



National Institute of Environmental Health Sciences
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Superfund Research Program Activities: Tribal Environmental Health

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Outline

- Brief background about SRP
- Examples of SRP engagement with Tribes and Tribal Nations
 - Communities impacted by mining and abandoned mines
 - Tribal communities impacted by other hazardous substances

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SRP Mandates Drive the SRP Program

Integrating Health and Environmental/Engineering Sciences

Health Effects

- Advanced techniques to detect, assess, and evaluate the human health effects of hazardous substances

Assessing Risk

- Methods to assess the risks posed by hazardous substances on human health

Detection

- Methods and technologies to detect hazardous substances in the environment

Remediation

- Basic biological, chemical, and physical methods to reduce the amount and toxicity of hazardous substances



Multi-Project Centers (P42)

Designed to integrate basic and application-oriented research across disciplines:

- Biomedical and Environmental Science and Engineering research.
- Community Engagement, Research Translation, Data Science, and Training.

Occupational Training (R25)

Emerging issues in EHS training.

Time-Sensitive Grants (R21)

Research on unpredictable events with a limited window to collect samples or data.

Conference Grants (R13)

Funding for conferences related to SRP mandates.

Individual Research Projects (R01)

Designed to complement the multi-project research program by tackling specific issues of emerging concern for Superfund.

Small Business Research Grants (SBIR) (R43-44)

Foster commercializing technologies relevant to hazardous substance clean-up and monitoring.

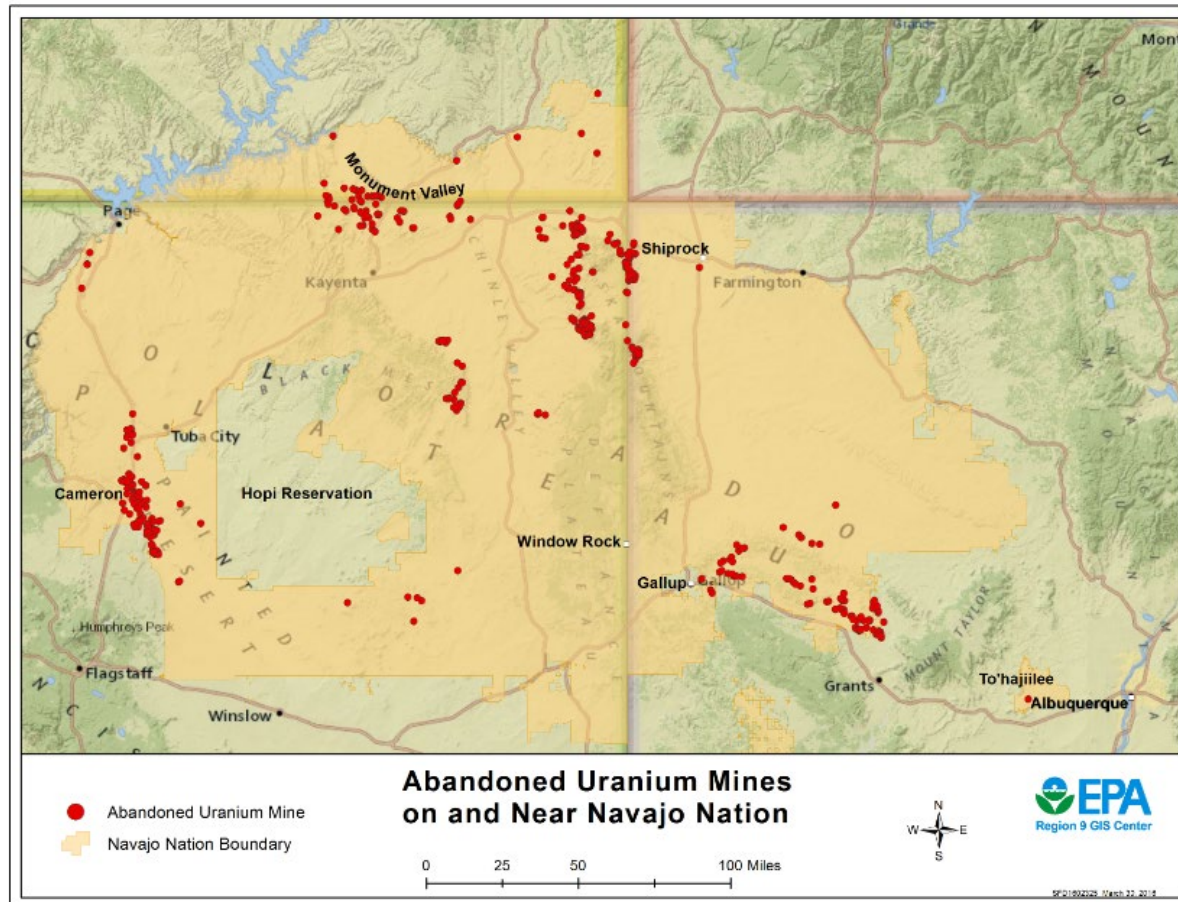
ViCTER (R01)

