



# Gold King Mine Spill Diné Exposure Project

SPRING 2017  
ISSUE 3

*Funded by:*

**National Institutes of Health**

\$434,028 (3/2016-2/2018)

**Agnese Nelms Haury Foundation**

\$600,000 (7/2016-7/2019)

U. of Arizona (UA),  
Northern Arizona U.  
(NAU), Navajo Nation,  
Diné College, Tó Bee  
Nihi Dziil, & Fort Lewis  
College

## *TÓŁÍTSO, THE WATER IS YELLOW:*

*Investigating short term exposure and risk perception of Navajo Communities to the Gold King Mine Spill  
– Upper Fruitland; NM, Shiprock, NM; and Aneth, UT –*

**Aim 1:** Determine exposure of Diné residents in these three communities to the Spill.

**August 2016:** Navajo Community Health Representatives sampled drinking water, yard soil, and household dust in about 60 Diné homes to measure for lead and arsenic. They did a finger prick to measure lead in residents' blood using a 3-minute test machine. They collected a urine sample to measure for arsenic. They also asked people what they eat, how they use the river, and how the Spill impacted them.

**To Date:** All water, dust, soil, and urine are being tested and we are analyzing the results. We are testing 7 corn samples for lead and arsenic.

**Aim 2:** Measure lead and arsenic in river water, river sediment, agricultural soil, irrigation water, and irrigation sediment.

**November 2015 – June 2016:** We took almost 1,000 samples of water and sediment from the river and irrigation canals and soil from fields.

**To Date:** Water samples were tested for arsenic, lead, and manganese; go to the next page for what we found. It will take until August 2017 to measure the concentrations of lead and arsenic in sediment and soil.

**Aim 3:** Find out what people are concerned about when using the River after the Spill and find out the risk based on the samples and information collected for Aims 1 and 2 (left & middle columns).

**May 13-22 & June 15-17:** We held 12 group discussions or “focus groups:” 4 in Upper Fruitland; 6 in Shiprock; and 2 in Aneth. 123 total people took part in these focus groups. We asked people how they used the river before the Spill; how the Spill impacted them; and what they think about the river's future.

**To Date:** We wrote down all English comments word-for-word. 50 hours were translated from Diné'ke'jí to English. We are working to carefully summarize what people said.

## TESTING FOR ARSENIC, LEAD, AND MANGANESE IN WATER

From November 2015 – June 2016, we collected 300 water samples from the San Juan River, irrigation canals, and wells along the San Juan River between Farmington, NM and Montezuma Creek, UT. We found out how much arsenic, lead, and manganese was in each water sample. These metals are found naturally in all water in different amounts, and it is hard to find where a metal originally came from. We compared the amount of metals to guidelines for drinking water for people (the US EPA Maximum Contaminant Level or MCL) and for plants and animals living in water (the NOAA SQuiRTs guideline).

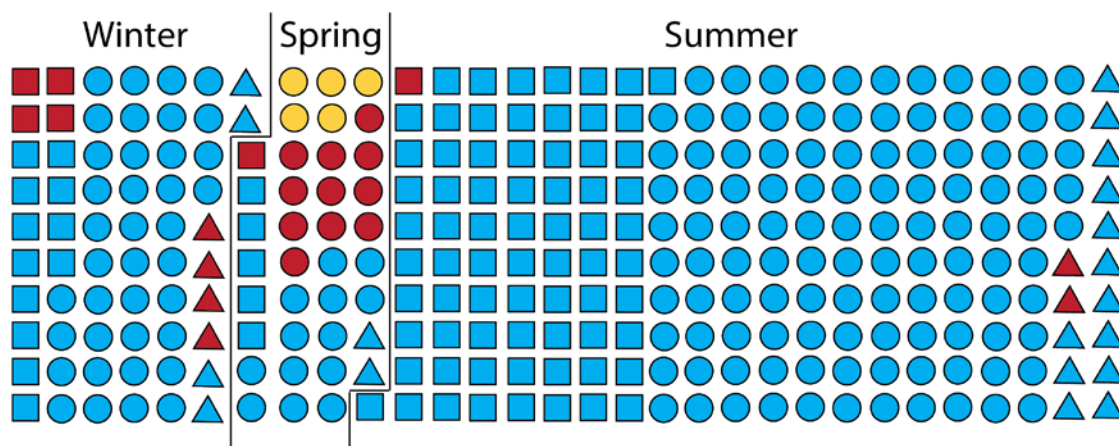
### AMOUNTS OF ARSENIC AND LEAD WERE GENERALLY BELOW GUIDELINES

**Arsenic** - All 300 water samples had arsenic levels BELOW guidelines for drinking water and agricultural water, and for small sensitive animals living in water.

**Lead** - All 300 water samples had lead levels BELOW the guideline for drinking water. 1% the 300 water samples (4/300) had lead levels ABOVE guidelines for plants and animals living in water. Those 4 samples were taken in the San Juan River during high spring runoff in the Spring 2016 when the river was flowing fast.

