Gold King Mine Spill
Diné Exposure Project

SPRING 2018
ISSUE 7

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

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 measured 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: *In December 2017, we reported results back to Shiprock, Upper Fruitland, and Aneth Chapters.*

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.

June 2016 – January 2018: We analyzed the samples for arsenic and lead. Water results were presented at Shiprock Ag days 2017

To Date: *In March 2018, we reported sediment results back during Shiprock Agricultural Days.*

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 in the final stages of finalizing the summary of what people said.*

CITIZEN SCIENCE: USING "WATER REPORTER" ON YOUR PHONE OR COMPUTER TO MONITOR THE SAN JUAN RIVER

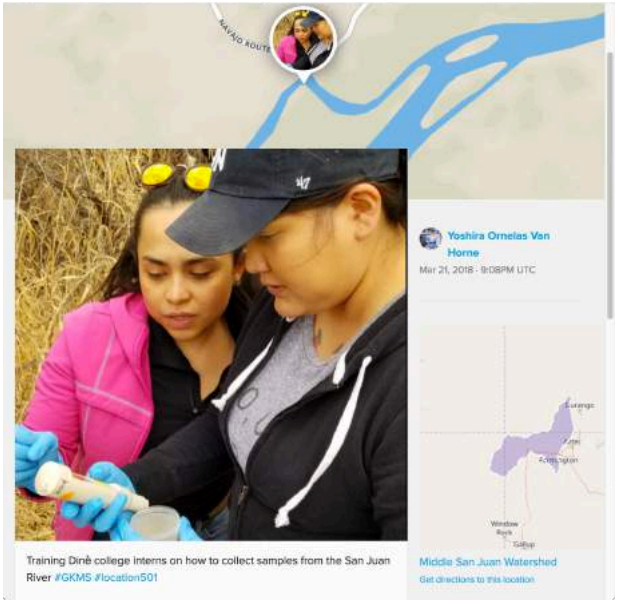
Now you can be a citizen scientist to monitor the San Juan River on the Navajo Nation by using your phone or the computer! You can document what you see along the San Juan River that impacts water quality and also see what other citizen scientists have documented! With your participation, Navajo citizens are coming together to monitor the San Juan River.

Phone App Instructions:

Step 1. Visit the App Store on Your Phone.
Step 2. Search for 'The Water Reporter' and download the App.
Step 3. Create an account for yourself.
Step 4. Add yourself to the Gold King Mine Spill Diné Exposure Project group.
Step 5. Share any photos or notes you take of the San Juan River. We want to see the river from as many different viewpoints as possible.
Step 6: Look out for San Juan River quality updates by others.

Internet Website Instructions:

Step 1. Visit www.waterreported.org
Step 2. Click on Sign Up and create an account for yourself.
Step 3. Add yourself to the Gold King Mine Spill Diné Exposure Project group.
Step 4. Share any photos or notes you take of the San Juan River. We want to see the river from as many different viewpoints as possible.
Step 6: Look out for San Juan River quality updates by other citizen scientists.



Training Dine' College interns how to collect water samples from the San Juan River and to report it in Water Reporter.

Farming is Life - Dá'ák'eh Bee Iiná Seed to Harvest Program

We established partnerships with 10 Diné Farmers to monitor their corn, water, and soil on their farms for from seed to harvest for Spring-to-Fall Season 2018. In addition, river water will be sampled at regular intervals from March to August and measured for water quality (e.g. pH, turbidity). This data will be added to the Water Reporter App. The UA team trained Diné College interns and staff on the sample collection methodology and equipment. Diné College interns will continue to lead sampling events. All water samples will be analyzed at NAU.

Soil Guidelines

Different guidelines, criteria, objectives or standards exist for soil. Below are definitions for each and who defines these. Guidelines are numerical limits or narrative statements recommended to support and maintain designated uses of the soil environment. **Objectives** are numerical limits or narrative statements established to protect and maintain designated uses of the soil environment at a particular site. **Standards** are guidelines or objectives recognized in enforceable environmental control laws of one or more levels.