Virtual Consortium for Translational Transdisciplinary Environmental Research supports cross-disciplinary research teams.

10 SRP Grant Recipients Support Indigenous Community Engagement

Grant Recipient	Tribes and Tribal Nations
→ University of New Mexico (P42)	Navajo Nation, Laguna Pueblo, Crow Nation
→ Columbia University Northern Plains (P42)	Cheyenne River Sioux Tribe, Oglala Lakota Nation, Spirit Lake Nation
★ University of Arizona (P42)	Navajo Nation, Tohono O’odham Nation
→ Massachusetts Institute of Technology (P42)	Passamaquoddy Tribe
→ Oregon State University (P42)	Swinomish Tribe, Umatilla Tribe, Samish Tribe
→ University of Rhode Island (P42)	Mashpee-Wampanoag Tribe
★ Duke University (P42)	Waccamaw Siouan Tribe
★ University of North Carolina (P42)	Lumbee Tribe
★ Yale University (R01)	Mi’kmaq Nation
★ North Carolina State University (P42)	Skarure Woccon Tribe

Communities affected by mining activities



<https://www.epa.gov/navajo-nation-uranium-cleanup/aum-cleanup>

Columbia University Northern Plains (CUNP) SRP Center

Hazardous metals, such as arsenic and uranium, from abandoned mining sites can contaminate groundwater that Tribal communities in the U.S. Northern Plains rely on for drinking water.



Center Goals

- Investigating the health effects (e.g., CVD and diabetes), geochemistry, and remediation of arsenic and uranium.
- Prevention/intervention activity: Partnering with Indigenous communities to for effective interventions to reduce drinking water contamination.
- Indigenous partners: Cheyenne Rive Sioux Tribe, Oglala Lakota Nation, Spirit Lake Nation



Photo courtesy of CUNP SRP Center



CUNP SRP Community Engagement Core

- In collaboration with Missouri Breaks Industries Research, Inc., the Community Engagement Core aims to decrease metal exposure and related disease in Tribal communities.



Safeguards Tribal sovereignty and the rights of citizens and communities.



Promotes traditional diets to improve health and prevent disease.



Partners with communities to educate on exposures and how to mitigate them.



Photo courtesy of CUNP SRP Center

University of New Mexico (UNM) Metal Exposure and Toxicity Assessment on Tribal Lands of the Southwest (METALS) SRP Center

Mining waste on Tribal lands has led to heavy metal contamination in the soil, air, and water, which may cause adverse health effects for Indigenous peoples that live near these mining sites.

Center Goals

- Studying toxic effects and cleanup of mixed metals and uranium exposure on tribal communities in the Southwest.
- Partnering with Indigenous communities to disseminate research and inform people of environmental risks.
- Prevention/intervention activity: community soil and water testing
- Indigenous partners: Navajo Nation, Laguna Pueblo

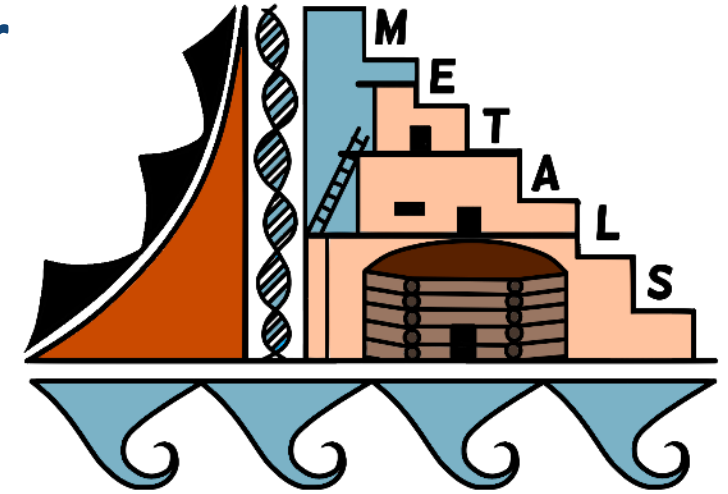


Photo courtesy of UNM METALS SRP Center



UNM METALS Community Work

- Community Engagement Core (CEC) works with Research Translation Core to facilitate community involvement in data collection/interpretation in a reciprocal relationship.



