Current Issues in Public Health and Uranium Remediation Policy in New Mexico and the Navajo Nation

Chris Shuey, MPH; Wendy Atcitty, MBA; Shasity Tsosie, MS
sric.chris@gmail.com, 505-350-0833, sric.org/uranium
Southwest Research and Information Center
Community Engagement Core Lead, UNM METALS SRC

Radioactive and Hazardous Materials Committee
New Mexico Legislature
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Community Contributors:
Jackie Bell-Jefferson, Mae Franklin, Susan Gordon, Bradley Henio, Grace Henio, Sarah Henio-Adeky, Edith Hood, Eric Jantz, Terry Keyanna, Larry King, Bertha Nez, Jennifer Nez, Jonathan Perry, Sandy Ramone, Christine Smith, Jerry Whiterock

METALS

COLLEGE OF PHARMACY
METAL EXPOSURE AND TOXICITY ASSESSMENT ON TRIBAL LANDS IN THE SOUTHWEST

Srp Superfund Research Program

SOUTHWEST RESEARCH AND INFORMATION CENTER

PUEBLO OF LAGUNA

INDIGENOUS EDUCATION INSTITUTE I.E.I

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Communities: We recognize and honor the communities and community organizations that are partners in the UNM METALS Superfund Research Center:

- Blue Gap-Tachee Chapter
- Cameron Farm Enterprise
- Indigenous Education Institute
- Pueblo of Laguna
- Red Water Pond Road Community Association

Land Acknowledgement Statement: *The University of New Mexico sits on the traditional homelands of the Pueblo of Sandia. The original peoples of New Mexico have deep connections to the land and have made significant contributions to the broader community statewide. We honor the land itself and those who remain stewards of this land and acknowledge our committed relationship to Indigenous peoples.*

Executive Summary – What the Legislature can do?

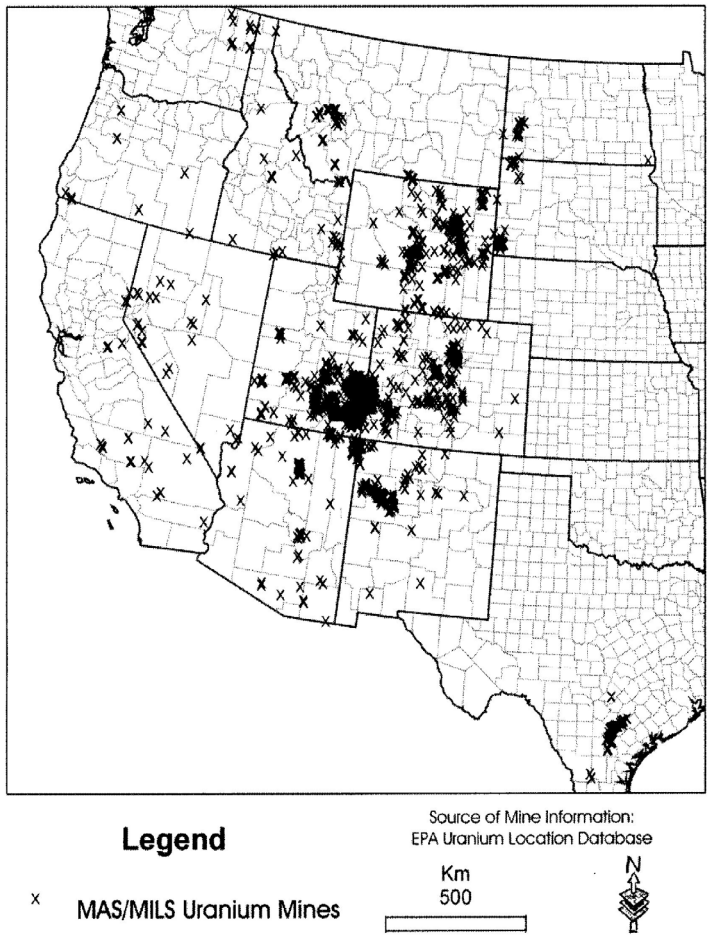
Catle graze next to the Mt. Taylor Mine near San Mateo, NM, circa 2018

Please note: In this presentation, we address needed responses to the Uranium Mining Legacy in New Mexico, the Navajo Nation and the Southwest. However, frontline communities, NGOs and academic institutions remain concerned about and are monitoring a new round uranium mining proposals. We will address those concerns at a future hearing.

- To protect public health and the environment over the 50-100 years it will take to remediate hundreds of abandoned uranium mines (AUMs) in the region, *take action now*
- Adopt a regional approach to mine remediation; drop the "policy" of opposing disposal of mine wastes from neighboring jurisdictions
- Authorize NMED and NMMMD to start now to explore developing a regional uranium mine waste disposal facility in Ambrosia Lake, with direct citizen participation
- This is a complicated issue, both scientifically and legally; convene a work session or sessions to hear and act on the details

Outline of Presentation

- How did we get here? 80 years of uranium mining impacts
  - Map: More than 10,000 uranium mines and more than 50 uranium mills operated in 15 Western states, leaving hundreds of millions of tons of toxic and radioactive wastes
- What are health impacts of exposure to uranium mine wastes?
- What policy measures are needed to address the Uranium Legacy?
- What more can the Legislature do to address this problem?



USEPA Uranium TENORM report, vol. 1, 2008

How we got here: Uranium mining impacts disproportionately affect Native Americans

