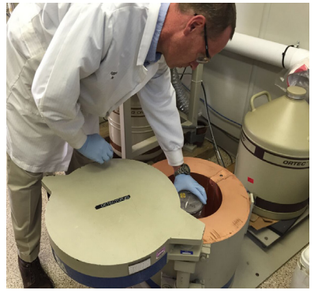
MANAGE AND ANALYZE SAMPLES

USACE established the onsite laboratory to test samples for uranium, thorium, and radium from CWC monitoring, other SLAPS Vicinity Properties, and St. Louis Downtown Sites remediation efforts. The transfer of samples from sampling teams to the FUSRAP Laboratory is tracked by a Chain-of-Custody form that accompanies the samples while they await analysis and provides sample information to the lab staff. The Chain-of-Custody documentation is required to support sample validity. It verifies that the samples are not tampered with before being received by the lab. The "holding time" from sample collection until the start of sample preparation is regulated to ensure sample stability.



This instrument detects gamma rays emitted from the sample.

Alpha spectroscopy is used to analyze each sample's individual radiological isotope.

The FUSRAP Lab staff of 20 prepare and analyze samples in accordance with an established protocol. All samples are analyzed using alpha and gamma spectroscopy. Each day, the lab runs approximately 65 gamma and 70 alpha analyses. Three shifts of laboratory technicians work 24 hours/5 days per week and the recent increase in staffing has reduced the time required to complete sample analyses.

The Data Management Group of five scientists validate the accuracy of sample data provided by the laboratory and enter it into the FUSRAP database. Each batch of printouts from the laboratory's instruments is reviewed by a standard process to confirm that analyses meet technical requirements. The group also ensures that data quality meets project and federal guidelines.

PRODUCE DOCUMENTS

A FUSRAP team of five scientists summarize sampling activities and evaluate the collected data in documents. USACE will review the data and may conclude a property does not require remediation, may conclude remediation is necessary and begin developing the remedial design, or may conclude additional information is necessary to make this determination.

To date, FUSRAP field crews have collected more than 28,000 samples of sediment and soil to characterize CWC and floodplain property conditions. USACE has published annual descriptions of the status of CWC, covering 9.6 of the 14.2 miles. These reports, called North St. Louis County Sites Annual Environmental Monitoring Data and Analysis, are available for the public to read at https://go.usa.gov/xANRb.

FUSRAP Lab Runs 24 Hours/Day, 5 Days/Week

Laboratory Analysis	per sample	per 24-hr day
Dry soil and sediment	12 hours	65 samples
Grind, mix soil and sediment	2 hours	65 samples
Run gamma analysis	2 hours	65 samples
Run alpha analysis	3 days	70 samples
Data Management Verification	**per batch**	**time per batch**
Validate lab's analysis	13 to 24 samples	1 to 8 hours
TOTAL samples of soil and sediment analyzed and validated	**>28,000 samples to date**	

Questions?

If you have questions regarding Coldwater Creek or the FUSRAP process for sampling, you can refer to the following resources at https://go.usa.gov/xANRb:

- Coldwater Creek: How Does USACE Decide Where to Sample?
- Coldwater Creek Sampling
- Coldwater Creek Soil Sampling and Analysis
- Conceptual Site Model and Coldwater Creek

You may also call the St. Louis District FUSRAP Area Office at 314-260-3905 or email your questions to STLFUSRAP@usace.army.mil.

US Army Corps of Engineers®
St. Louis District

St. Louis Sites Fact Sheet

COLDWATER CREEK SAMPLING TIMELINE

"Gateway to Excellence"

Cleanup activities at the St. Louis Sites are part of a nationwide U.S. Army Corps of Engineers (USACE) environmental program known as the Formerly Utilized Sites Remedial Action Program (FUSRAP).

These sites contain soils contaminated with uranium, thorium, and radium as a result of activities associated with the Manhattan Engineer District/Atomic Energy Commission (MED/AEC) during the nation's early atomic program in the 1940s and 1950s.

Surface water (caused by rain or snow) and flooding events transported contaminated material from the St. Louis Airport Site (SLAPS), Latty Avenue Properties and haul roads into Coldwater Creek (CWC). Once contamination reached CWC, creek flow moved contaminated material downstream.

USACE first eliminated the sources of contamination at SLAPS and Latty. USACE continues to investigate and sample the CWC corridor and the adjacent properties within the creek's 10-year floodplain. The FUSRAP team monitors the creek water and sediment twice a year in 11 locations. Evaluation of monitoring data confirms that contamination from current FUSRAP activities is not impacting creek water or sediment.

To learn more about FUSRAP, visit the FUSRAP webpage at https://go.usa.gov/xANRb or www.mvs.usace.army.mil/Missions/FUSRAP. Contact the FUSRAP Area Office at 314-260-3905 or by email at STLFUSRAP@usace.army.mil.

The Coldwater Creek (CWC) corridor, which starts at Banshee Road and continues to the Missouri River for 14.2 miles, is part of the St. Louis Airport Site (SLAPS) Vicinity Properties. CWC is surrounded by recreational, residential, commercial, and industrial areas. USACE performs year-round sampling and analysis of sediment and soil in and around CWC and within its 10-year floodplain. USACE employs approximately 70 people to plan and execute the sampling program downstream in 1-mile increments. Each mile's surrounding floodplain ranges from 30 to 150 acres. Investigating this large area takes time because of the logistical challenges and technical requirements.

