

Citizens for a Clean Columbia

Our mission: to advocate for a clean Columbia River ecosystem
NEWSLETTER JULY 2022

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 us on our website <https://citizensforacleancolumbia.org> or on Facebook <https://www.facebook.com/groups/315230442457913/> or contact us at citizensforacleancolumbia@gmail.com.

News in Brief

Upland Lakes and Wetlands Study Questions

- The EPA has outlined potential study questions that will be important to answer to assess risk and need for remediation in these sensitive areas.
- Some potential study design suggestions are offered; no tissue samples will be needed.

Soil Amendment Technology Evaluation Study (SATES): Phase IV Reports and Analyses

- Results of the year one, three post-amendment application sampling events in 2021 (Phase IV) were compiled in several draft documents.
- Unfortunately, none of the amendments have had a positive effect on reducing lead bioaccessibility to date. Additional sampling data are expected later this summer.

Sediment Transport Study Planned

- EPA expects TAI to perform a phased sediment transport study to support a sediment erosion and deposition assessment as part of the UCR RI/FS.

Northport Waterfront Cleanup Update

- The WA Department of Ecology (DOE) made their final recommendation for cleanup through a public forum and on their website in Spring 2022, including an opportunity for public comments.

- The remedial action objectives are to prevent direct contact, ingestion, or inhalation of contaminated soil and sediment by humans and ecological receptors. Five areas require cleanup.

Northport Residential Soil Cleanup

- EPA will return to Northport in mid-August to begin cleanup of contaminated soil at 14 residential properties and one common-use area.

Columbia River Treaty Update

- The Northwest Power and Conservation Council and the Columbia Basin Trust (Trust) have worked to improve public access to environmental data and general information about the international aspects of the Columbia River. Links to information from both sides of the border can be accessed at <https://www.nwcouncil.org/news/international-columbia-river/>. Few updates, however, are available, particularly on the U.S. side.
- On the Canadian side of the border, town hall meetings and webinars continue to provide information about key elements for a modernized treaty including ecosystem function with flexibility and adaptive management to address climate change and seasonal variation, and greater inclusivity for long-term transboundary governance.

Bossburg Update (no accompanying article)

- The National Park Service (NPS) will be installing new signage later this summer. Representatives from CCC, DOE, CCT, the Spokane Tribe of Indians, Lake Roosevelt Forum and Stevens County reviewed the draft design. EPA expects to start discussions with NPS over the next 6 months on a long-term strategy to address lead contamination.

CCT Update (no accompanying article)

- The Confederated Tribes of the Colville Reservation (CCT) was awarded an Environmental

Justice Grant to establish local air monitoring. PurpleAir monitors have been purchased and, once a technician is hired, hosts for the monitors will be sought.

EPA Lead Strategy (no accompanying article)

- Region 10 EPA drafted a lead strategy plan that was shared with the public in February 2022. Information can be found at: <https://www.epa.gov/lead/draft-strategy-reduce-lead-exposures-and-disparities-us-communities>.

Human Health RI/FS (no accompanying article)

- EPA will begin drafting preliminary remedial management action objectives (RMAOs) for human health risks. The preliminary RMAOs are slated for external review by Fall, 2022.

Technical Advisor Update

- Joe focused over the past six months on the Phase 3 Sediment Study Technical Memo, the Upland Lakes Study, the Sediment Transport Study and the Soil Amendment Technology Evaluation study.

Upland Lakes and Wetlands Study Questions

Additional information is needed to assess contamination from chemicals of interest (COIs such as heavy metals) in Upland Lakes/Emergent Wetlands in the UCR area. The overall study questions posed by the EPA are:

- What are the concentrations of COIs in sediments of upland lakes/emergent wetlands that have potentially been influenced by aerial deposition of smelter particles?
- What is the bioavailability of COIs in upland lake/emergent wetland sediments?
- Do COI concentrations in sediment pose unacceptable risks to the environment?

The study will be designed to address potential effects on reproduction, growth, and survival of aquatic invertebrates, fish and amphibians or reptiles (herpetofauna), semi-aquatic birds or

mammals, and plants in upland lake/emergent wetland sediments.

