URANIUM RESEARCH ON NATIVE LANDS

NSF HIGHLIGHTS—TRACK 1 RESEARCH

TITLE

Uranium Transport and Site Remediation research crosses cultural borders to protect people and the environment

OUTCOME

Scientists from the University of New Mexico (UNM), New Mexico Tech (NM Tech), and the New Mexico Bureau of Geology have made significant progress characterizing the extent of contamination from legacy uranium mining and milling and how its spreads in groundwater, surface water, vegetation, and soils on the Laguna Pueblo and Navajo Nation. Data from New Mexico EPSCoR–supported research in the Navajo Nation that was published in *Environmental Science & Technology* convinced local leaders to place new sites on its Priority List for environmental remediation. Researchers have built lasting collaborations with state and federal regulatory agencies, such as the New Mexico Environment Department (NMED) and Environmental Protection Agency (EPA) Region VI, to investigate the impacts of legacy uranium mining on tribal lands in west-central New Mexico.

IMPACT/BENEFITS

University of New Mexico scientists are using new, innovative methods based on the use of nitrogen isotopes as tracers to characterize the source, nature, and migration of contaminants on tribal lands in New Mexico. In the last year, team members documented elevated concentrations of uranium and co-occurring metals in abandoned uranium mine wastes on Native American lands. For example, uranium concentrations in water from a seep on the Blue Gap Tachee site were up to 5 times the EPA's drinking water limit and suggest that abandoned mine wastes can be a major source of potential metal exposure to local people and livestock living nearby. Results from this and other research sites near the Jackpile Mine on the Laguna Pueblo are being shared and translated to the Native American communities at Tribal Council and chapter meetings. Because of relationships established through the NM EPSCoR project, the NMED reached out to NM EPSCoR Uranium Team researchers after the 2015 Gold King Mine spill on a tributary of the Animas River (an environmental disaster associated with the spill of 3 million gallons of mine wastewater and tailings) for independent analysis of the impacts on tribal lands and waters. In addition, outreach efforts to K-

12 students at Laguna Pueblo have fostered interest in STEM learning and have inspired young Native American scientists.

EXPLANATION

Inadequate understanding of uranium biogeochemistry and mobility in natural and contaminated environments and our consequent inability to control transport of uranium during and after mining is a critical roadblock to its sustainable utilization as a safe and sustainable energy source in New Mexico. As part of their continued efforts for the NM EPSCoR *Energize New Mexico* grant, the Uranium Transport & Site Remediation research team promotes collaborations among university scientists concerned with fundamental uranium biogeochemistry, engineers, applied geologists, and regional resource managers and tribal leaders concerned with mineral resources, contamination, and remediation. Research addresses questions related to the movement of uranium molecules in air, water, and soil, and the recovery and remediation of contaminated areas. These efforts contribute to NM EPSCoR Strategic Plan objectives dedicated to characterizing and mapping contaminants from legacy uranium production, and will have a lasting impact on the health and wellbeing of local communities, livestock, agricultural products, and the environment.

Dan Cadol (New Mexico Tech) checks his dust traps near the Jackpile-Paguate Mine on Laguna Pueblo

NM EPSCoR Uranium Transport and Site Remediation research team faculty and students from the University of New Mexico, New Mexico Tech, and Laguna Pueblo at the Jackpile-Paguate Mine on Laguna Pueblo

Members of the Uranium research team from the University of New Mexico and New Mexico Tech take soil and water samples from a pond near the former Jackpile Mine on the Laguna Pueblo