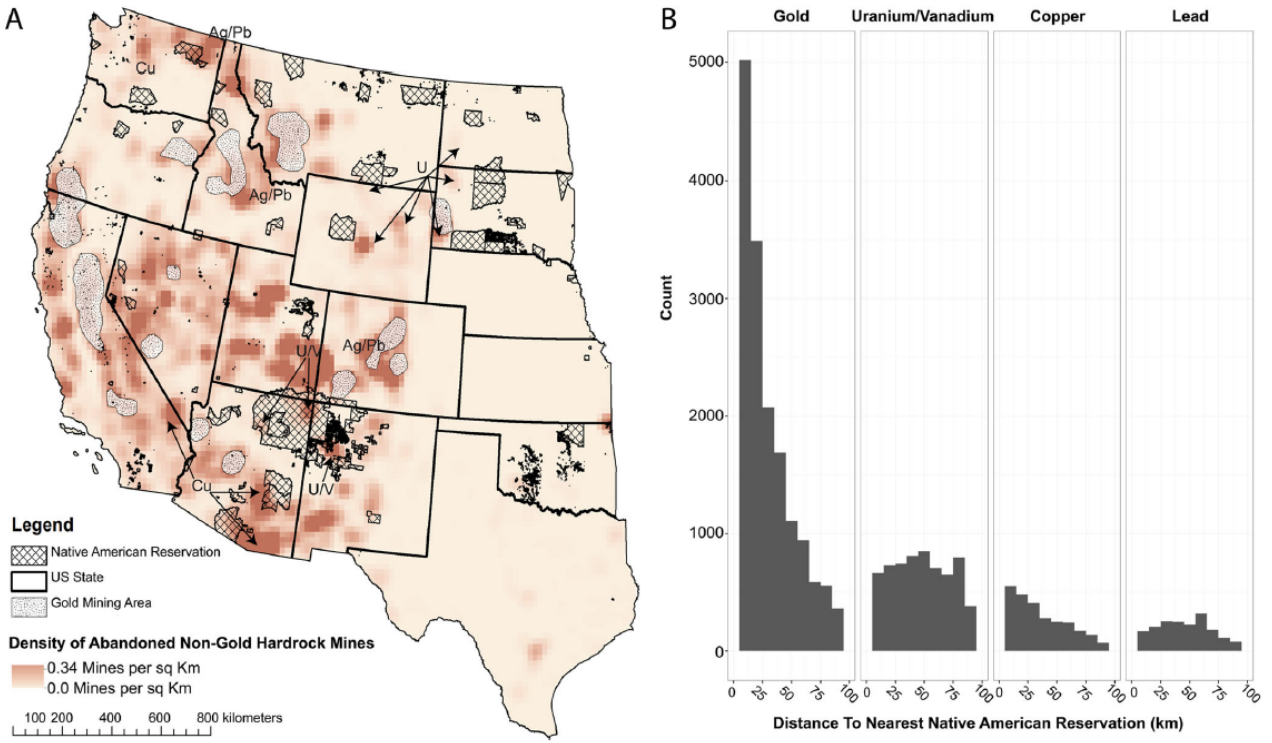


Fig. 1 **a** Density of hard rock metallic mines in the Western USA. Native American Reservation land is indicated by *hatched polygon areas*, and mine densities are associated with intensity of *red hues*. The predominate commodity type is also indicated on the map by its *chemical symbol* (*Au* [Gold]; *Pb* [Lead]; *U* [Uranium]; *V* [Vanadium]; *Cu* [Copper]). **b** Histogram of distance between hard rock mines (by primary commodity type) and the nearest Native American Reservation

Lewis, Hoover, & MacKenzie (2017) Current Environmental Health Reports

- First mining of uranium in Monument Valley AZ-UT in 1942; in Grants Mineral Belt in New Mexico, 1950
- >600,000 Native Americans impacted by hardrock mining, including uranium mining
- The "Uranium Legacy" -- a chronic technological disaster with long-term environmental impacts and ongoing exposures to local populations
- Vast majority of abandoned uranium mines (AUMs) in the region were **defense-related**, meaning they were created to provide uranium to the U.S. nuclear weapons program