Study design considerations when addressing these questions include the minimum number of lakes and wetlands to be tested (5 lakes are suggested to include Cedar Lake and at least two emergent wetlands, either stand alone or contiguous with a lake), how sediment sampling should be conducted (at least 10 samples using a stratified randomized sampling grid of one acre or less is suggested, with the number of grid squares determined by overall size of the targeted upland lake/emergent wetland), sediment sampling depth (0-6 inches below the surface is suggested, and at least two emergent wetlands should be included, along with at least 2 core samples from 2 lakes) and 42-day amphipod tests. At a minimum, all sediment samples will be analyzed for target analyte list metals and grain size distribution in addition to sediment parameters that affect bioavailability of chemicals.

Biological tissue samples will not be needed and modeled tissue concentrations to estimate risk to herpetofauna and wildlife are recommended.

Mindy Smith, CCC secretary

SATES: Phase IV Reports and Analyses

Results of the three sampling events in 2021 (Phase IV) were compiled for review in the *DRAFT Interim Data Summary Report for the Soil Amendment Technology Evaluation Study Phase III: Test Plot Field Implementation Phase IV: 2021 Test Plot Monitoring, March 2022* and *Draft 2021 Field-Scale Statistical Analysis Technical Memo for the Soil Amendment Technology Evaluation Study, June 2022*.

Background: The overall SATES objective is to identify and field test soil amendment technologies that could appropriately and cost-effectively reduce the long-term potential for human exposure to lead in shallow soils in the UCR area. Also evaluated were

other soil metals and changes in soil composition and chemistry expected for the amendments applied (e.g., increased arsenic).

The chosen amendments - soluble phosphate, compost, and combination soluble phosphate and biochar - were evaluated for their ability to:

- Reduce soil lead bioaccessibility by chemical sequestration
- Reduce soil lead mobility and leachability by increasing soil pH
- Increase vegetation cover to reduce potential direct human exposure and reduce erosion and transport of affected soil
- Increase the thickness of the humus barrier, and
- Improve soil structure to reduce the potential for erosion and transport of affected soils.

Test plot locations are on tribal allotments that were sampled during the 2014 residential soil sampling study and found to have elevated lead levels. Soil amendments were chosen based on their performance in Phase II bench-scale tests and stakeholder input (see CCC Jan 2022 newsletter).

Soil samples were collected from each test plot within each of the main subplot areas using a grid of 30 incremental sampling points. Each increment was collected from 0- to 3-inch depth from the soil surface after removing loose surficial debris. The grid was shifted to new locations for subsequent sampling events to avoid resampling the same locations. Field replicate and triplicate samples were also collected to evaluate precision of field techniques, the homogeneity of the increment samples during the validation process, and to calculate a 95% upper confidence interval for the mean concentrations.

Phase IV: Phase IV began with three sampling events in 2021 (May, July, and October) and will continue with twice-annual sampling in 2022 and 2023 in May

and October. An additional round of soil sampling is being conducted in July 2022 to verify trending changes in analytes or changes in percent in vitro bioaccessible lead and arsenic and/or metal concentrations. An incremental composite sampling method is used for all collected samples. The Colville Confederated Tribes CCT has been performing, and will continue to perform, vegetation monitoring prior to each sampling event.

Phase III and IV results for the first year of monitoring can be found in the *Draft Interim Data Summary Report for the Soil Amendment Technology Evaluation Study Phase III: Test Plot Field Implementation Phase IV: 2021 Test Plot Monitoring*. That document summarizes the study design, amendment application, sample collection, test procedures (i.e., field, laboratory analytical procedures, and quality assurance and quality control), the analytical chemistry results of the Phase III amendment screening, and the monitoring results for Phase IV monitoring events from 2021.

The *2021 Field-Scale Statistical Analysis Technical Memo (Statistical Memo)* presents the results of the statistical analyses of the first year of test plot monitoring, summarized below. Analyses included total and bioaccessible arsenic and lead, soil pH, Mehlich III extractable lead and phosphorus, synthetic precipitation leaching procedure (SPLP) target analyte list (TAL) metals and phosphorus, and total carbon and nitrogen.

Data were analyzed utilizing two different types of the Analysis of Variance (ANOVAs) using only the primary samples from Phase IV (not the replicate and triplicate samples). The two types of ANOVA differ by whether or not an error term was used. The repeated measures ANOVA is the standard procedure and is used when multiple tests are performed on the same subjects because a percentage of tests are expected to be significantly

different by chance alone. The purpose of doing an ANOVA without the error term (three-way ANOVA) is to allow a direct examination of the variance (variability) in results that can be attributed to treatment, plots, and monitoring events.

