sediment was dominated by cobble. CCC provided comments on the study report asking for greater specification of procedures and the use of sensor data to assess whether overlying water or groundwater was drawn into the sediment.



There has also been concern with prior porewater sampling techniques about the lack of ability to obtain a sufficient volume of porewater for chemical analyses without drawing in overlying water or groundwater and while avoiding oxygenation. In response to this concern, a pilot study was completed to determine if the Trident probe could be used to successfully obtain porewater samples from the variety of substrates in the UCR and across

the range of sampling conditions encountered with respect to water depths, velocities.

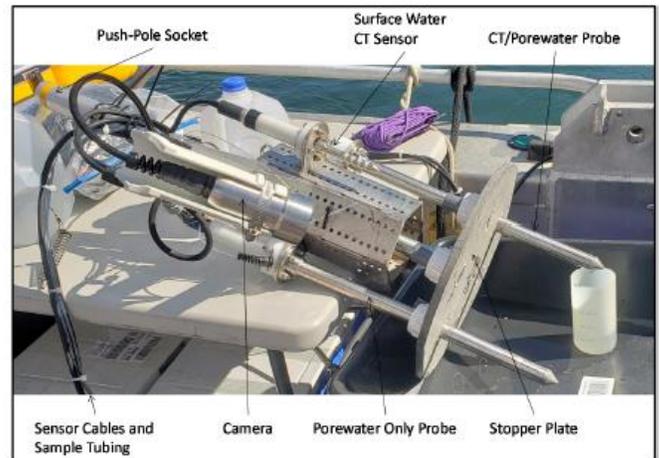


Figure 2-1. Configuration of the Push-Pole Trident system used during the UCR pilot study.

The study results demonstrated that the Trident probe successfully collected porewater as confirmed by water quality parameters such as temperature, and pH without evidence of field contamination in water up to 37.7 feet deep, current speeds up to 5.7 feet per second, and from a range of bottom types including sand and cobbles. The samples were collected in an oxygen-free glovebox. CCC reviewed the study report and requested additional detail about the devices (original and modified) and how sampling depth is determined.

Mindy Smith, CCC secretary

Soil Amendment Technology Evaluation Study (SATES)

The purpose of this study is to identify and field test soil amendment technologies that could cost-effectively reduce long-term potential for human exposure to lead in shallow soils in the UCR area. CCC provided comments on the phase I draft data summary report.

This report provides a comprehensive assessment of the soil chemical, mineralogical and physical properties of the test plots including vegetation conditions; the latter assessment was conducted by the Colville Confederated Tribes prior to soil sampling. These data will serve as baseline for monitoring the effects of the soil amendment alternatives. The following amendments are being considered for inclusion in the bench testing effort: soluble phosphorus, biosolids, wood ash, biochar and compost.

Each of the 6 test plots covered an area of 100 x 100 feet. The initial phase of the sampling was to evaluate the spatial variation of arsenic, lead, and pH in near-surface soil and assess duff thickness. For this phase, discrete soil samples were collected from each test plot in August 2017 and analyzed for lead and arsenic. Sampling areas were then backfilled and plugged with wooden plugs to prevent resampling at the same locations during the second part of this phase of the study. Mean lead levels in the soil from 0 to 3 inches ranged from 216 to 566 mg/kg with a variation (standard deviations as a percent of the mean) ranging from 47% to 124%.

Sampling for soil characterization was completed in October 2017 using the four test plots highest in lead concentration and sampling from 16 test pits – 2 feet wide, 2 feet long, and 18 inches deep. Characteristics measured included total solids, arsenic, lead, Ph, and duff thickness; soil physical properties including a description, bulk density, hydraulic conductivity moisture holding; and target analyte list metals (aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, phosphorus, potassium, selenium, silver, sodium, thallium, vanadium, and zinc). These were later filled in with local soil and capped with a wooden board.



Thirty field duplicates from immediately adjacent soil samples were obtained to assess data precision (field and laboratory). Only 2 of the samples had a relative percent difference (RPD) for lead exceeding 50% (the set value for acceptable deviation). Of four discrete field duplicate samples, six of 88 total analyte pairs exceeded 50%; five, however, were from a single sample. Of the 630 samples analyzed for lead, arsenic and total solids, 175 (27.7%) were J qualified (estimated).

Mindy Smith, CCC secretary

Residential Soils Voluntary Removal Action Conducted in 2018

A second residential soil sampling program (2016) was conducted as part of the UCR RI/FS conducted at 136 residential properties and 8 tribal allotments. Six had lead levels of above 600 parts per million in some areas. TAI volunteered to perform removal actions at four residential properties. The other two were referred to the Washington State Department of Ecology for follow-up.