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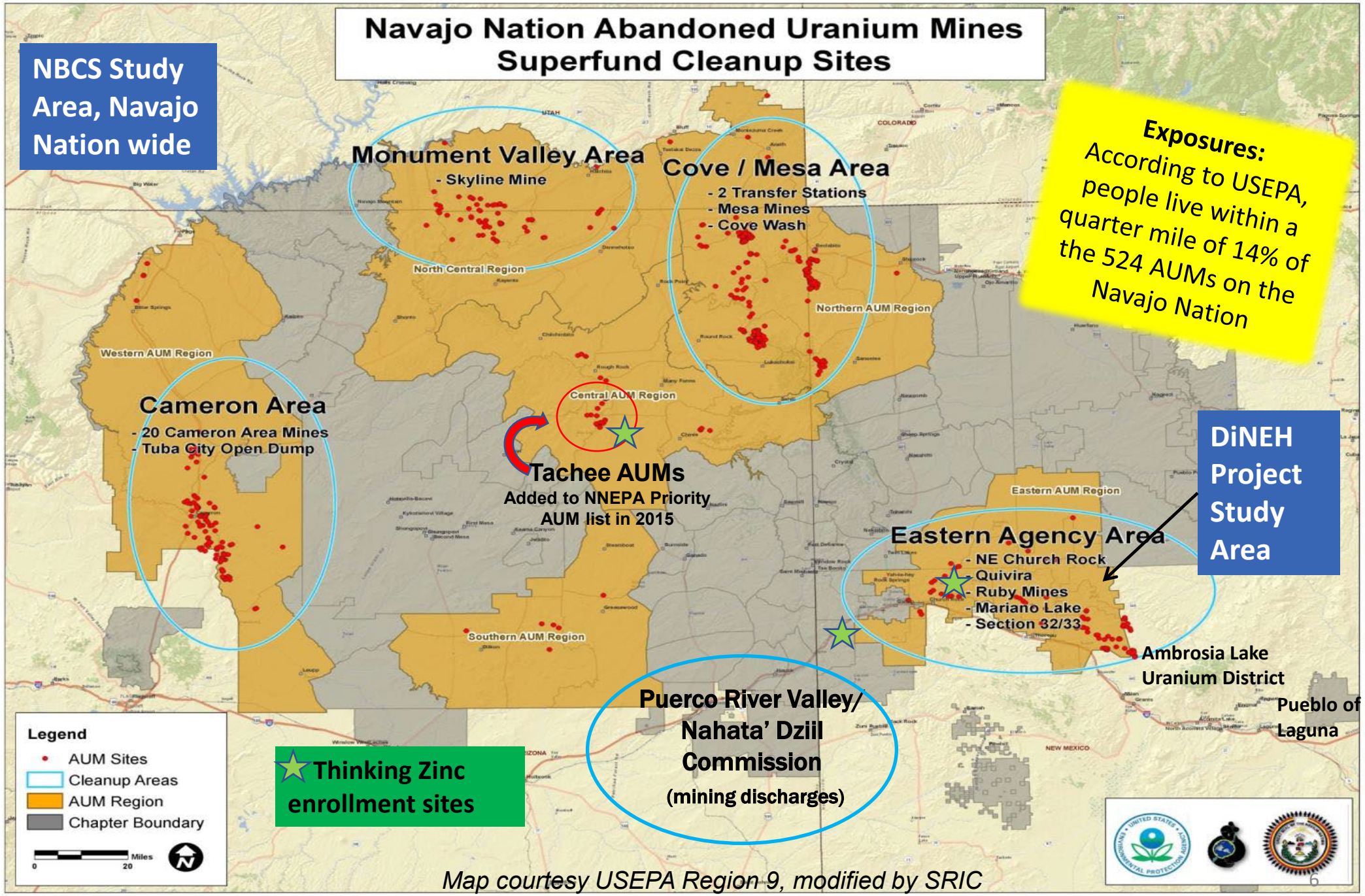
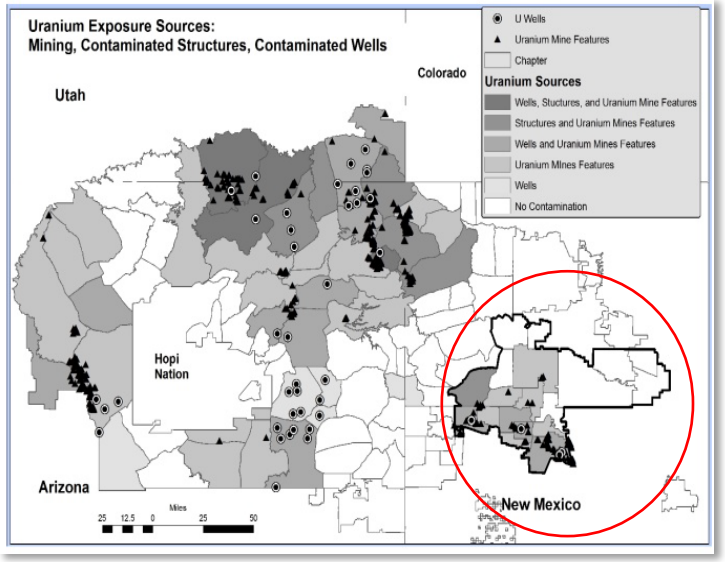
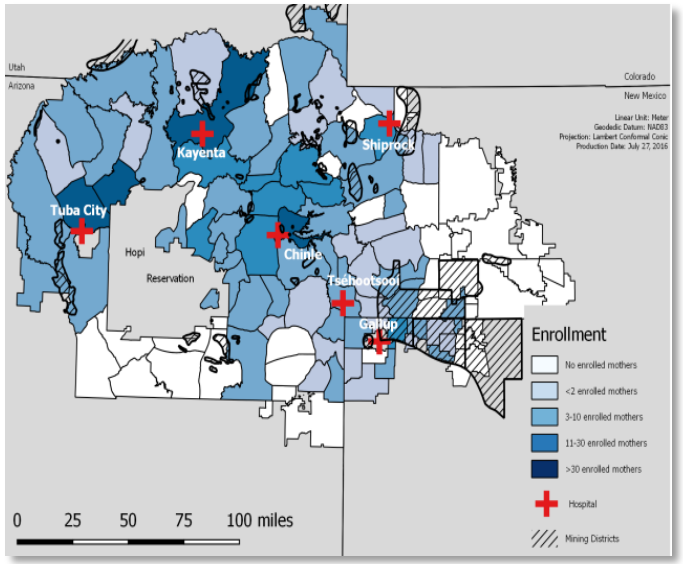
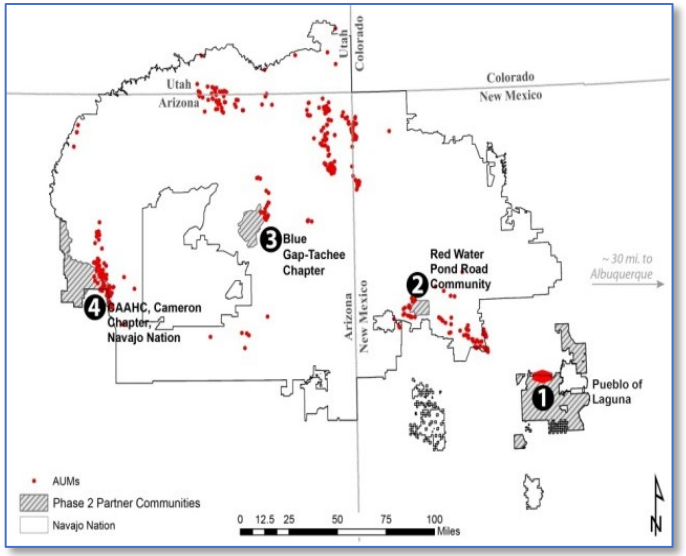


Map courtesy USEPA Region 9, modified by SRIC

Health Studies: Community questions about exposures have driven UNM's environmental health research







DiNEH Project, 2002-2012

- Does U in drinking water increase risk of kidney disease?
- Do multi-pathway exposures to metals in mine wastes increase risks of chronic disease?
- *Community-based trainings to develop study design, implementation methods, consents*

Navajo Birth Cohort Study, 2010-present

- Do exposures to U mine waste affect child health, development?
- Do exposures to metals in mine wastes increase chronic disease?
- *Extensive trainings to develop EH capacity among community members hired by UNM, SRIC and NNDOH*

METALS SRP, 2014-present

- Do mixed-metal U mine wastes contribute to air, water and farmland contamination?
- Do exposures to U wastes result in immunologic, cardiovascular, pulmonary effects?
- Status of remediation?
- *Community defines research*

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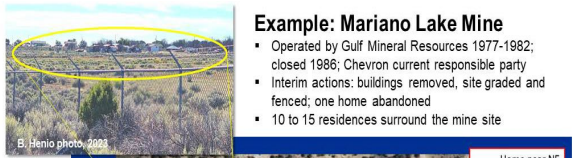
Key Findings Across Population-based Studies over the Past 20 years