### AMOUNTS OF MANGANESE IN SOME SAMPLES WERE OVER GUIDELINES

**Manganese** - Amounts of manganese were ABOVE guidelines for drinking water for people (the US EPA MCL) and plants and animals living in water in Spring 2016 more than Winter 2015 and Summer 2016. For manganese, the guideline for drinking water for people is not to protect health but to keep the water from tasting or smelling bad.



#### Legend

Where sample was taken (number of samples):

Canal	River	Well	
■ (88)	● (164)	▲ (19)	Below guidelines
■ (0)	● (5)	▲ (0)	Above US EPA Secondary MCL (50 ppb)
■ (6)	● (11)	▲ (6)	Above NOAA SQuiRTs (80 ppb)



Our logo was created by Wyatt Gilmore (Diné) of 4 Directions Media, and each part of the design is important. The circle represents the 4 cardinal directions and 4 sacred mountains with an outlet to the east representing that the cycle of life continues to breathe and flow. The yellow river represents the San Juan River polluted by the Gold King Mine Spill. The mountains show where the spill started in Colorado. The red land and sky are in distress from the Spill, which affected all living things. The Navajo Basket illustrates the process of healing the San Juan River and living things affected by the Spill. Finally, the blue water droplet illustrates the goal of returning the River back to harmony with the universe, because water is life.

## WELCOMING NEW STUDY LEADER JENNIFER RICHARDS, UNIV. OF ARIZONA

Jennifer Richards, MPH (Diné/Lakota/Taos) is a Doctorate in Public Health (DrPH) student at the University of Arizona Zuckerman College of Public Health. She is originally from Tuba City, Arizona. Since 2013, Ms. Richards has worked for the Johns Hopkins Center for American Indian Health as a Senior Trainer and Affiliate Liaison. In this work, she has trained Community Health Workers to implement Family Spirit, a mother and child health home visiting program tailored for American Indian communities. She has over 12 years of experience working on public health programs in Southwest and Northern Plains tribes. Ms. Richards studies American Indian health disparities, mother and child health in tribal communities, health in rural areas, and Indigenous determinants of health. She is working with the Upon completion of the DrPH program, she hopes to become a Principal Investigator on Indigenous community-based participatory interventions, advance the translation of data into program and policy changes, and advocate for AI health equity at the state and national level. Her prior endeavors have focused on Fetal Alcohol Spectrum Disorder prevention, preconception health education, MCH surveillance, and diabetes and obesity prevention programming. Jennifer obtained her MPH in Maternal and Child Health from the University of Arizona in 2008.



## THREE DINÉ COMMUNITIES

This project focuses on three Navajo chapters or communities who use San Juan River water for farming or ranching: Upper Fruitland, NM, the most upstream chapter who voted to open the irrigation water after the spill; Shiprock, NM, 20 miles downstream who voted to keep irrigation canals closed and allow their fields to go fallow; and Aneth, UT.



## WHAT'S NEXT?

- Collect sheep and more corn samples.
- Summer 2017: start sharing preliminary results.
- Continue to analyze soil, water, and urine samples and information from focus groups.
- Fall 2017 to Spring 2018: share full results.



AHE' HEE!!

We gratefully acknowledge our many research partners, volunteer students, advisory board members, and funding sources. This research effort is enhanced immensely by their enthusiastic support.



Yoshi Ornelas Van Horne, Dr. Paloma Beamer, and Rachelle Begay (Diné) in August 2016 during the household sampling in partnership with Navajo Community Health Representatives.

**Fact Sheet**

Chief, K., J.F. Artiola, P. Beamer, S. Wilkinson, R.M Maier, C. Rock, and C. Sanchez. 2015. Understanding the Gold King Mine Spill. Fact Sheet. University of Arizona, Tucson, AZ. ([http://www.superfund.pharmacy.arizona.edu/sites/default/files/u43/gold\\_king\\_mine\\_spill.pdf](http://www.superfund.pharmacy.arizona.edu/sites/default/files/u43/gold_king_mine_spill.pdf))

**News Article**

Beamer, P., K. Chief, N. Borrero, and B. Rivera. 2016. Water Is Our Life: How a Mining Disaster Affected the Navajo Nation. Truth Out, April 2016. <http://www.truth-out.org/news/item/36049-water-is-our-life-how-a-mining-disaster-affected-the-navajo-nation>.



UNIVERSITY OF ARIZONA

Karletta Chief  
Dept. of Soil, Water & Environmental Sciences  
PO Box 210038  
Tucson, AZ 85737  
[goldkingproject@gmail.com](mailto:goldkingproject@gmail.com)  
(505) 652-4563 or 505-652-GKME  
Like us on Facebook

[RECIPIENT]

Address Line 1  
Address Line 2  
Address Line 3  
Address Line 4