Results of the phosphate-containing amendments (likely to be most effective) are shown in Figure 1.

Figure 1. Results from Statistical Memo; repeated measures ANOVA (modified from Table 4-1)

Parameter	Treatment, significant increase in IVBA with phosph-containing amendments*
SPLP* Aluminum	0.0472
SPLP Antimony	Not significant (NS)
SPLP Arsenic	<0.0001
SPLP Barium	0.0017
SPLP Beryllium	0.042
SPLP Cadmium	<0.0001
SPLP Calcium	<0.0001
SPLP Chromium	<0.0001
SPLP Copper	NS
SPLP Iron	0.00561
SPLP Lead	0.044
SPLP Magnesium	<0.0001
SPLP Potassium	<0.0001
SPLP Selenium	NS
SPLP Silver	NS
SPLP Thallium	0.0466
SPLP Vanadium	<0.0001
SPLP Zinc	0.000452
Mehlich III Extractable Lead	NS
Mehlich III Extractable Phosph.	<0.0001
IVBA Arsenic (extracted at both pH 1.5 and 2.5)	<0.0001
IVBA Lead (extracted at both pH 1.5 and 2.5)	NS
Total Organic Carbon	0.0441
Mineralizable Nitrogen	<0.0001
Phosphorus	<0.0001

*IVBA, in-vitro bioaccessibility;

SPLP, synthetic precipitation leaching procedure

Based on these analyses, none of the amendments decreased the bioaccessibility of lead. The changes in soil composition and chemistry are as expected for the amendments applied. The Mehlich III and SPLP potassium analyses indicate significantly higher levels of potassium in the soluble phosphate treatments (soluble phosphate and soluble phosphate combined with biochar) to which potassium chloride potash was added. SPLP arsenic, cadmium, calcium, chromium, magnesium, manganese, potassium, sodium, thallium, vanadium, and zinc were all significantly increased by the phosphate treatments as well.

Plant growth is unlikely to be strongly affected by any of the amendments. Neither the addition of compost nor biochar increased total organic carbon or total carbon, although mineralizable nitrogen significantly increased in soil samples from subplots where the soluble phosphate treatment was applied.

Phase IV of the SATES project is scheduled to continue through 2023. TAI and EPA will continue to monitor mid to longer-term effects on lead bioavailability as additional field data are collected.

Mindy Smith, CCC secretary

Sediment Transport Study Planned

For the UCR RI/FS to be complete, a phased sediment transport study is needed to support a sediment erosion and deposition assessment (SEDA). The key study questions for each phase of the study are:

- Phase 1: Where are the locations of slag and sediment impacted (above conservative benchmarks) by Trail Smelter releases to the Columbia River?
- Phase 2: Can erosion and deposition be reliably predicted in areas where impacted sediments are present? Specifically:

- Which impacted sediment deposits are stable under current and future hydrologic regimes?
- Which impacted sediment deposits are transient and under what hydrologic conditions?
- Phase 3: What are physical and chemical sediment and porewater conditions at the surface and at depth in areas of impacted sediment that are stable under current and future hydrologic regimes?

Some of this information will be available from previous reports and some will require additional data collection. CCC suggested a more clearly worded question for phase 1 (“Where are the locations of slag and sediment impacted by Trail Smelter releases to the Columbia River?”) and to consider an updated monitoring effort at Black Sand Beach to provide information on sediment and slag transport. In addition, information on vertical distribution from the Black Sand Beach original excavation and removal report would be useful as would some study of vegetation from areas that still experience flooding during high-flow events.

Mindy Smith, CCC secretary

Northport Waterfront Cleanup Update

The WA DOE, under the leadership of Justin Rice (juri461@ecy.wa.gov), is directing and funding a remedial investigation and cleanup of contamination from Le Roi and Teck’s smelter-related metals on Northport’s Town Park and boat launch waterfront area (the Site). This article will provide background and describe the cleanup plan.

The Site includes all permanently and seasonally-exposed areas of the riverbank, shore, and hillside next to the Northport City Park and boat launch. The park has upper and lower recreational areas. The upper area is about 20 to 30 feet above the river and includes parking, picnic tables, and trailer hook-

ups. The lower area includes an access road, boat launch, and dock.