Exposure Variables	Outcomes	References*
Proximity to mine waste sites	▪ Doubling of risk of kidney disease in active mining era, 1950-1986 ▪ 81% increase in the risk of hypertension during legacy period (after 1986); ▪ Proximity associated with clinically defined autoimmunity: twofold increase in antinuclear antibody (ANA) positivity ▪ Markers of autoimmunity significantly elevated in women, all participants	Hund et al, 2015; Harmon et al, 2017; Erdei et al, 2019; Erdei et al, 2023
Biomonitoring of metals	▪ 92% of babies with detectable urine uranium at birth born to mothers who had urine-U levels greater than national norms ▪ Pregnant Navajo women have higher U exposures than all U.S. women ▪ 4-fold increase in U levels among Thinking Zinc participants ▪ Biomarkers of immune dysfunction significantly higher than U.S. levels	Erdei et al, 2022; Dashner-Titus et al, 2022; Hoover et al, 2020; Harmon et al, 2018
Metals in drinking water	▪ Elevated autoantibody biomarkers associated with drinking U at levels <MCL ▪ Consumption of U correlated with increased CVD marker, C-reactive protein ▪ Arsenic, mercury, nickel and radium consumption associated ANA positivity ▪ Arsenic (15.1%), uranium (12.5%) most frequently measured metals exceeding MCLs in nearly 500 unregulated water sources on the Navajo Nation	Erdei et al, 2019; Harmon et al, 2018; Erdei et al, 2023; Hoover et al, 2017
Age	▪ Associated with increased serum ANA response ▪ Associated with increased autoantibodies to denatured DNA	Erdei et al, 2023; Erdei et al, 2019

Copies of these peer-reviewed papers are available upon request. AID = autoimmune disease; ANA = antinuclear antibodies; CKD = chronic kidney disease; CVD = cardiovascular disease; MCL = maximum contaminant level

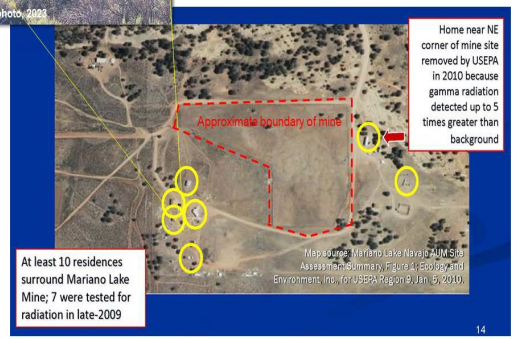
This is what "proximity" looks like

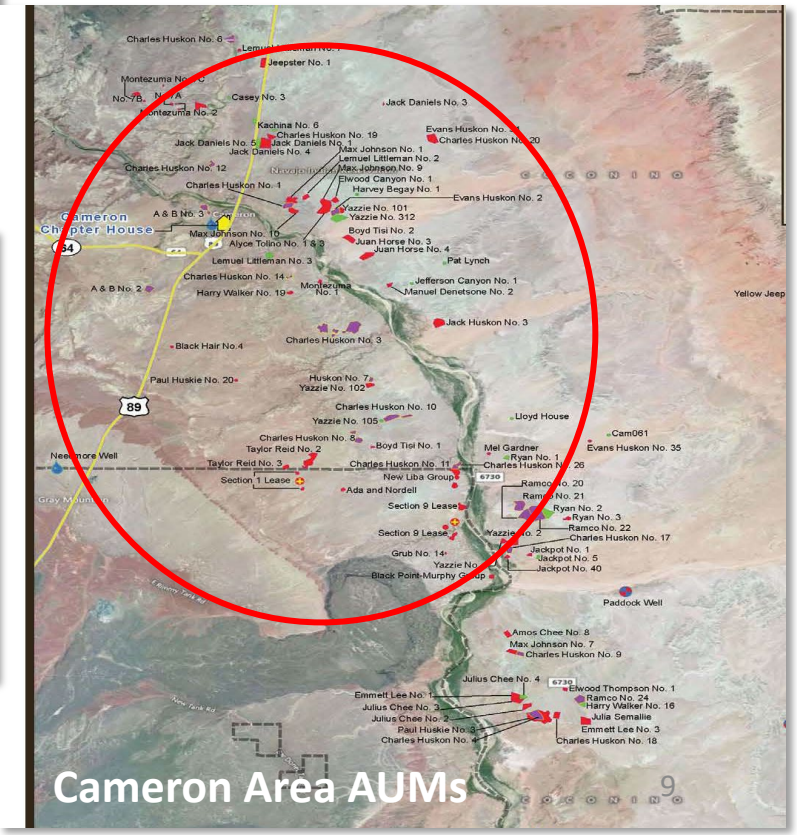
Claim 28 Mine in Blue Gap-Tachee



Example: Mariano Lake Mine

- Operated by Gulf Mineral Resources 1977-1982; closed 1986; Chevron current responsible party
- Interim actions: buildings removed, site graded and fenced; one home abandoned
- 10 to 15 residences surround the mine site





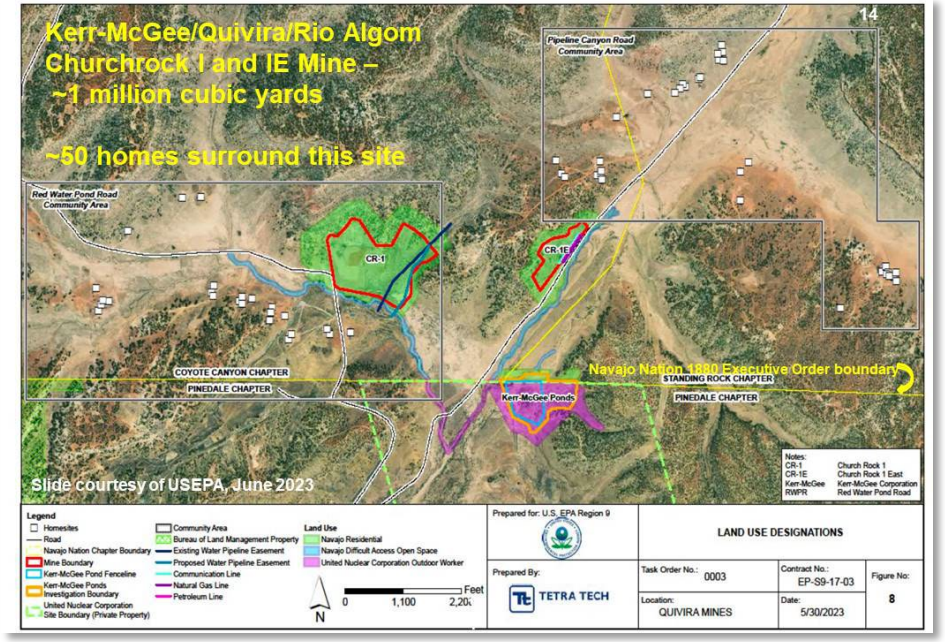
Above L: 20 homes next to Mariano Lake Mine; Above R: Village of Paguate sites next to Jackpile Mine, Pueblo of Laguna