Guides Superfund remedial decision-making with community perspectives.



Develops risk communication materials that integrate Indigenous learning models and Western science.



Partners with a Laguna Pueblo community and three Navajo communities.



Photo courtesy of UNM METALS SRP Center

Research Highlight: Combining Arsenic Data Across Populations Sheds Light on Exposure Sources

A collaboration among UNM METALS, University of California, Berkeley, and Columbia University SRP Centers, researchers combined data across three different populations to better characterize sources of arsenic exposure that should be included in risk assessments.

- Combined data from the three SRP Centers:
 - UNM's **Navajo Nation Birth Cohort Study**
 - Columbia's Health Effects of Arsenic Longitudinal Study population in Bangladesh
 - Berkeley's cohort of adults in Northern Chile
- First study to report role of **indoor dust in arsenic exposure** for the Navajo Nation.



Photo courtesy of Nancy Lolacano



Tribal communities affected by other hazardous contaminants

Massachusetts Institute of Technology (MIT) SRP Center

Carcinogenic water contaminants, like PAHs and NDMA, are linked to adverse health effects like childhood cancer. This can threaten the health of Indigenous peoples, who tend to disproportionately live near polluted sites.

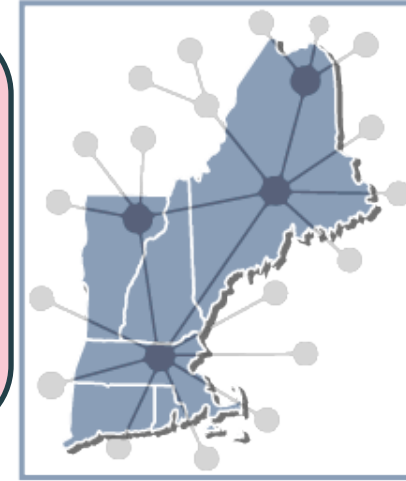


Photo courtesy of MIT SRP Center

Center Goals

- Developing new technologies to detect, map, and remediate contaminants like NDMA and PAHs.
- Prevention/intervention activity: Partnering with communities to investigate and address water quality issues, as well as other environmental health risks.
- Indigenous partners: Passamaquoddy Tribe



MIT SRP Center Partners with the Passamaquoddy Tribe

- The MIT SRP Center CEC partners with the Passamaquoddy Tribe in Maine to test drinking water for contaminants and teach community members how to keep themselves safe from harmful pollutants.



Supports citizen science programs to test drinking water and communicate results to Tribal members.



Listens to Passamaquoddy experiences to lead research questions and projects.



Builds trust and capacity between the Tribe and the SRP Center.



Photo courtesy of MIT SRP Center

Oregon State University (OSU) SRP Center

Polycyclic aromatic hydrocarbons (PAHs) are a group of chemicals that are formed by burning organic material. People can be exposed to PAHs through smoke, exhaust, or through the food they eat.



Photo courtesy of OSU SRP Center

Center Goals

- Identifying PAHs and investigating their effects on human health.
- Prevention/intervention activity: testing food sources for PAHs
- Indigenous partners: Swinomish Tribe, Umatilla Tribe, Samish Tribe



OSU SRP Examines Tribal Life and Health

- OSU SRP Center CEC partners with the Umatilla, Swinomish, and Samish Tribes to investigate the presence of PAHs in traditional Tribal foods and practices.



Analyzes traditional Tribal foods to determine PAH levels from natural and artificial sources.



Tailors research to be relevant to Indigenous partners and initiates community-based participatory research.



Emphasizes cultural awareness, historical and cultural context in data.



Photo courtesy of OSU SRP Center



Research Highlight: Testing Butter Clams for PAHs

Butter clams are an important food source for the Swinomish and Samish Tribes. However, Tribal members were concerned that butter clams in Fidalgo Bay may be contaminated by two nearby oil refineries.

- Worked with Tribal partners to collect butter clams for analysis.
- Identified what contaminants, including PAHs, might be found in butter clams from the oil refineries.
- Tested passive sediment samplers in the clams' habitat.



