

Cancer Risk from Exposure to Uranium among the Navajo

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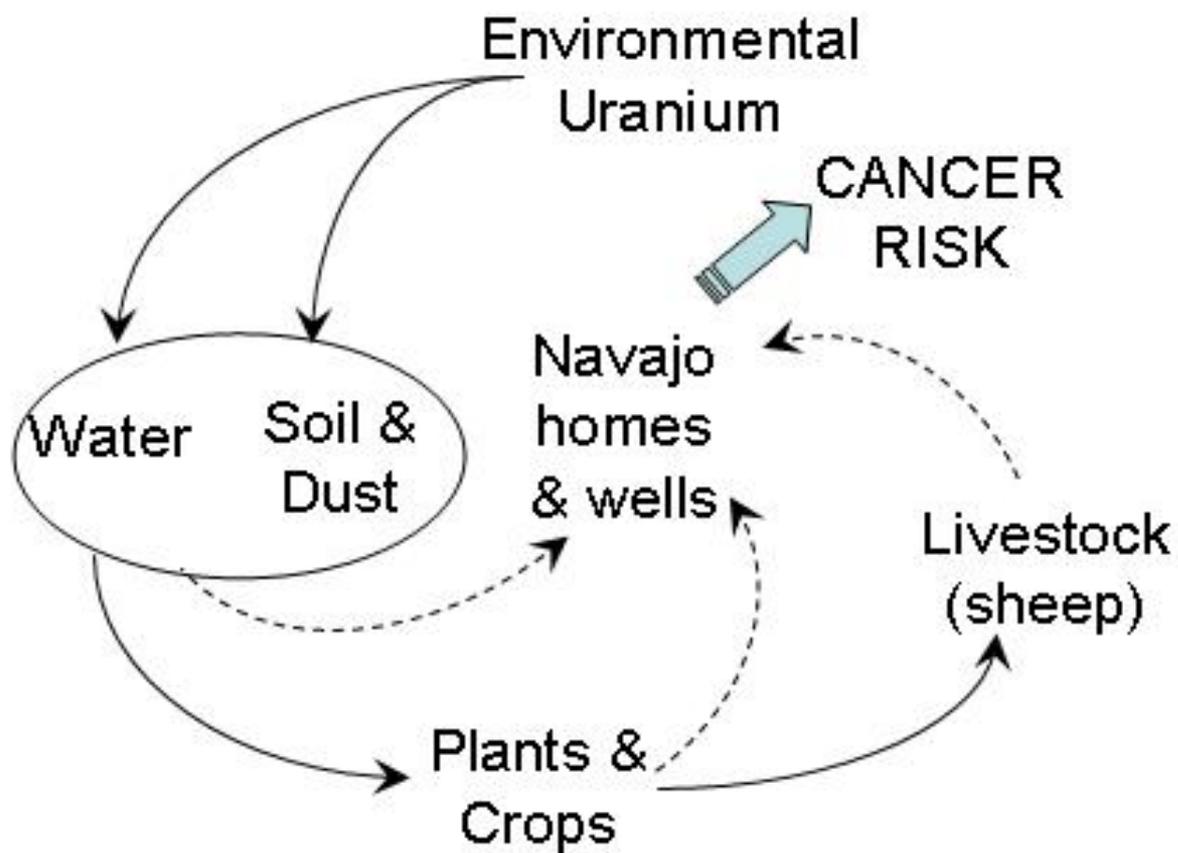


Partnership for
Native American
Cancer Prevention

Project Goals

- To determine environmental uranium information specific to the Navajo Lands.
- To bridge the gap between environmental science and cancer research by providing our results to our collaborators including Tribal leaders and community members.
- To provide a research experience for Native American students that is both scientifically challenging and of interest to them and their communities.