Implications of health results for remediation

- *It's not safe to live close to AUMs*; prioritize remediation of AUM waste sites located near where people live

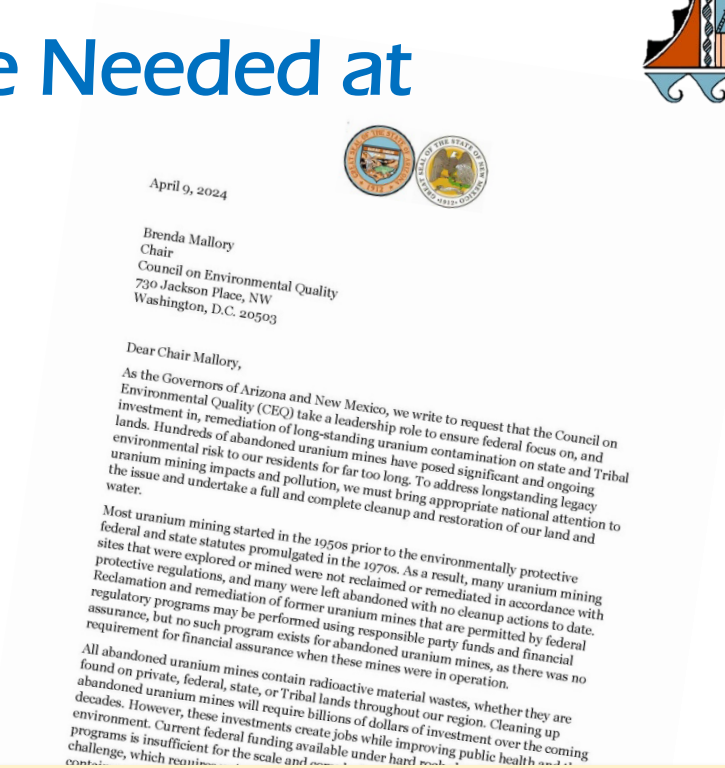
- Precautionary Principle: Consolidate mine wastes into fewer sites to reduce exposures
  - A few regional mine waste disposal facilities are preferable to hundreds of AUMs made into permanent disposal sites
  - Cap-in-place remediation methods commit tribal, state and private lands to permanent waste disposal

- Reforms needed in how USEPA and other regulatory agencies evaluate health risks from AUMs:
  - Supplement "risk assessment" methods with actual community health data, biomonitoring data
  - Embrace environmental health study findings in remediation decision making



What AUM Remediation Policies are Needed at Federal, State and Tribal levels?

- **Federal Government bears responsibility!** It opened the West to uranium mining for the U.S. nuclear weapons program
  - 59 AUMs in New Mexico located on Federal lands (NMED dashboard)
- Governors Lujan-Grisham (NM) Hobbs (AZ) letter to Council on Environmental Quality (right) enunciated important policy objectives:
  - Recognize this is a REGIONAL problem that requires a regional, transboundary commitment
  - NM's "policy" opposing disposal of uranium wastes from the Navajo Nation on the New Mexico side ***inconsistent*** with Governors' position
- DOI/BLM resistant to identifying federal lands for regional disposal facilities
- Any "federal working group" must include frontline communities, who live with the risk but have been locked out of remediation policy discussions
- Community members, NGOs and academic institutions have vast knowledge, insight and experiences to inform remediation policy
- Are remediation standards consistent across jurisdictions?



April 9, 2024

Brenda Mallory
Chair
Council on Environmental Quality
730 Jackson Place, NW
Washington, D.C. 20503

Dear Chair Mallory,

As the Governors of Arizona and New Mexico, we write to request that the Council on Environmental Quality (CEQ) take a leadership role to ensure federal focus on, and investment in, remediation of long-standing uranium contamination on state and Tribal lands. Hundreds of abandoned uranium mines have posed significant and ongoing environmental risk to our residents for far too long. To address longstanding legacy uranium mining impacts and pollution, we must bring appropriate national attention to the issue and undertake a full and complete cleanup and restoration of our land and water.

Most uranium mining started in the 1950s prior to the environmentally protective federal and state statutes promulgated in the 1970s. As a result, many uranium mining sites that were explored or mined were not reclaimed or remediated in accordance with protective regulations, and many were left abandoned with no cleanup actions to date. Reclamation and remediation of former uranium mines that are permitted by federal regulatory programs may be performed using responsible party funds and financial assurance, but no such program exists for abandoned uranium mines, as there was no requirement for financial assurance when these mines were in operation.

All abandoned uranium mines contain radioactive material wastes, whether they are found on private, federal, state, or Tribal lands throughout our region. Cleaning up abandoned uranium mines will require billions of dollars of investment over the coming decades. However, these investments create jobs while improving public health and environment. Current federal funding available under hard rock programs is insufficient for the scale and challenge, which require

Abandoned uranium mines are directly related to the United States' defense efforts and the cost for their cleanup is beyond the ability and responsibility of impacted states and Tribal nations to fund.