Photo courtesy of OSU SRP Center

University of Rhode Island (URI) Sources, Transport, Exposure, and Effects of PFAS (STEEP) SRP Center

PFAS are a class of chemicals that are linked to a variety of adverse health impacts. Because PFAS are highly stable, they are a worldwide contaminant that remain in the environment for many years.



Photo courtesy of URI STEEP SRP Center



Center Goals

- Tracing the fate of PFAS from contaminated sites and assessing its health impacts throughout the human life cycle.
- Prevention/intervention activity: engage the community to address concerns about the safety of local fish/shellfish.
- Indigenous partners: Mashpee-Wampanoag Tribe



URI STEEP SRP Center CEC Partners With Mashpee-Wampanoag Tribe

- Works with Mashpee-Wampanoag Tribe to collect fish, shellfish, and well water for analysis to address community PFAS concerns.



Tests local fish and shellfish from the Cape Cod area for PFAS levels.



Develops strategies to communicate PFAS risks with Tribal members.



Collaborate with organizations on Cape Cod to educate and empower communities affected by PFAS contamination.



Photos courtesy of URI STEEP SRP Center

Want to learn more about SRP work with Native American Communities? Check out our Science Digest!



Features

Work with Native American Communities

Native American communities across the U.S. experience [disproportionate exposure to hazardous chemicals](#), compared to the rest of the population. Active and legacy mining and waste-storage operations may expose some of these communities to chemicals that can persist in the environment and affect health.

Funded by SRP, researchers across the country are working to understand the many potential sources of exposure and identify solutions to protect health in Native American communities. Scientists and community outreach experts are teaming to create community-engaged research projects that address concerns, then communicate their findings and recommendations in ways that speak to the culture of each community.

Cleaning up Drinking Water Sources

Native Americans in the U.S. Northern Plains are exposed to high levels of [arsenic, uranium, and other metals](#) in their drinking water. In 2022, Columbia University and Tribal partners in the Northern Plains founded the [Columbia University Northern Plains \(CUNP\) SRP Center](#) to address this contamination. All of the center's research projects and interventions have been identified, co-designed, and are being led in collaboration with Tribal partners, such as Missouri Breaks Inc., a Native American-owned research organization.



The CUNP SRP works with local high schools to get Tribal youth involved in science. (Photo courtesy of the CUNP SRP Center)

Using data from the Strong Heart Study, the researchers are revealing the adverse health effects of metal exposures, including [insulin resistance](#), [diabetes](#), [lung disease](#), and [cardiovascular disorders](#). The Strong Heart Study is the largest and

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Extra slides

Community Work Highlights

Educating During the Summer

- Shared resources and educated members of the Mashpee-Wampanoag Tribe about PFAS contamination in Cape Cod.
- Hosted a program about PFAS at a science summer camp for Tribal youth.

Hosting Film Screenings

- URI STEEP SRP Center and the Mashpee-Wampanoag Tribe hosted a joint film screening of “The Devil We Know,” about the advocacy work of West Virginian residents to stop a corporation from dumping PFAS in their community.



Photos courtesy of URI STEEP SRP Center

Where We Work: Mapping Tools

Research

Grant Funded

Centers, Interagency
Collaborations, and Consortia

Superfund Research Program

About SRP

Community Engagement and
Research Translation

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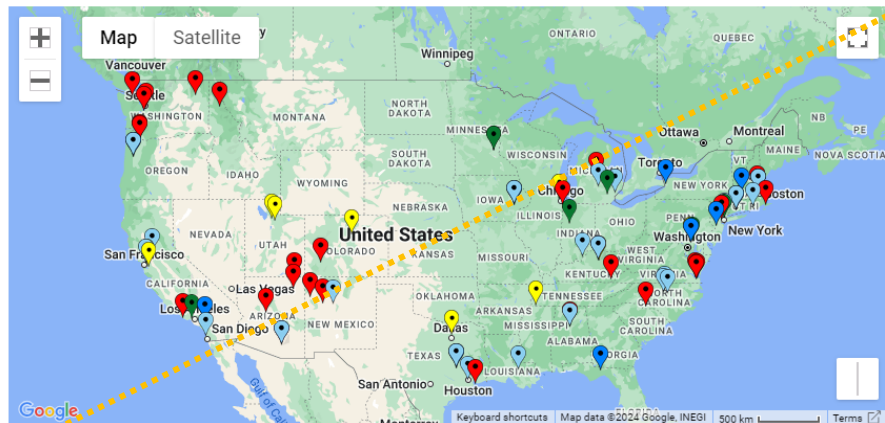
Table View

Who We Fund

Where We Work

Superfund Research Program

The map below shows the locations of the SRP grant recipients, as well as the hazardous waste sites where they conduct research or outreach. To see more information about hazardous waste sites, visit the [Research and Engagement at Hazardous Waste Sites](#) page.