	Canadian Soil Quality Guidelines (SQG) for the Protection of Environmental & Human Health for Agricultural Land Use	New Mexico Environmental Department Soil Screening Levels (SSL) for Residential Screening Levels	U.S. Environnmental Protection Agency Regional Screening Levels for Soil Screening Levels
Legend			
Abbreviation	SQG_E or SQG_{HH}	SSL_{res} or NMED RSL	SSL or USEPA RSLs
Arsenic	12 ppm	7.07 ppm	--
Lead	70 ppm	--	400 ppm
Recommended by	Navajo EPA	Dr. Kevin Lombard, Superintendent, Agricultural Science Center at Farmington, New Mexico State University	Dr. Kevin Lombard, Superintendent, Agricultural Science Center at Farmington, New Mexico State University
Purpose	Agricultural: where the primary land use is growing crops or tending livestock. This also includes agricultural lands that provide habitat for resident and transitory wildlife and native flora.	NMED SSLs are presented for use in evaluating three discrete potential receptor populations: Residential, Industrial/Occupational, and Construction. Each NMED SSL considers incidental ingestion of soil, inhalation of volatiles from soil (limited to those chemicals noted as volatile organic compounds [VOCs] within Table B-2) and/or particulate emissions from impacted soil, and dermal contact with soil.	The Soil Screening Guidance is a tool that the U.S.Environmental Protection Agency (EPA) developed to help standardize and accelerate the evaluation and cleanup of contaminated soils at sites on the National Priorities List (NPL) with future residential land use.This guidance provides a methodology for environmental science/engineering professionals to calculate risk-based, site-specific, soil screening levels (SSLs) for contaminants in soil that may be used to identify areas needing further investigation at NPL sites. A screening level of 400 mg/kg has been set for lead based on Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities (U.S. EPA, 1994).
Reference	http://ceqg-rcqe.ccme.ca/en/index.html#void	https://www.env.nm.gov/hazardous-waste/guidance-documents/	https://www.epa.gov/risk/regional-screening-levels-rsls https://semspub.epa.gov/work/03/2218759.pdf

SHIPROCK AGRICULTURAL DAYS 2018

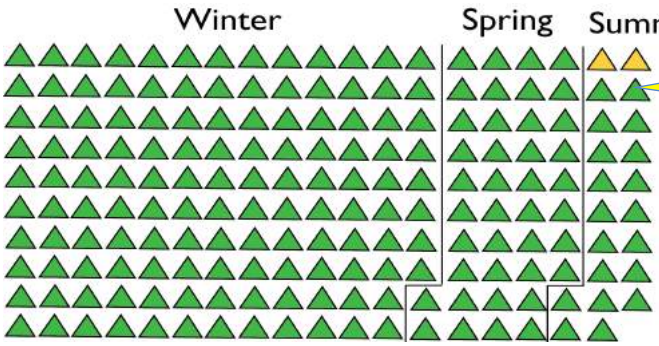
On March 21st, Dr. Paloma Beamer presented soil results at Shiprock Ag Days at Shiprock Chapter. **Overall, arsenic and lead were very low in soil samples and met agricultural standards.** The traffic light to the right explains the individual sample results. A "GREEN" color indicates the sample is "ok" in meeting the arsenic/lead guidelines. A "YELLOW" color indicates the sample "needs more information". A "RED" color indicates the sample did not meet guidelines and to "beware."

←BEWARE

←NEED MORE INFORMATION

←OK

ARSENIC IN AGRICULTURAL SOIL



Legend

Types of Samples (number of samples):

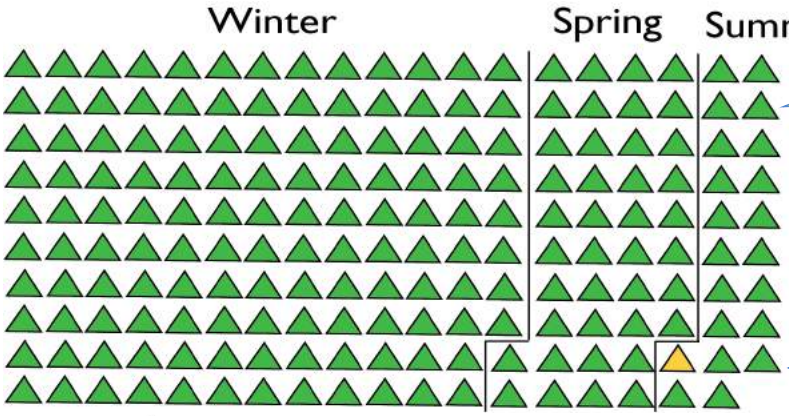
Grab	
▲ (0)	Above Canadian Agricultural Soil Quality Guideline (12 ppm)
△ (2)	Above NMED RSL Guideline (7.07 ppm)
△ (187)	Below Guidelines

Triangles represent a soil sample.