— Letter to CEQ from Govs. Lujan-Grisham and Hobbs, April 9, 2024

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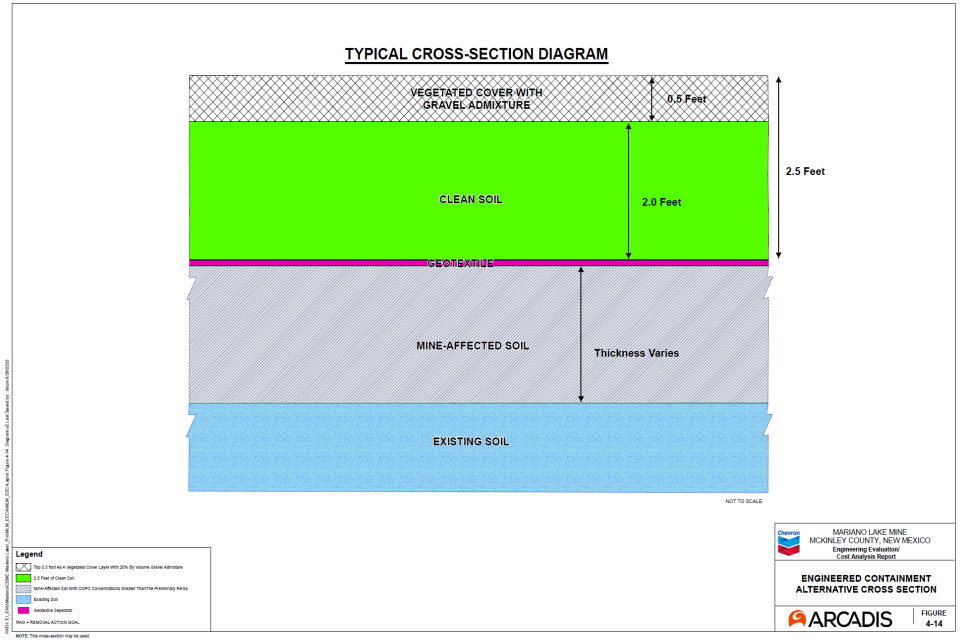
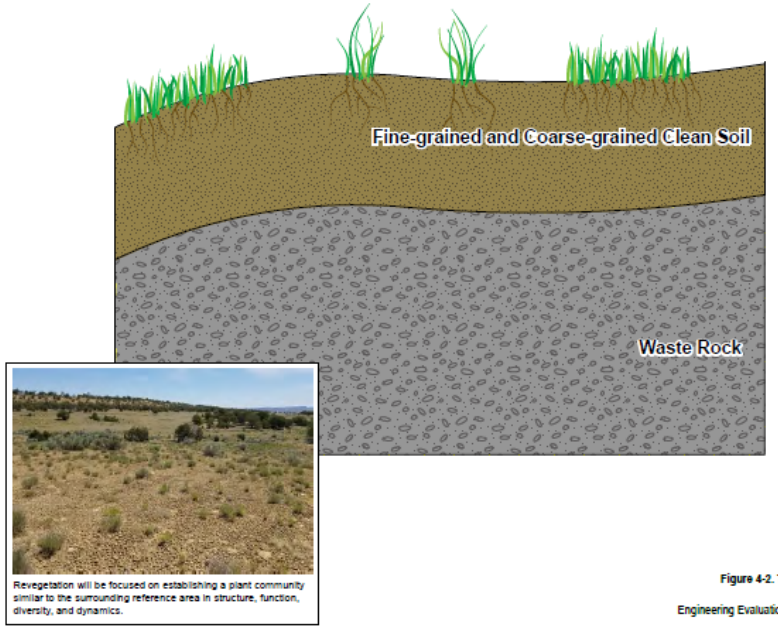
Cap-in-place remediation is EPA's preferred alternative
(from USEPA EE/CAs for 7 AUMs in Eastern Agency)

Mariano Lake Mine Cover Design



Ruby Mines Cover Design



- Thin dirt covers (2.5 ft thick) with limited vegetation subject to erosion, animal intrusion
- Little in-field experience with thin, evapotranspiration covers on U mine wastes
- Places burden of long-term surveillance of remediated mine sites on local communities
- Not the most protective method for human health and environment
- Likely to be EPA's preferred alternative for remediation of majority of AUMs in the region; only alternative advanced for remediation of AUMs in New Mexico

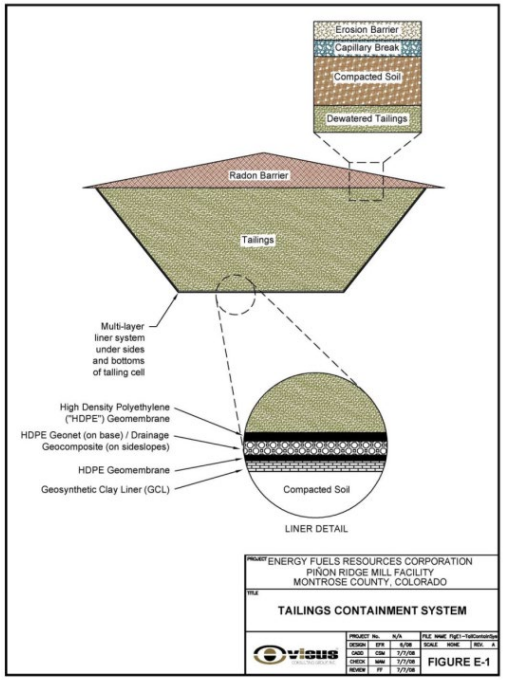
What does a regional uranium waste disposal facility look like?

- Atlas Corp. Uranium Mill Tailings at Moab, UT on banks of Colorado River (top left)
- Tailings shipped by train 30 miles to Crescent Junction Disposal Cell (top right)
- Existing facilities like this one are hundreds of miles away from NM and NN
- Beyond the Red Rock Landfill property 6 miles east of Thoreau, NM does not have a regional disposal facility for uranium mine wastes; no such facilities are sited near the Navajo Nation
- Leads to less expensive cap-in-place alternatives