Surface soil removal was performed in October 2017 with approximately 141 cubic yards removed and

disposed to the Stevens County Landfill near Kettle Falls, WA. Following excavation, TAI restored the properties in accordance with property owners' requests. The work, however, was suspended in late 2017 due to seasonal weather conditions and resumed in Spring 2018, beginning with pre-removal soil sampling to better define areas for removal actions. TAI conducted soil removal activities in August and September 2018 with approximately 3,255 cy of soil excavated from areas on three properties. Excavated soil was again disposed to the Stevens County Landfill and properties restored in accordance with property owners' requests. All removal activities conducted in 2017 and 2018 were overseen by full-time US EPA personnel.

Mindy Smith, MD, MS

Technical Advisor Report

My efforts over the past five months focused on the phase 3 sediment toxicity pilot studies, soil amendment technology evaluation (SATES) study, aerial delineation study, and the wildlife toxicity reference value (TRV) report. I performed no work in January 2019 due to the partial government shut down. CCC used my reviews in preparing their comments to EPA.

I reviewed the draft memorandum on results of the freeze grab sediment sampling pilot study. The procedure offers the capability to collect sediment samples under some conditions where the Van Veen sampler does not function. Sample size with the freeze grab sampler is much lower than with the Van Veen sampler and the various shapes of the retrieved samples will require development of a rubric to determine sample depth. There was also a concern that methanol could enter the river during freeze grab sampling.

Results presented in the draft pore water pilot study memorandum were encouraging. The trident probe was able to collect 625 milliliter samples in 40 to 60 minutes from a variety of sediment compositions. I requested that more information be presented on the internal volume of the sampler and collection tubing to better evaluate purge volumes, as well as more information on potential mixing with wash water as the sample is drawn through the sampler and tubing. I also requested that the data be made available on the RI/FS database website.

I observed SATES soil collection for the bench-scale studies on October 18, 2018. My previous concerns about soil moisture, rain and the use of x-ray fluorescence (XRF) measurement of lead in soil turned out not to be issues. The soil was dry, the weather cooperative, and the XRF was used to determine which 2-foot-square subplots were sampled. All soil was collected in one day for the composite high-lead sample to test the potential soil amendments in the bench-scale studies to be undertaken soon. Amendments to be tested are phosphorus fertilizer, biosolids, wood ash, biochar, woody debris and compost. Although formal results on analysis of the high-lead composite soil sample are not yet available, preliminary XRF analyses indicated that the lead level will be high enough to perform the bench-scale amendment study.

I reviewed the draft aerial delineation study in October. This study will develop models of the transport and deposition of stack emissions from Trail to the Upper Columbia River (UCR) area. The primary concern with the draft was the proposed use of soil lead and arsenic levels adjacent to the smelter to validate the models. Soil lead levels next to the smelter were not only influenced by stack emissions; these areas were also subject to dust from ore handling and maintenance activities as well as differential deposition due to various stack

heights over time. An additional concern was the assumption that a relatively smooth decrease in deposition would occur as distance from the smelter increased. Local topography and meteorological conditions could easily result in regions of enhanced or diminished deposition in the UCR area.

A continuing concern with the draft final wildlife TRV report was the lack of reference vetting by EPA or any of the participating parties. The TRV report also references the chemicals of potential concern (COPC) refinement document, which is still in draft and has not been issued. I suggested the TRV report issue after the COPC refinement document. Deer and elk are not addressed in the TRV report. Significant populations of both are present in the UCR area. I suggested TRVs be derived for both populations.

Joe Wichmann, PhD; CCC Technical Advisor

Soliciting T-shirt Ideas

CCC is looking for some good ideas for our new T-shirt logo. We have finally run low on our stock so if you have some good ideas, please forward them to Hilary Ohm at hilary@highwaterfilters.com.

Want to be More Involved?

CCC welcomes new members. Our next General Member Meeting will be in the fall. Please join us. We will post updated information on the website (www.cleancolumbia.org).

We are still looking for a new webmaster. This would involve maintaining our website and posting new information to it about once a month. If anyone out there is interested in helping us with this, please contact Mindy Smith (smithm69@msu.edu).

With questions for the EPA project managers, contact Monica Tonel for information on human health studies at Tonel.Monica@epa.gov and Kathryn Cerise for information on ecological studies at Cerise.Kathryn@epa.gov. Kira Lynch is responsible for the Soil Amendment Technology Evaluation Study and can be reached at Kira.Lynch@epa.gov. Concerns may also be directed to the EPA assistant region 10 administrator Michelle Pirzadeh (Pirzadeh.Michelle@epa.gov).

Mindy Smith, CCC secretary