Project Overview

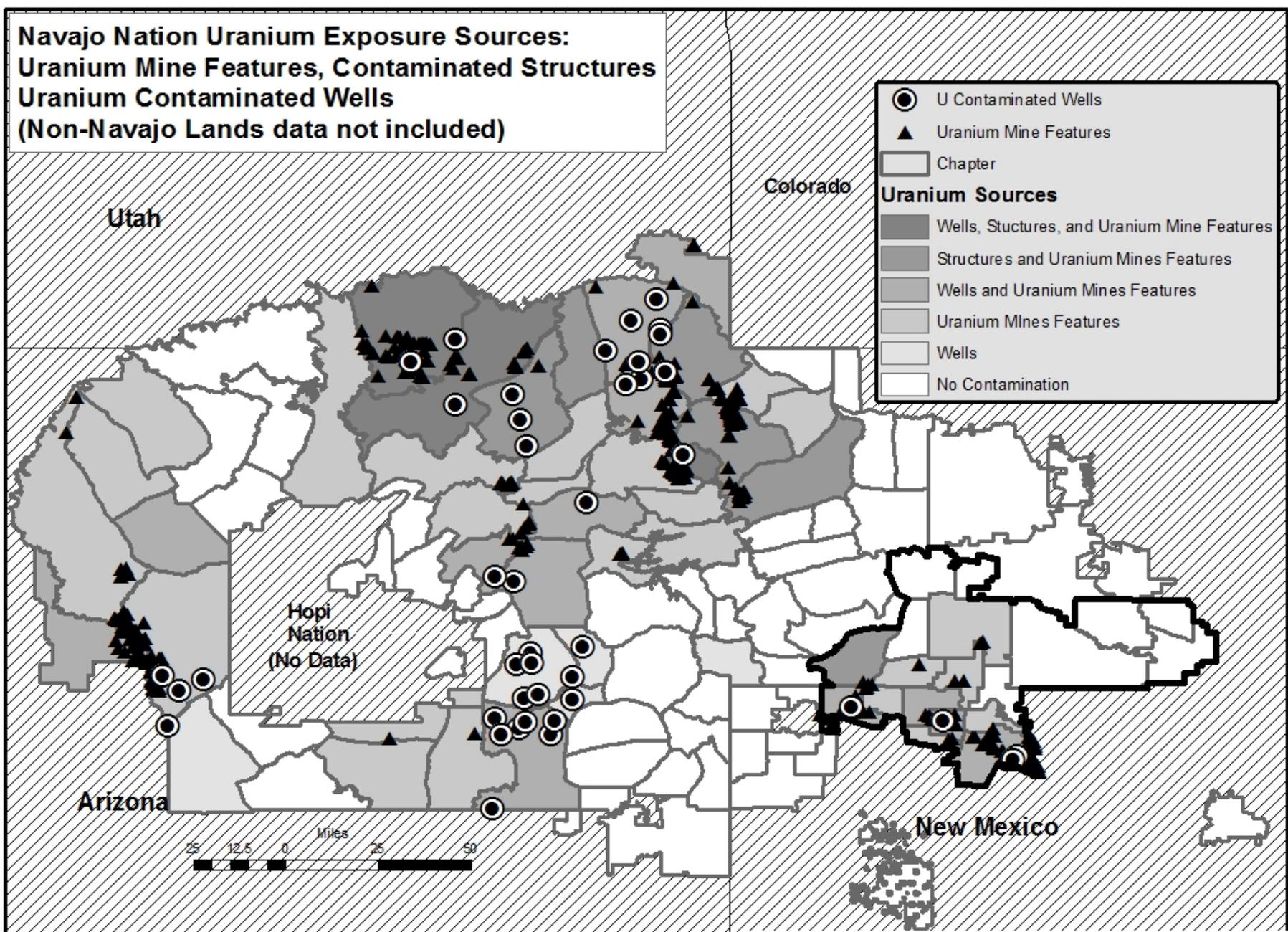


Key Issues:

Collaborating with Native Nations

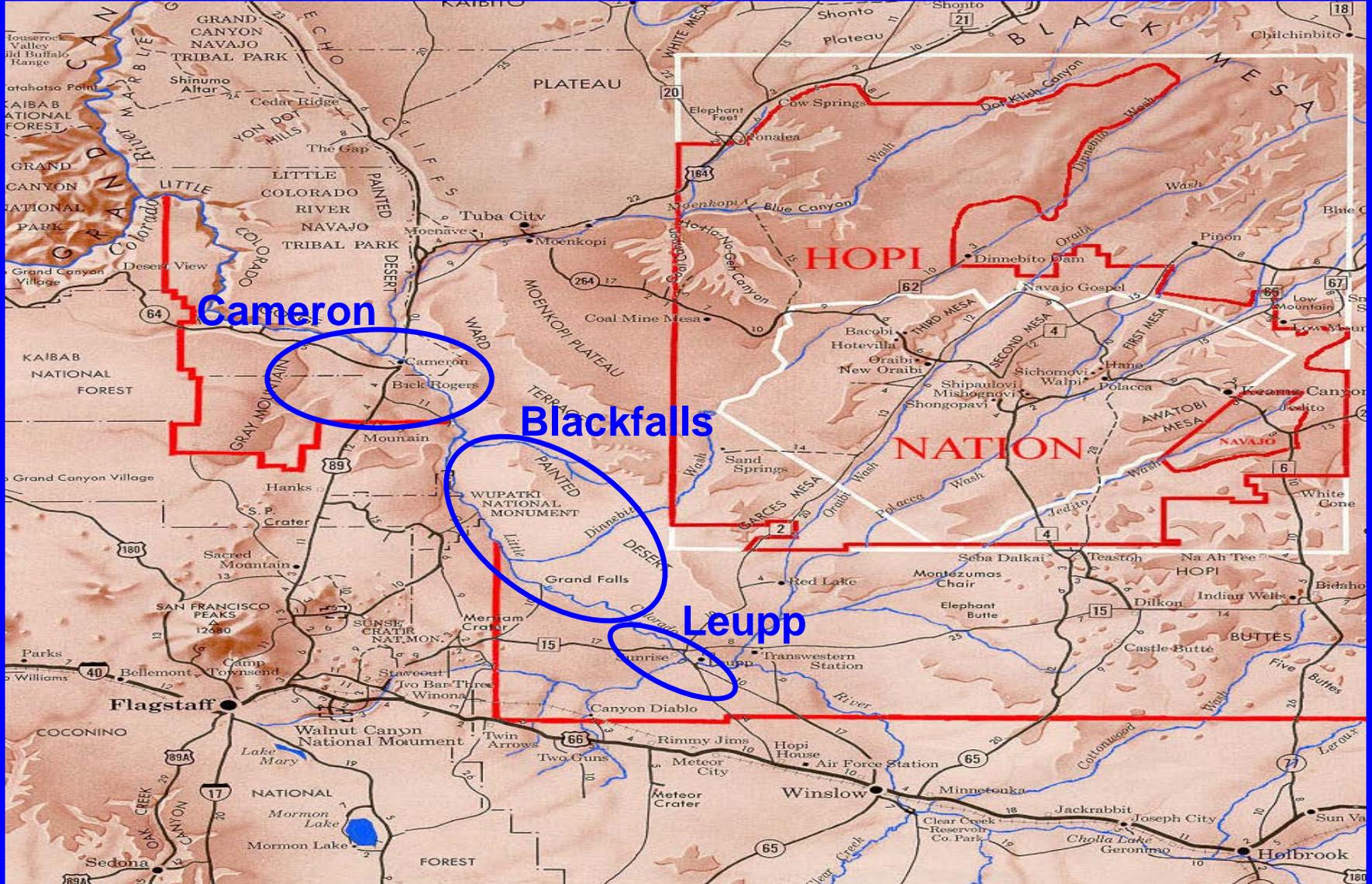
- Native Nations are sovereign.
- Every Native Nation has its own government and governmental processes.
- Cultural differences between majority populations and Native populations as well as between different Tribes are important.
- Face to face meetings important, particularly through visits to the Reservation
- Patience and respect are key.

**Navajo Nation Uranium Exposure Sources:
 Uranium Mine Features, Contaminated Structures
 Uranium Contaminated Wells
 (Non-Navajo Lands data not included)**