The EPA identified hazardous substances (primarily lead and arsenic) in soil at the former Le Roi Smelter site and on surrounding properties in 2003. In 2004, the EPA oversaw an emergency response action at the upland smelter area to remove remaining structures, excavate shallow contaminated soil, and consolidate and cap soil with a barrier layer and 1 foot of gravel. BNSF Railway, owner of the Northport City Park property, completed an independent cleanup action at the park. However, cleanup actions did not address the nearshore sediments and riverbank affected by smelter waste.

Several investigations have been conducted at the Site including a 2014 Beach Sediment Study, conducted by Teck as part of the remedial investigation/feasibility study (RI/FS). An RI was also conducted by GeoEngineers under DOE’s oversight to assess the nature and extent of smelter waste. The latter involved screening 329 samples in the field using a hand-held x-ray fluorescence instrument and collecting sediment and soil samples from 26 test pits excavated to 4 feet below ground surface (bgs), three hand samples dug to 2 feet bgs, and 109 surface samples collected from about 0 to 0.5 feet bgs. Arsenic was detected in 33% of samples, copper in 82%, lead in 99%, and zinc in 93% of the samples field screened. Locations of metal contamination are provided in that report.

Model Toxics Control Act and Sediment Management Standards provide the process for establishing soil and sediment cleanup values, respectively. Details on these are also found in the report. Soil and sediment cleanup levels (simplified terrestrial ecological evaluation) are 20 mg/kg arsenic, 100 mg/kg copper, 220 mg/kg lead, and 270 mg/kg zinc.

The **remedial action objectives** for the Site are to prevent direct contact, ingestion, or inhalation of contaminated soil and sediment by humans and ecological receptors. Three alternative strategies to accomplish this, combining removal, capping and institutional controls, were presented to the public in a public (zoom) meeting and posted for public comment in May 2021 (see July 2021 CCC newsletter). Based on input from the community and others, Ecology’s Toxics Cleanup Program, provided their final recommendation through a public forum and on the website in April 2022; the public comment period ended on June 1, 2022.

There are 5 areas requiring cleanup (Figure 2, below), each with a different proposed cleanup plan. Of note, excavated soil, sediment, and slag will be transported offsite to a permitted landfill for disposal. Estimated costs for the selected cleanup action are \$4,918,000 to \$5,436,000.

Figure 2. Northport Waterfront Cleanup Areas



The proposed remedial action includes the areas shown in Figure 3 below:

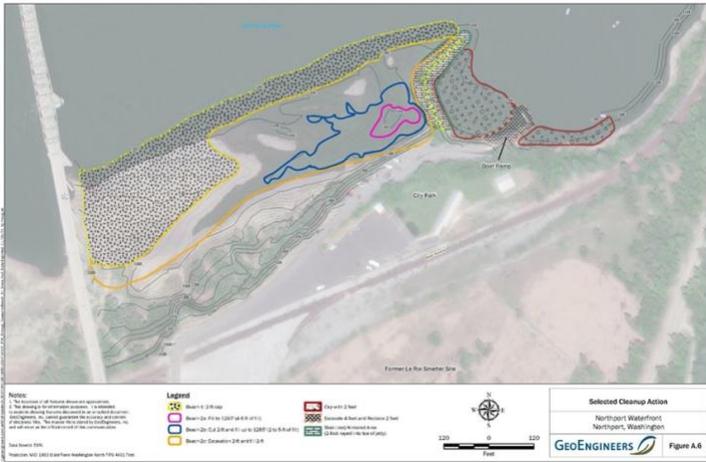
- **Seasonal Beach:** The sub-area will be capped with 2+ feet of imported stream-bed-consistent sediment material (yellow outline below). Capping includes portions of the beach near the main river channel edge and the prominent gravel bar along the downstream portion of the beach. As part of the Site re-grading action, portions of the seasonal beach (primarily

adjacent to the jetty) are capped with up to 6 feet of material (blue and pink outline). For the areas not capped, contaminated areas will be excavated and backfilled with 2-5 feet of cap material. Portions of the area will be re-graded to promote surface water drainage to the river.