Most of the triangles (187 of them) are Green except for 2 Yellow ones that means it was above or exceeded the NMED RSL guidelines for arsenic

These are the two standards we compared to: Canada & New Mexico.

LEAD IN AGRICULTURAL SOIL



Legend

Types of Samples (number of samples):

Grab	
▲ (0)	Above NMED RSL (400 ppm)
△ (1)	Above Canadian Agricultural Soil Quality Guideline (70 ppm)
△ (188)	Below Guidelines

The color of the triangle indicates which standard, it met.

Most of the triangles (188 of them) are Green except for 1 Yellow one that means it was above or exceeded the NMED RSL guidelines for Lead.

KTNN RADIO FORUM

KTNN Radio Gold King Mine Spill Panelists

The Gold King Mine Spill Diné Exposure Project hosted a radio forum on Tuesday, March 20, 2018 at 6 - 8 PM MDT. The radio forum was on KTNN (AM 660 & FM 101.5) & KWRK (FM 96.1). The panelists featured on the forum were: Dr. Paloma Beamer (UA), Chili Yazzie (Shiprock Chapter), Dr. Kevin Lombard (NMSU), Steve Austin (Navajo EPA), Mae-Gilene Begay (Navajo CHR), and Janene Yazzie (TBND). The panelists discussed how they were involved in the monitoring and research activities on the Navajo Nation after the Gold King Mine Spill, what results they found, and answered questions from radio listeners. The panelists engaged in a dialogue with each other and radio listeners about their experience, their involvement, lessons learned, & goals for the future.

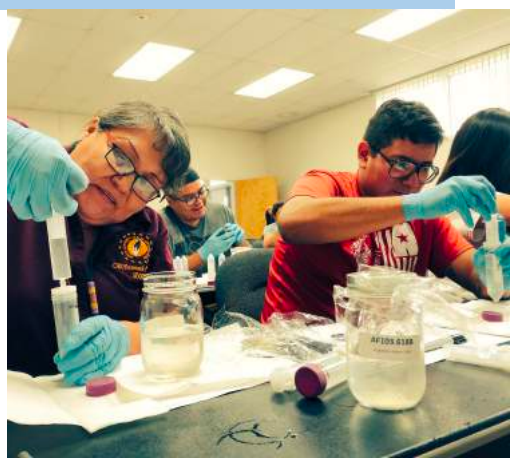
CROSS CULTURAL PERSPECTIVES SHARING STORIES ACROSS THE WATERSHED

Approximately 50 people attended the April 17th, 2018 "Sharing Stories" event to hear four tribal and non-tribal speakers across the watershed share their perspectives about the social and historical context of the Animas-San Juan River system and the impacts to communities by the Gold King Mine Spill. Attendees enjoyed a Basques Dinner during the event. Basques are indigenous people who live in north-central Spain & southwestern France. The event follows the first "Sharing Stories" that was held in Durango, CO in November 2017 where nearly 100 Durango residents heard Dine' perspectives.

Panelists included Chili Yazzie, Perry Charley, Carmenlita Chief, Jonathan Thompson, Marcel Gaztambide, and Al Yazzie

DINE' COLLEGE STUDENTS LEARN FROM NAVAJO CHRS

Navajo Community Health Representatives (CHRs) shared their experiences with 14 Dine' College Students in how they responded to the Gold King Mine Spill days after the accident and how they informed Navajo residents of the spill and how to protect themselves. The CHRs explained the emergency response courses they take. UA and Navajo CHRs trained students how to sample, filter, and process water samples. Dine' College students entered water quality data in the Water Reporter and analyzed the data together.



AHE' HEE!!

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1P20MD006872

Superfund Research Program
The University of Arizona
P42ES04940

The University of Arizona
Southwest Environmental Health Sciences Center
P30ES006694

WHAT'S NEXT?

- Collect harvested corn in Fall 2018.
- Continue to analyze information from focus groups.
- Summer 2018 Continue to monitor the San Juan River
- Summer 2018 Begin to discuss emergency response

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)

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

UNIVERSITY OF ARIZONA

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