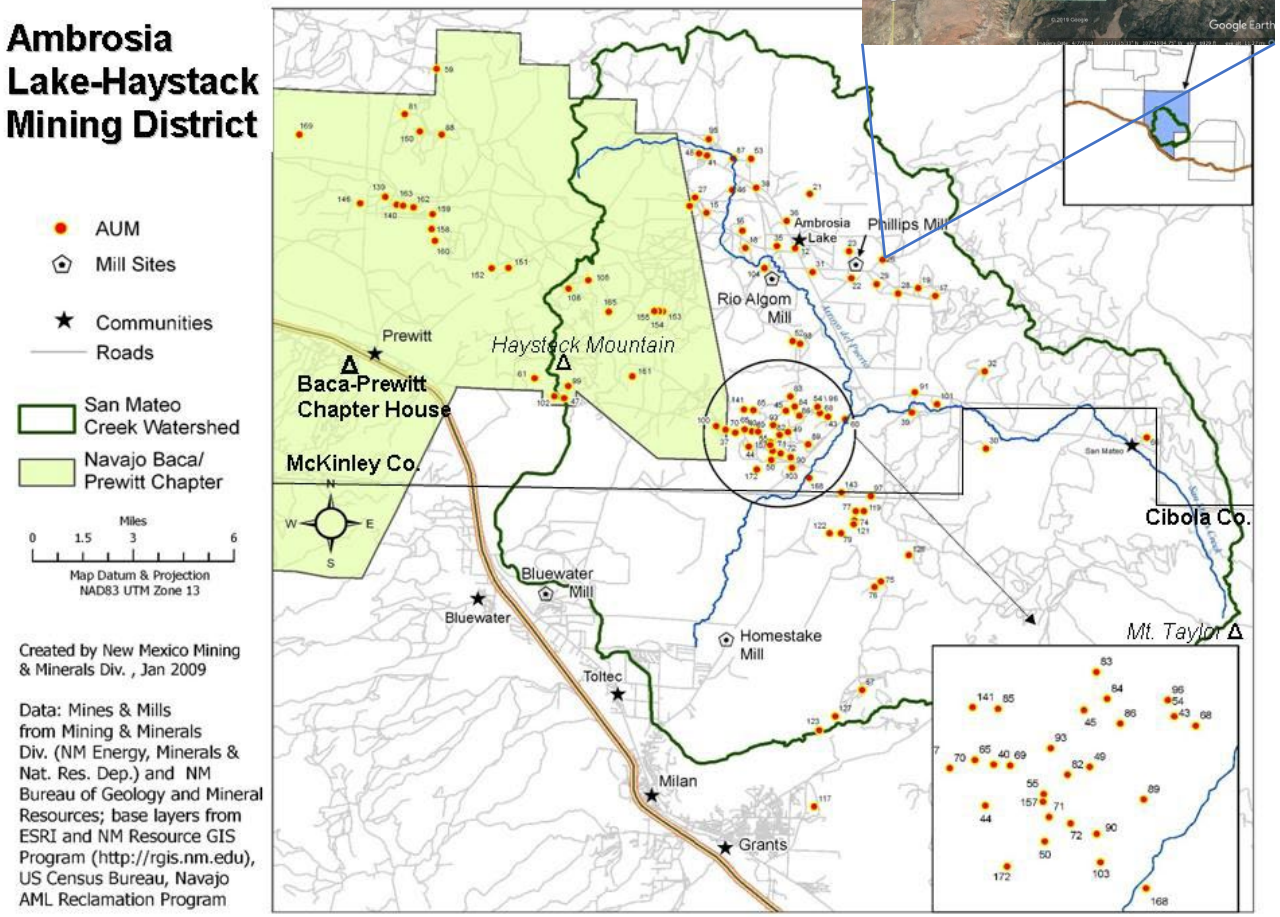
Advantages of Red Rock Landfill Property

Provides permanent, safe place to dispose of mine wastes from Eastern Agency AUMs

- ✓ Away from people; few occupied homes within 1 mile of the site
- ✓ On private land, owned by Northwest New Mexico Regional Solid Waste Authority (photo, left)
- ✓ Serves trash collection needs of Cibola and McKinley counties and *the entire Navajo Nation*
- ✓ Has plenty of room to **construct an engineered disposal "cell"** based on NRC's "prime option" of below-grade disposal in lined cells (graphic, right)
- ✓ Would be permitted by N.M. Environment Dept. under NM Solid Waste Act
- ✓ Mine wastes would not be mixed with municipal wastes
- ✓ Topography minimizes wind and water erosion; deep groundwater is isolated



Is Ambrosia Lake an option now?



Inset above: State Land Office lands in Ambrosia Lake impacted by AUMs; map above: NM Mining and Minerals Division, circa 2010

- Would take 10 years to find and construct a disposal site, so getting started now would be prudent
- ***Must overcome New Mexico's "policy" opposing disposal of wastes from the Navajo Nation***
- Federal legislation would be needed to co-dispose of mine wastes on 2 closed uranium mill tailings piles
- Would not eliminate need to haul wastes by truck or rail
- Opportunities:
  - Lobby NM Governor to change NM's "policy" position
  - Multi-jurisdiction cooperation with representation by frontline communities
  - NM State Land Office has at least 7 AUMs on lands in its jurisdiction (map inset)

What should the Legislature do?