Use the checkboxes below to toggle the desired map points:

- ☒ Multiproject Center Grants (P42) grant recipients
- ☒ Small Business Innovation Research (SBIR) (R43/44)
- ☒ Individual Research Grants (R01) grant recipients
- ☒ Occupational and Safety Training Education Programs on Emerging Technologies (R25) grant recipients
- ☒ Time Sensitive (R21) grant recipients
- ☒ Hazardous Waste Sites



Region 4: AL, FL, GA, KY, MS, NC, SC, TN

Superfund Research Program



Note: The map points for the Hazardous Waste Sites are an approximate representation of the site locations.

Use the checkboxes below to toggle the desired map points:

- ☒ Hazardous Waste Sites with Ongoing Research
- ☒ Hazardous Waste Sites with Completed Research

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Hazardous Waste Sites with On-Going Research

35th Avenue - Birmingham, Alabama

- Project: University of Alabama at Birmingham: [Community Engagement Core](#)
- Research Types: Outreach or Community Engagement
- Research/Outreach: On-going

Table View

Superfund Research Program

The following tables represent the HTML table view of the "Where We Work" map in a format that is accessible. An Excel version is also available for [download](#).

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Multiproject Center Grants (P42)

Number of rows to display: 10/20 All

Grant Recipient	Project	Funding	City	State
Baylor College of Medicine	Bioregional Systems and Bioscience, Ultrastructural Detection, Early Life Exposures, Clinical Outcomes, Chronic Liver Disease and Neurodegenerative Defects, Remediation and Rehabilitation	2020-2025	Houston	Texas
Columbia University	Columbia University and Southern Plains Partnership for the Superfund Research Program	2022-2027	New York	New York
Duke University	Duke University Superfund Research Center - Developmental Outcomes, Mechanisms, Outcomes, and Remediation	2020-2027	Durham	North Carolina
Harvard School of Public Health	Neurological and Mental Health Outcomes	2020-2025	Boston	Massachusetts

Site Work
By Region!!

Do You Love
Spreadsheets?
Download
Table in
Excel!!!

<https://tools.niehs.nih.gov/srp/sites/www.cfm>

Note: this map does not show collaborating institutions (e.g. subcontracts to other partnering universities or organizations).

- Add qr code for our website and “where we work” site and the community engagement page
- Add science digest and qr code for it- December 2023 science digest
- Be sure to keep mentioning and emphasizing that our grant recipients are not only telling communities what they are exposed to, but how they can reduce their exposures

Research Highlight: Strong Heart Family Study

An extension of the Strong Heart Study (1985) that evaluates cardiovascular risk factors among 285 American Indian adults.



Strong Heart Study

The largest epidemiologic study of cardiovascular disease in

Using data from the study, researchers discovered that:



Declines in blood lead levels were associated with reduced blood pressure.



Reductions in blood lead levels was linked to reductions in DNA markers associated with heart failure, thickened heart walls.

Project 3:

**Health effects of metals in
Native American communities:
A longitudinal multi-omics study**

A. Navas Acien A. Kupsco T. Sanchez K. Schilling M. Gamble

Images courtesy of CUNY SPR Center

Research Highlight: How Bodies Process PAHs in Smoked Salmon

OSU SRP Center CEC partnered with the Umatilla Tribe to measure how people metabolize and eliminate PAHs after eating smoked salmon, an important traditional food for Pacific Northwest Native Americans.

- Conducted community educational forum to inform study volunteers about purpose of study.
- Took air samples during smoking process and collected urine from volunteers before and after eating smoke salmon.
- Gave advice to Tribal members to lower PAH exposure while still eating salmon.



Images courtesy of OSU SRP Center

North Carolina State University (NCSU) Center for Human Health and the Environment (CHHE) SRP Center

In 2016, high levels of PFAS were found in North Carolina's Cape Fear River and its watershed. More than 200,000 NC residents use the Cape Fear River for drinking water and recreation.



Center Goals

- Investigating the toxicity of PFAS and its effects on thyroid and immune function.
- Assessing accumulation of PFAS in organisms and remediating contaminated areas.