Slide compliments of Tommy Rock

Study Sites – Southwestern Navajo



Study Site Pictures

Home in Cameron



Open pit mine



Blackfalls wells



Sampling on the Reservation



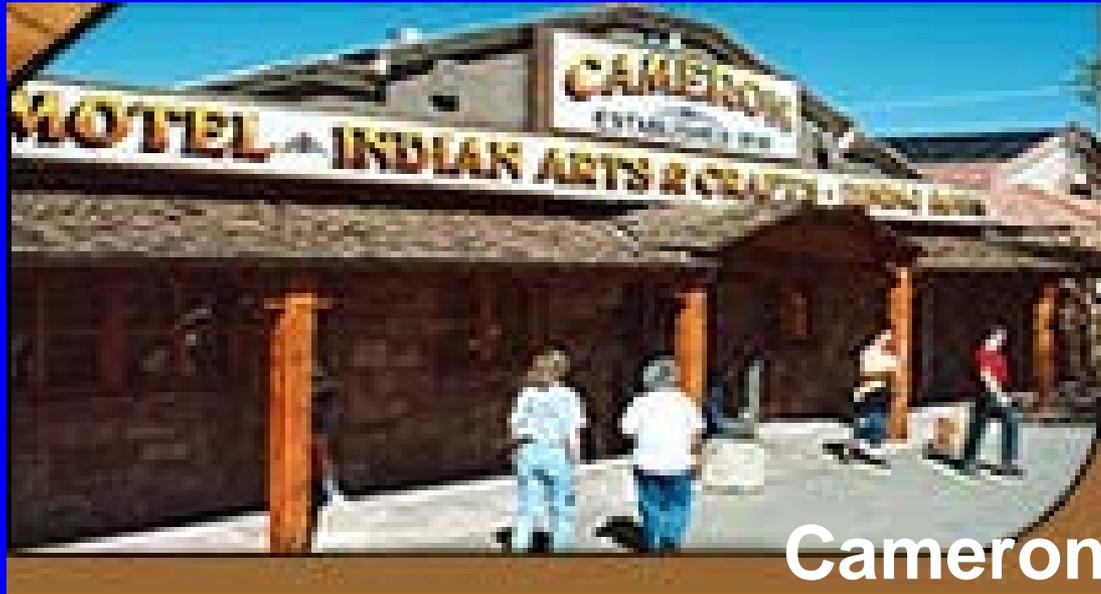
Collaborators

- Students and their families
- Specific Navajo communities and their leaders
- Navajo EPA (Federal government) and Navajo Natural Resources (Tribal government)
- Navajo Institutional Review Board.
- Other researchers working on similar projects on Navajo Lands
- Scientific collaborators

Student Researchers



Community Collaborators:



Cameron



Blackfalls



Leupp

Governmental Collaborators:



- Navajo Environmental Protection Agency



- Navajo Nation Institutional Human Health Review Board (Navajo IRB)
- Navajo Nation Department of Natural Resources

Other Researchers working on Navajo:

- University of New Mexico Dineh Project (Dr. Johnnye Lewis)
- Institute for Tribal Environmental Professionals (Mansel Nelson – Environmental Education Outreach)
- United States Geological Survey, Flagstaff (Dr. Margaret Hiza)
- Southwest Research and Information Center (Chris Shuey)
- Dine' College (Perry Charley and Dr. Don Robinson)



NAU students training with UNM interviewers

Scientific Collaborators:



**Margaret Briehl (Pathology)
University of Arizona Cancer Center**



**Michael Ketterer
Metro State U
Environmental
Analytical Chem**



**Jamie Donatuto and
Larry Campbell
Swinomish Tribe**



**Paloma Beamer (Public Health) and
Karletta Chief (Soil, Water, Environmental Science)
U of Arizona**

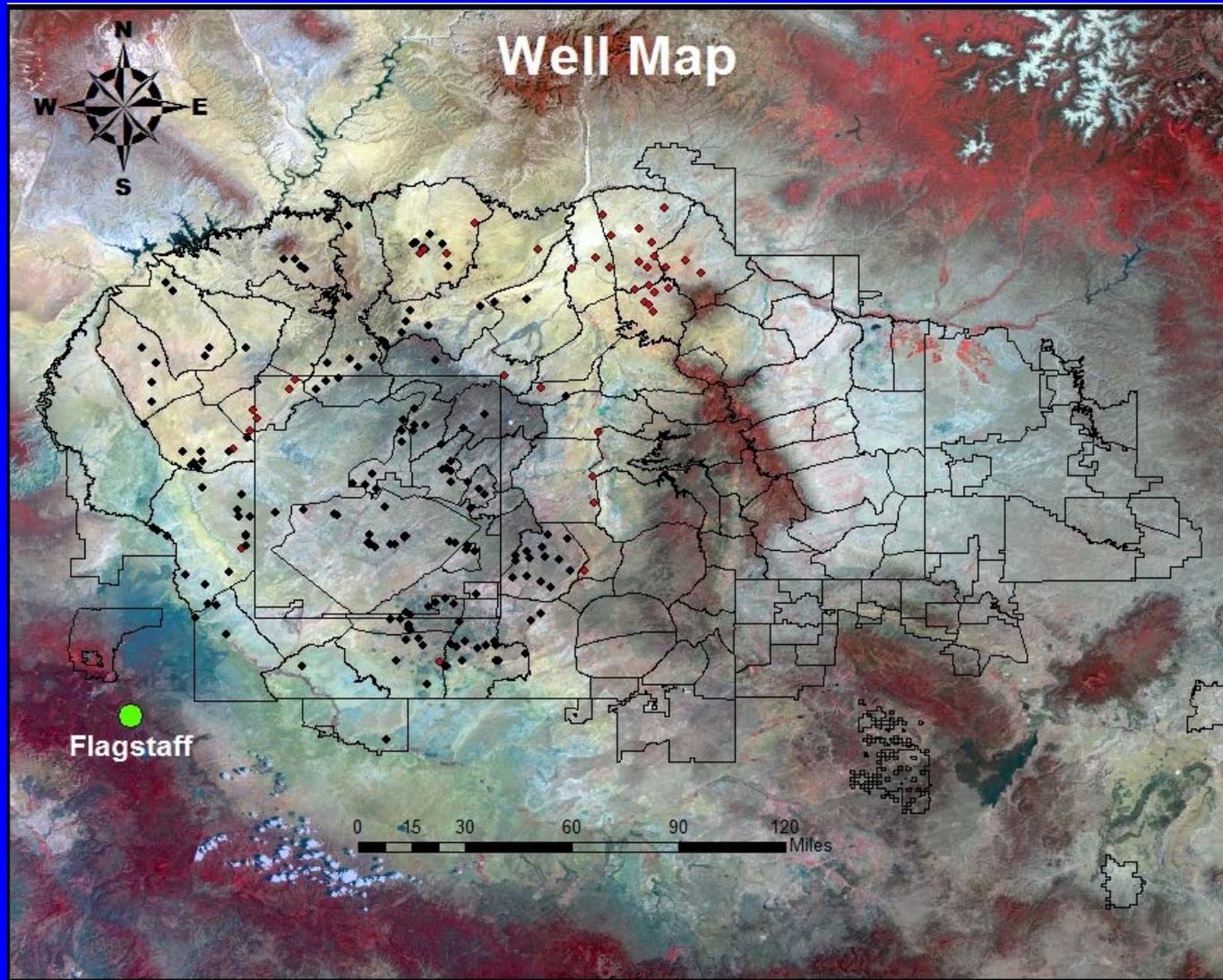


**Michael Lerma
NAU
Political Science**

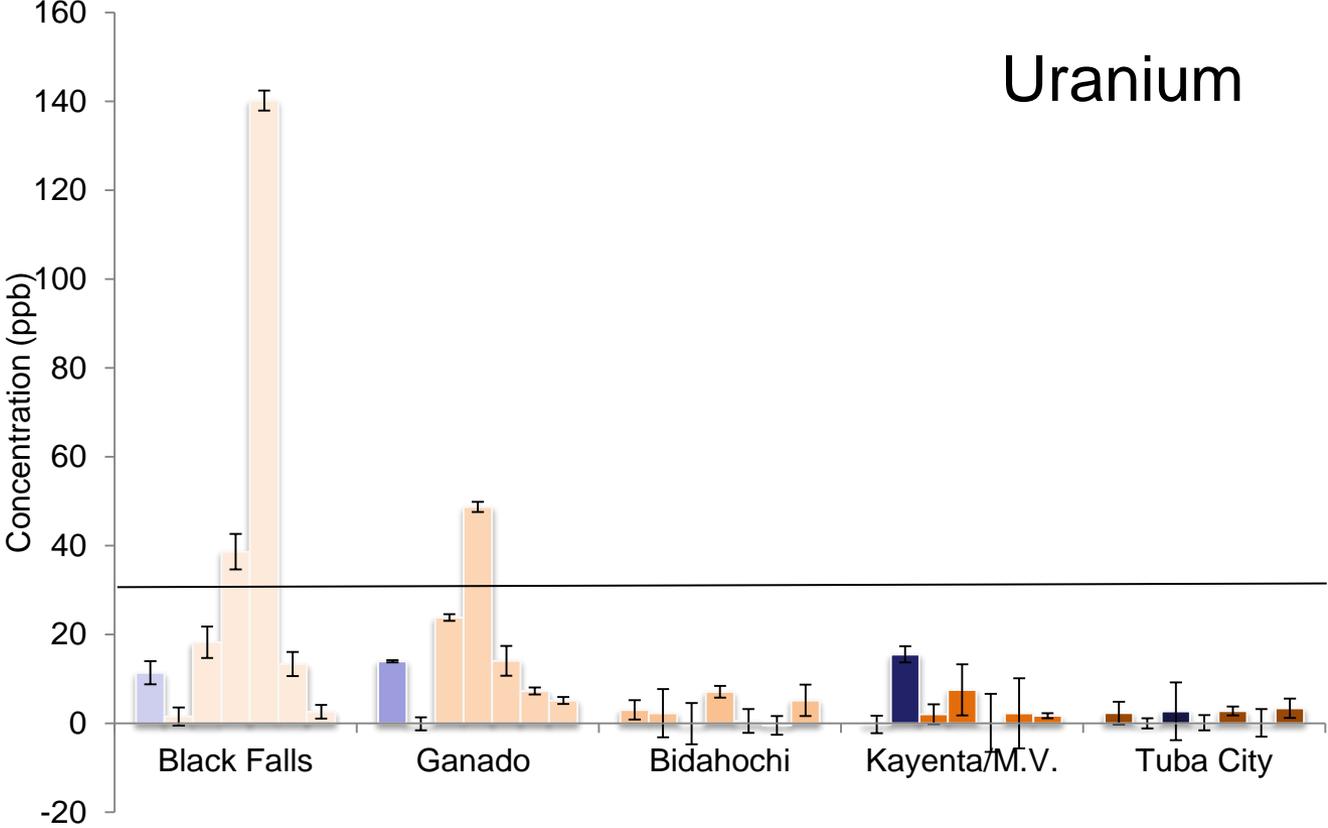