- **Jetty:** The entire jetty will be capped (yellow/green tongue area); the slopes with 2 feet of 12-inch loose riprap, with armoring using cobbles and boulders and keyed into the toe of the slope. The cap at the top of the jetty consists of 2 feet of cap material tapered into the riprap (red outline below).
- **Bay and Public Dock:** Two feet of cap material will be used and the area around the dock will be excavated to 4 feet bgs and replaced with 2 feet of the cap material.
- **Bayshore:** Two feet of cap material will be used in addition to excavating other areas. A small amount of excavation and replacement along the boat ramp will occur to maintain a level transition along the established concrete boat launch interface.
- **Hillside:** After removing easily-accessible surface debris, contaminated soil and slag debris will be removed from two exposure areas to depths between 3 and 4 feet bgs. Excavations will be backfilled with imported borrow material and completed with 6 inches of topsoil and plantings of native vegetation. The existing trail that leads from the parking area to the bottom of the hillside will be stabilized by excavating 1 foot of existing soil and replacing with common borrow and fenced. Visible slag and up to two feet of contaminated soil will be excavated from remaining areas of the hillside that are easily accessible and can be completed in a manner that does not disturb mature vegetation; these areas will be backfilled with imported borrow material and completed with topsoil and

plantings of native vegetation. Bench seating and picnic shelter areas along the top of the hillside will be established.

Figure 3 (A.6 in DOE report). Cleanup Action for Seasonal Beach, Jetty, Bay and Public Dock, and Bayshore Areas.



Periodic review will be completed no less than every five years after the initiation of the cleanup action. For additional details see DOE's Northport Waterfront cleanup site webpage at <https://apps.ecology.wa.gov/cleanupsearch/site/14874>.

Mindy Smith, CCC secretary

Northport Residential Soil Cleanup

In 2021, EPA sent out letters offering voluntary soil sampling to those who did not participate in prior sampling events. Of the 74 property owners contacted, EPA received 43 signed consent forms for access. Sampling performed on these properties, based on incremental sampling methodology used in prior sampling events, identified 16 properties with lead concentrations near or above 700 ppm. Fifteen of these property owners consented to soil cleanup.

In mid-August, EPA will return to Northport to conduct cleanup of the contaminated soil at these 15 residential properties consisting of residential properties and one common-use area (located at 3rd

and Columbia). The EPA contractor firm conducting the soil cleanup work is the same as in the 2020 soil cleanup. EPA estimates the entire cleanup to take 8 to 10 weeks, with work being done Monday to Saturday. The WA State Department of Ecology also has committed to assist with disposal cost funding as part of the 2022 cleanup. Information fliers have been sent out to the local community.

Mindy Smith, CCC secretary

Columbia River Treaty Update

The Northwest Power and Conservation Council and the Columbia Basin Trust have compiled a vast amount of information on the Columbia River including its history in British Columbia (BC) and the United States (US), hydropower generation at Columbia River dams in both countries, and the history and future of the Columbia River Treaty (CRT). The Council is an agency of the states of Idaho, Montana, Oregon, and Washington. This group is responsible for long-range electric energy planning in the Northwest and for protecting and enhancing fish and wildlife that have been affected by the construction and operation of hydropower dams in the US portion of the Columbia River Basin. However, little updated information is available, particularly on the U.S. side, and the US negotiating team has been largely absent from the public eye since negotiations began in 2018.

The Columbia Basin Trust is an agency of BC that addresses the impacts of the three CRT dams in BC. This group assists affected and neighboring communities through funding and grants for programs including arts, culture and heritage, business advocacy, environment, scholarships, and community development.

CRT information can be accessed at <https://www.nwcouncil.org/news/international-columbia-river/>. Webpages in this site include

Council and Trust co-supported conferences and projects, information specific to the CRT (e.g., history, maps and data), reports on climate change in the Columbia Basin, and links to the many Tribes and First Nations in the Columbia Basin and agencies (e.g., Bonneville Power Administration, United States Army Corp of Engineers) involved in the existing treaty. Information can also be obtained from Pacific Rivers, a group started in 1987 whose mission is to protect and restore watershed ecosystems of the West. Their website URL is: <https://www.pacificrivers.org/columbia-river-treaty.html>.

In March 2022, I attended a discussion about transboundary water governance. An informal working group of water governance experts began meeting in 2019 with the intent to support ongoing conversation about the future of the Columbia Basin's water resources. Emerging and urgent issues to be addressed within the context of the treaty were ecosystem function and services, climate change, (active) adaptive management, water quality, changing energy markets, meaningful participation of local governments and stakeholders in decision making, and recognition of the rights of First Nations and Tribes to self-determination both in terms of their aboriginal titles and rights and in regards to their legally-protected Treaty rights to govern their lands and resources.