**Center for
Human
Health and the
Environment**

Photo courtesy of NCSU CHHE SRP Center

UNM METALS in the News

Grantee Highlight: Using Art to Improve Environmental Health Literacy Among Indigenous Tribes

- Research translation coordinator Mallory Quetawki helps communicate UNM METALS research to Indigenous partners
- Quetawki illustrated concepts like DNA damage and repair to convey information about how uranium and metals damage DNA in immune cells.

Extramural Paper of the Month: Natural materials can remove uranium and arsenic from water

- A new approach developed by researchers UNM combines limestone and a bone-like mineral called hydroxyapatite to remove arsenic and uranium from water.



Image courtesy of Mallory Quetawki

Community Work Highlight: Earth Day with the Skarure Woccon Tribe

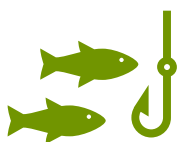
- Concerned Tribal members from the Skarure Woccon Tribe met with NCSU CHHE SRP Center researchers on Earth Day 2023 to learn more about PFAS.



Forged relationships with Tribal members to assist them in the future.



Answered questions about a center study on GenX, a type of PFAS, and its health effects.



Informed members about PFAS in fish and drinking water, and how to avoid exposure.



Photos courtesy of Kristen Futch

University of Arizona (UA) SRP Center

Mining waste on Tribal lands can leach arsenic into the surrounding environment. When people drink contaminated groundwater or inhale arsenic-contaminated dust, they can experience health effects like diabetes.



Center Goals

- Studying the health effects of mine waste contamination on U.S. Southwest populations.
- Predicting exposures Native American and Hispanic communities to reduce incidences of diabetes in mining communities.



Superfund
Research Center

Photo courtesy of UA SRP Center

UA SRP Center Tribal-University Partnerships

- The UA SRP Center Community Engagement Core focuses on community engagement with people living near mining sites to minimize risks to Indigenous populations.



Engages Tribal communities by considering cultural values and traditions.



Empowers communities to maintain food sovereignty while decreasing risks of arsenic exposure.



Fosters university-community partnerships based on trust and transparency



Photo courtesy of UA SRP Center

University of North Carolina at Chapel Hill (UNC) SRP Center

Inorganic arsenic is the highest priority contaminant regulated under SRP. Chronic exposure to arsenic in drinking water is linked to type 2 diabetes and other metabolic disorders.

Center Goals

- Investigating the impacts of arsenic exposure on human health.
- Developing tools to predict contaminant levels in the environment and to prevent exposure to arsenic in drinking water.



Photo courtesy of UNC SRP Center

UNC SRP Center CEC

UNC SRP Center CEC partners with the Winyah River Alliance and Clean Water for North Carolina to facilitate dialogue with community members about the center's research.



Partners with Indigenous populations to advocate for clean water and clean rivers.



Enhances understanding of arsenic exposure in high-risk communities.



Informs development of local and state policies.



Photo courtesy of UNC SRP Center

Yale University SRP Individual Grant: Understanding and Enhancing PFAS Phytoremediation Mechanisms Using Novel Nanomaterials

PFAS are a class of chemicals that persist in the environment and are linked to a many adverse health effects, including immune suppression various cancers. Hemp plants can absorb a limited amount of PFAS from the soil they grow in.



Project Goals

- Developing new nanomaterials to help hemp plants take up more PFAS.
- Testing the nanomaterial-enhanced hemp plants in PFAS-contaminated soil.
- Partnering with Upland Grassroots and the Mi'kmaq Nation to clean the former Loring Air Force Base.



Photo courtesy of Upland Grassroots

Duke University SRP Center

Put in extra slides

Prenatal and early life exposure to certain chemicals, including PFAS and polycyclic aromatic hydrocarbons, can have negative effects on human health later in life.

Center Goals

- Assessing how common pollutants affect human development and neurodevelopment.
- Reducing and remediating certain chemicals at Superfund sites using bacteria.



Photo courtesy of Duke SRP Center

Partnering with Waccamaw Siouan Tribe to Reduce Exposure to Contaminants in Soil

Duke SRP Center CEC to helped study participants understand PFAS tests from their gardens and protect themselves from PFAS exposure.



Worked with [Waccamaw Siouan STEM Studio](#) to distribute soil exposure reduction supplies to community members.



Aided Tribal members in understanding contaminant level reports from sampling their gardening soil.



Photo courtesy of Duke SRP Center