**Nancy Johnson
NAU Biology**

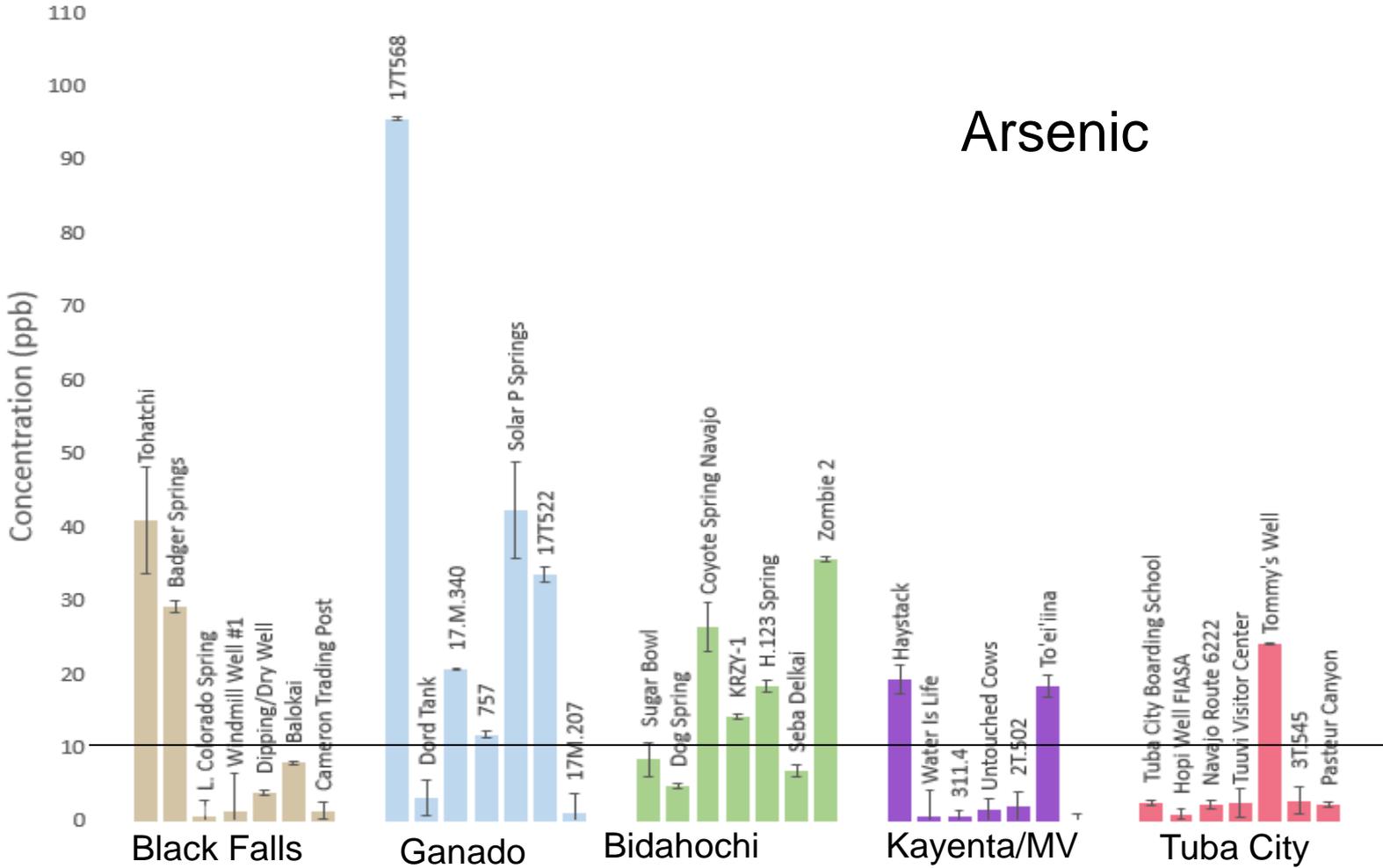
Water Research



Uranium



Arsenic



Traditional Food: Mutton

Navajos and Sheep:

- Mid 1600 sheep introduced to Navajos.
- Navajos transitioned from hunter/gathers to farming and pastoralism.
- The amount of livestock symbolize the good life.



Research Goals

- Quantifying levels of uranium in sheep grazing on abandoned uranium mines.
- Model for dietary metal exposure, utilizing indigenous Health Indicator (IHI) to assess health impact.
- Model uranium exposure.



Sample Collection

5 from Leupp – control (May 2013)

5 from Cameron – mine site (June 2013)



Ingram NAU
Research Group



Summer students
from NAU, Dine'
College, Northland
Pioneer College,
Arizona Western
College and
community
members working
together