Most interesting to me, was the need to advance a long-term transboundary governance objective to specifically include the establishment of a Columbia basin-wide International River Basin Organization (IRBO). IRBOs are now a feature of over 260 international watercourses throughout the world and provide a mechanism for enhanced public engagement and transparency, coordination, scientific review, and can act as a referral resource to address emerging issues.

In order to create a flexible, sustainable, ethics-based and legitimate water governance structure, the working group recommended the following:

- Include sovereign representation with full participation and leadership of indigenous nations, states, province, and local government
- Be transparent in decision making
- Provide long-term and sustainable staffing, funding, and institutional structure
- Develop a mechanism for prioritization of issues and joint decision-making and oversight of adaptive management implemented under transboundary agreements
- Provide a mechanism for compilation and sharing of information relevant to transboundary river issues
- Engage the public in meaningful participation including a basin-wide educational outreach effort

I also attended a session on ecosystem function. Many groups, particularly tribal councils, are working on issues that must be addressed to reduce ecosystem damage and promote restoration. These include drawdown issues and the creation of performance measures to allow for modeling to assist with establishing vegetation especially in floodplain, riparian, and wetland habitats; restoring natural river functions and flow regimes important for species needs, and reintroduction of salmon.

Supporting materials and all presentations for these session are available on the [B.C. Columbia River Treaty website](#). Additional links on ecosystem function can be accessed at <https://engage.gov.bc.ca/columbiarivertreaty/info-sessions/>.

Mindy Smith, CCC secretary

Technical Advisor Report

My efforts over the past six months focused on the Phase 3 Sediment Study Technical Memo, the

Upland Lakes Study, the Sediment Transport Study and the SATES.

I reviewed EPA's combined comments on the Phase 3 Sediment Study Technical Memo and provided comments to CCC on February 23, 2022. I suggested that a field be added to the Exponent database file for the study listing the sampler used to obtain sediment samples. This was in response to the differing analytical results for freeze grab samples obtained by ALS Environmental and Manchester Environmental Laboratory.

I reviewed "Expanded Upland Lake Study questions_04072022" and provided comments to CCC on April 11, 2022. I suggested that several 2- to 3-foot core samples be obtained from each lake and analyzed in 3" to 6" horizons. This could provide information on the source of metals contamination. Geological processes would be expected to yield relatively uniform results with depth. Human sources would be expected show relatively rapid decreases in metals concentrations with depth.

I reviewed "UCR Sediment Transport Study Questions and Data Needs revised draft 040622" and provided comments to CCC on April 12, 2022. This important study will review existing data on the location and movement of slag deposits. Additional sampling will be performed as needed. I suggested that a monitoring event at Black Sand Beach may provide useful information to inform the study since the last monitoring event at this location was performed in 2013.

I reviewed "DRAFT Interim Data Summary Report for the Soil Amendment Technology Evaluation Study Phase III: Test Plot Field Implementation Phase IV: 2021 Test Plot Monitoring, March 2022" and provided comments to CCC on June 27, 2022. I suggested the report include a more detailed discussion of the differences in preparation and

application of soluble phosphate in 2020 versus 2021. I also suggested that all analyses of amendments for acceptability for use be validated and included in the Exponent database file for the study. None of the soil amendments decreased lead bioavailability in the field study over the course of the first-year post application.

I reviewed "DRAFT 2021 Field-Scale Statistical Analysis Technical Memo for the Soil Amendment Technology Evaluation Study, June 2022" and provided comments to CCC on June 27, 2022. I suggested that the report include a discussion and analysis of the expected increase in soil levels of cadmium, calcium, chromium, magnesium, manganese, potassium, sodium, thallium, vanadium and zinc in the soluble phosphate treated subplots due to the levels of these metals in the triple super phosphate that was applied.

Joe Wichmann, PhD; CCC Technical Advisor

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 Facebook (<https://www.facebook.com/groups/315230442457913/>). We also have new CCC T-shirts available that can be obtained from Hilary Ohm (hilary@highwaterfilters.com).



With questions for the EPA project managers, contact Robert Tan for information on Human Health Risk Assessment or Soil Amendment Technology Evaluation Study (SATES) at Tan.Robert@epa.gov and Bonnie Arthur for information on ecological studies at Arthur.Bonnie@epa.gov. Concerns may also be directed to the EPA Region 10 Deputy Regional Administrator Michelle Pirzadeh (Pirzadeh.Michelle@epa.gov) or regional administrator Casey Sixkiller (Sixkiller.Casey@epa.gov).