Weather conditions sometimes require additional safety and health precautions to protect workers. Conditions at the sites, like the ice and snow here, further complicate the work and delay the teams.

DEVELOP A WORK PLAN

The FUSRAP team first reviews topographic maps, historical aerial photos, channel improvements, and historical sampling data to determine the current and historical status of CWC and surrounding properties. Next, the team locates and photographs the sections' tributaries, drainages, depositional areas, low-lying areas, fill areas, structures, utilities, sewers, and erosion control features.

Subject matter experts then use the information gathered to develop a sampling Work Plan (WP), which identifies areas that require investigation and sampling. The WP also identifies potential hazards and establishes protective clothing and safety requirements for workers. Field staff must have medical exams, vaccines, and yearly safety training. They are also trained in health and safety, transport of environmental samples, and equipment operation.

MEET LEGAL REQUIREMENTS

To enter private property in and around CWC, a FUSRAP team of two contractor employees and two USACE real estate experts request the property owner's permission in writing, usually several months in advance. Investigation cannot begin until the property owner signs a right-of-entry (ROE) permit and returns it to USACE. The written ROE allows the team to access the properties to collect soil and sediment samples, to scan for radioactive contamination, and to allow access to the creek or other adjacent properties that require investigation.

Obtaining an ROE can take as little as a month or more than six months, depending on how a property owner responds to the request. When an owner delays or refuses to sign an ROE, teams may not be able to sample on the property or may have to travel much greater distances to access sampling areas along the creek.

Project scope, scheduling, bad weather, or difficult access can lengthen the CWC sampling timeline. Additional actions may also be required. For example, a crew may need additional time to clear away heavy brush or cut steps into a steep embankment.

FOLLOW DAILY CHECKS

Every morning, the field team meets to discuss safety, lessons learned, and plans for the day. They communicate with property owners and then look over the sampling site for potential hazards (poison ivy, fall and trip hazards, wild and domestic animals).

The FUSRAP radiological survey team checks their instruments' calibrations daily. This step is necessary for data accuracy.

Four people check radiological instrumentation each morning to confirm its accurate operation prior to use. Vehicles are loaded with sampling equipment, supplies, and personnel protective equipment and are inspected before leaving the lab or the site. Additionally, the team monitors the weather throughout the day because lightning, flash flooding, and temperature extremes are life threatening, so stand down and recovery periods are often necessary.

SAMPLE SEDIMENT, NATIVE SOIL

After contacting Missouri One Call to locate underground utilities, teams use Global Positioning System (GPS) to locate, flag, and collect photos of sampling locations indicated in the WP. They record the location coordinates and elevations before the sampling crews arrive.

The sampling crews, totaling 26 people, then collect the samples and record the data. Their efforts are often slowed down by rough terrain and dense brush. Some areas require carrying heavy equipment long distances or crossing through the creek and up steep banks for soil sampling.

Soil sampling crews use hand augers in wooded areas and on the creek banks to collect surface samples down to 6 inches and subsurface samples to reach what the team's geologist determines are "native soils." Native soils occur where land has not been disturbed or backfilled. The depth can vary from 6 inches to 20 feet or more. The crew will sample fill dirt or disturbed soil while seeking native soil for a complete characterization.

Drill rigs drill for soil samples quickly but getting them in place is not always easy because dense brush and woods and other obstructions limit access to many sampling locations.

Hand-augering through steep, rocky terrain with thick vegetation is not only difficult but is also time consuming. Drill rig sampling is used when possible because it is faster. However, the CWC corridor has so much vegetation and such steep creek banks that teams can only use a drill rig at approximately 10 percent of the locations.

Sediment and soil sample teams place samples in cans, label them, and seal them before transfer to the FUSRAP laboratory at SLAPS. In log books and drilling logs, the team geologist documents such information as soil type, color, sample depth, moisture, and radiological readings. Decontamination crews clean, decontaminate, and again survey sampling equipment before its next use.

SCAN RADIOLOGICALLY

FUSRAP scientists develop survey plans and guiding illustrations of the physical characteristics of CWC, including areas in the 10-year floodplain, that require radiological scans and measurements. Some areas have culverts, utilities, riprap, or consolidated materials, which are hard-surfaced materials that resist weathering like a concrete or an asphalt pad.

Seven FUSRAP team members support and perform radiological scans of consolidated materials and surface soil using portable radiological instruments. They move radiation detectors at a constant distance from the surface being investigated. For surface soil, gamma walkover radiological scan surveys can be particularly difficult because of brush, steep banks, and rough terrain, again increasing the time required. Daily surveys are processed and reviewed by FUSRAP's geographic information system (GIS) team and by a health physicist to determine if additional investigation is needed.

Debris and site conditions make sample collection challenging.

This timeline shows the typical CWC sampling and analysis with an approximate time range for each step. Some steps pictured here may be performed at the same time.