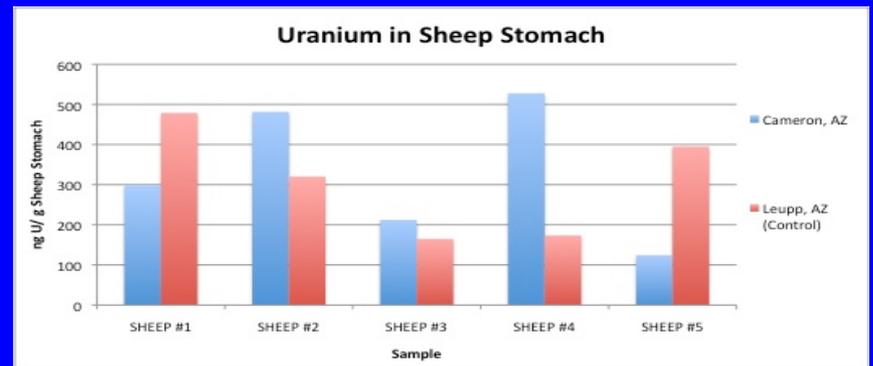
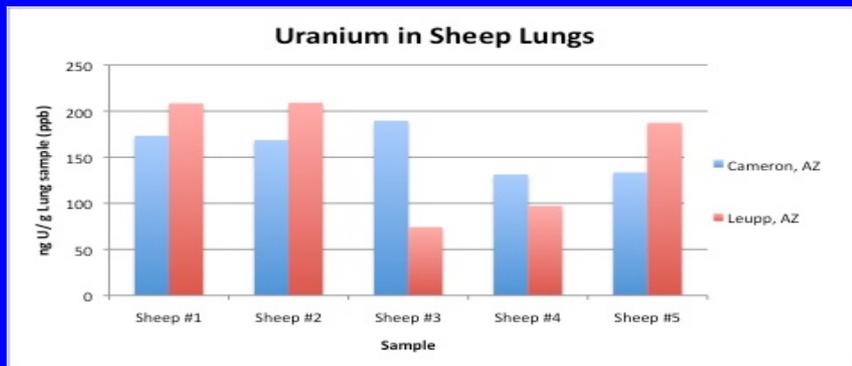
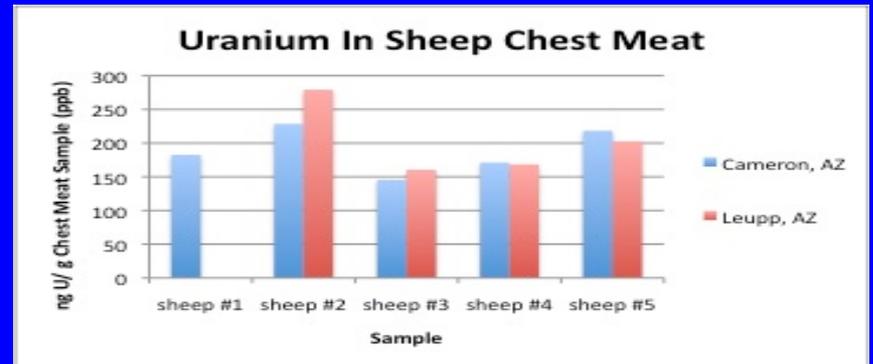
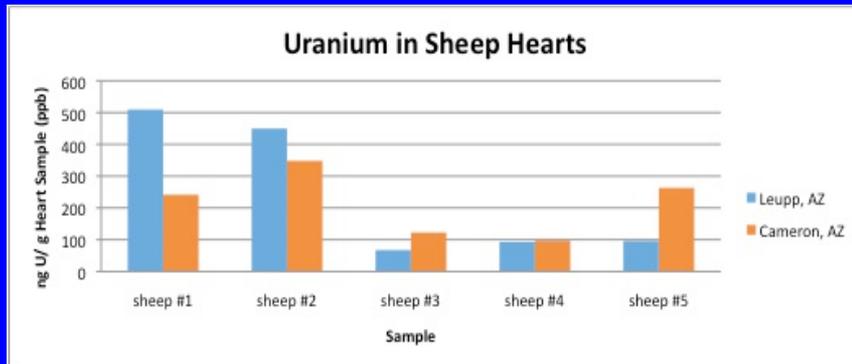
Dr. Ruby ("Rez Vet") examination

Sample Collection

- Kidney
- Liver
- Heart
- Esophagus
- Small intestine
- Large Intestine
- Stomach
- Hoof
- Wool
- Rib meat
- Leg meat
- Chest meat
- Lungs
- Fat
- Leg bone



Results



- Similar results from control (Leupp) and mining (Cameron) areas
- Next step to compare results to sheep raised off the Reservation
- Sample collection December 12, 2015 in 100 miles from the Reservation

Future Work

- Fate and transport of uranium species under environmental conditions that exist on Navajo Lands – uranium isotope ratio methods
- Bioavailability of uranium
 - Water exposure
 - Soil exposure
 - Plant exposure
 - **Livestock exposure – In Process**
 - **Policy – T. Rock doctoral work**
- Continue to work with Navajo Nation to investigate specific chemistry/biological issues of interest to their communities

Acknowledgments

Technical Assistance

- Dr. Michael Ketterer – ICP/MS (Metro State)
- Ben Moan – environmental lab (NAU)

Collaborators

- Cameron and Leupp Chapters
- Blackfalls Community

Funding

- Native American Cancer Prevention Program, National Cancer Institute
- National Institutes of Health – Training Grants at NAU
- National Science Foundation – Undergrad Mentoring in Environmental Biology and Research Experiences for Undergrads (summer)
- US EPA

Questions/Comments