Federal Initiatives

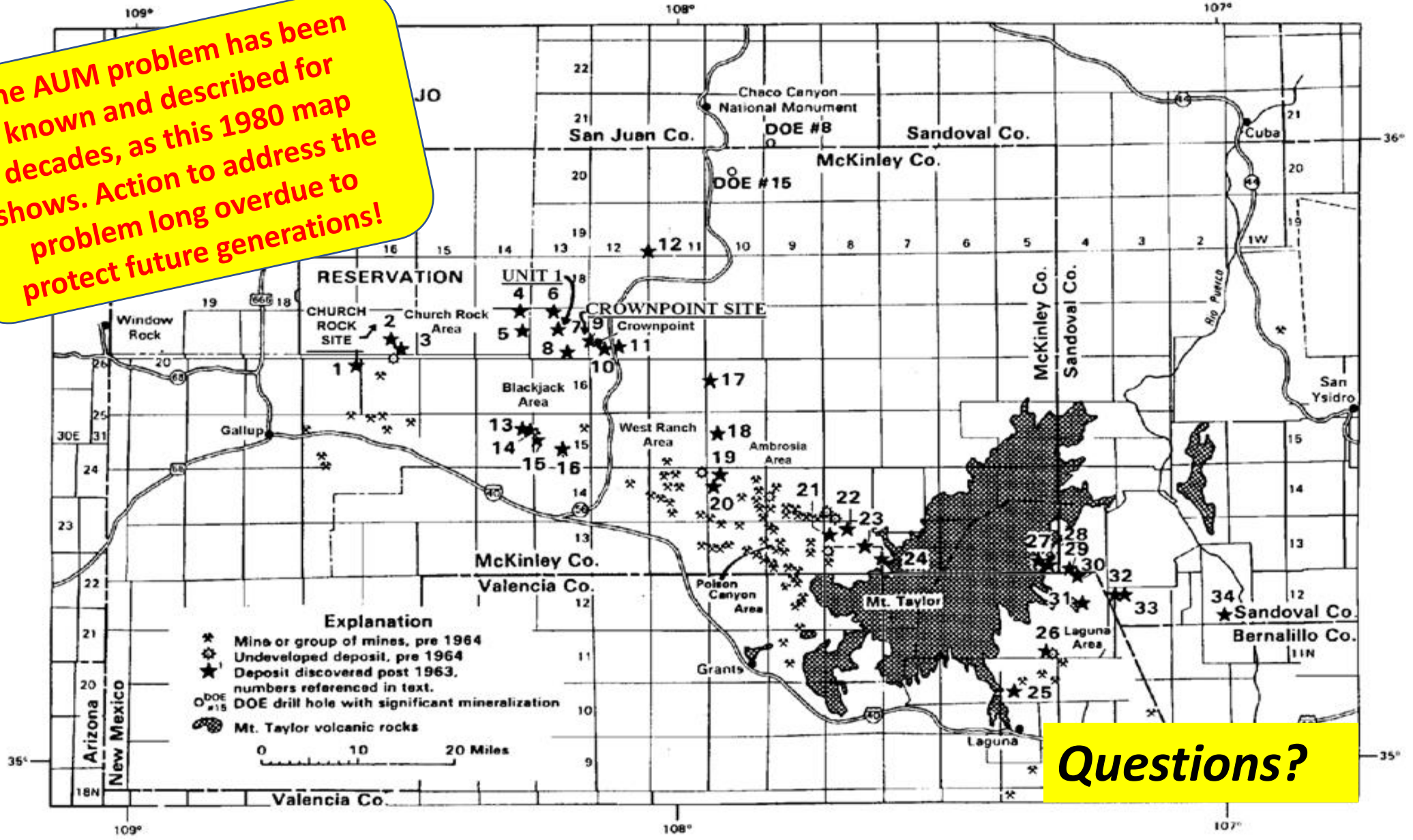
- Brief NM Congressional Delegation on needs, promote field hearing
- Acceptance of Federal responsibility
- Billions of dollars needed for remediation, job creation, health surveillance
- Authorize DOI/BLM to find federal lands for disposal facilities
- Give USDOE authority to clean up uranium mines; it has NO such authority today
- Elevate frontline communities to equal status as “stakeholders” in AUM remediation
- Don’t reinvent the wheel; extent of the problem is known from existing EPA and DOE Reports

State Initiatives

- Adopt a regional approach; drop “policy” of opposing disposal of mine wastes from neighboring jurisdictions
- Add money to Uranium Mine Reclamation Revolving Fund – currently has 0 dollars! (Would be used for agency staffing, public information, limited assessments)
- Authorize and fund NMED and NMMMD to explore developing regional U mine waste disposal facility in Ambrosia Lake, with direct citizen participation
- Recognize health study findings to inform remediation decisions

URANIUM MINING AND MILLING OPERATIONS IN THE EASTERN NAVAJO AGENCY AND GRANTS URANIUM DISTRICT, 1960s-1980s

The AUM problem has been known and described for decades, as this 1980 map shows. Action to address the problem long overdue to protect future generations!



Questions?

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Yan Lin, Ph.D.
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Debra MacKenzie, Ph.D.
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Southwest Research and Information Center (SRIC)
Chris Shuey, MPH
Wendy Atcitty
Sarah Henio-Adeky
Kirena Tsosie
Shasity Tsosie

Indigenous Education Institute (IEI)
Nancy Maryboy, Ph.D

Stanford University
Scott Fendorf, Ph.D.
Juan Lezama, Ph.D

Biomedical Researchers
Tamara Anderson
Jessica Begay, M.S.
Karen Cooper, Ph.D.
Mary Pat Couig, PhD,MPH,RN
Erica Dashner-Titus, Ph.D.
Rama Gullapalli, Ph.D.
LaTasha James
Fredine T. Lauer, MPH
Jim Liu, Ph.D.
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Environmental Researchers
September Benson
Abdul-Medhi Ali, Ph.D.
Lincoln Encino
Ricardo Gonzalez-Pinon, Ph.D.
Eric Peterson, Ph.D.
Jennifer Rudgers Ph.D.
Andrew Schuler, Ph.D.

Biostats and Data Management
Miranda Cajero
Ruofei Du, Ph.D.
Deborah Kanda DrPH
Li Li, Ph.D.
Curtis Miller, Ph.D.
Elena O'Donald, Ph.D.

Research Translation/Admin
Thomas De Pree, Ph.D.
Mallery Quetawki
Romaisha Rahman, Ph.D.
Carolyn Roman, Ph.D.

Internal Advisors
Donald Godwin, Ph.D.
Brent Wagner, Ph.D.

External Advisory Board
Keri Hornbuckle, Ph.D
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Michael Pollard, Ph.D
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Current Trainees
Daniel Beene
MacKenzie Freeman
Kaelin Gagnon
Abigail Granath
Paige Haley
Al Ekram Hridoy
Yanhong Huang
Zhuoming Liu
Jorge Moreno
Sumira Phatak, Ph.D.
Aaron Romero
Andeanna Roros
Myranda Thompson
Robyn Turner
Teddy Woldeyohannes
Jason Zhang

Past Trainees
Roger Atanga
Sumant Avasarala, Ph.D.
Roxanne Awais
Marsha Bitsui
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Seth Daly, Ph.D.
Jacquelyn Delp
Cherie DeVore, Ph.D.
Tammi Duncan, Ph.D.
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Jorge Gonzalez Estrella, Ph.D.
Han Hua, Ph.D.
Russell Hunter
Savannah LaRosa-LoPresti
Tylee Griego
Juliana Huestis
Sebastian Medina, Ph.D.
Maria Isabel Meza, Ph.D.
Casey Miller
Sara S. Nozadi, Ph.D.
Jennifer Ong, Ph.D.
Rachel Speer, Ph.D.
Nabil Shaikh, Ph.D.
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