

DEPARTMENT OF HEALTH ACTIVITIES AFTER THE GOLD KING MINE SPILL

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Presentation to the Gold King Mine Citizens' Advisory Committee

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What will be covered?

- What is environmental health epidemiology? (briefly)
 - ▣ Environmental exposures and health
- NMDOH activities after GKM
 - ▣ Health expertise provided
 - ▣ Leveraging of Four Corners States Biomonitoring
 - Description of project and definition of biomonitoring
 - San Juan County 2015 water results; upcoming urine results
 - Discussion of metal concentrations in water and health
 - Discussion of how urine results will be interpreted
 - San Juan County 2016 sampling

What is environmental health epidemiology?

- Epidemiologists are disease detectives.
- *Environmental health* epidemiologists identify potential exposures in the environment (chemicals, metals, etc., in air, water, food) and try to figure out where there might be risks to health and what can be done to prevent health impacts.
- BUT, because people vary in terms of how healthy they are, what diseases they have, their metabolism, their genetic background, and other factors, we can't predict how a certain exposure will affect an individual.

New Mexico Department of Health (NMDOH) activities after Gold King Mine (GKM) Spill

Health Expertise Provided:

- Reviewed surface water, groundwater and sediment data and communicated relevant health concerns to involved agencies and directly to domestic well owners.
- Available to general public, federal and state agency leadership to answer questions about domestic well testing, test results, health concerns and water treatment options.
- Developed press releases, factsheets, a NMDOH web page, and health advisories.
- Reviewed plans, attended public meetings and was available for an open house.
- Leveraged resources to provide testing of private well water for metals. This included those who were not eligible for testing by the EPA.

Leveraging of Four Corners States Biomonitoring Consortium

Description of Project:

- 5-year grant from CDC, 2014 – 2019
- Build capacity for lab testing, share resources
- Similar regional exposure concerns and population compositions
- Specific studies: metals, phthalates, pesticides
 - ▣ Metals: arsenic, cadmium, manganese, mercury, uranium, selenium



Metals in green font were cited in the Gold King Mine Water Spill Long Term Monitoring Plan as “of concern with regard to acid rock and mine drainage and to the GKM spill.”

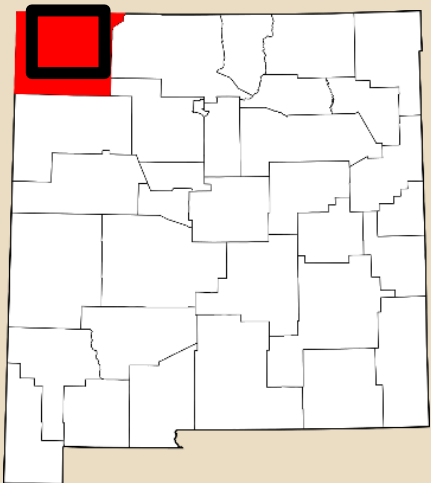
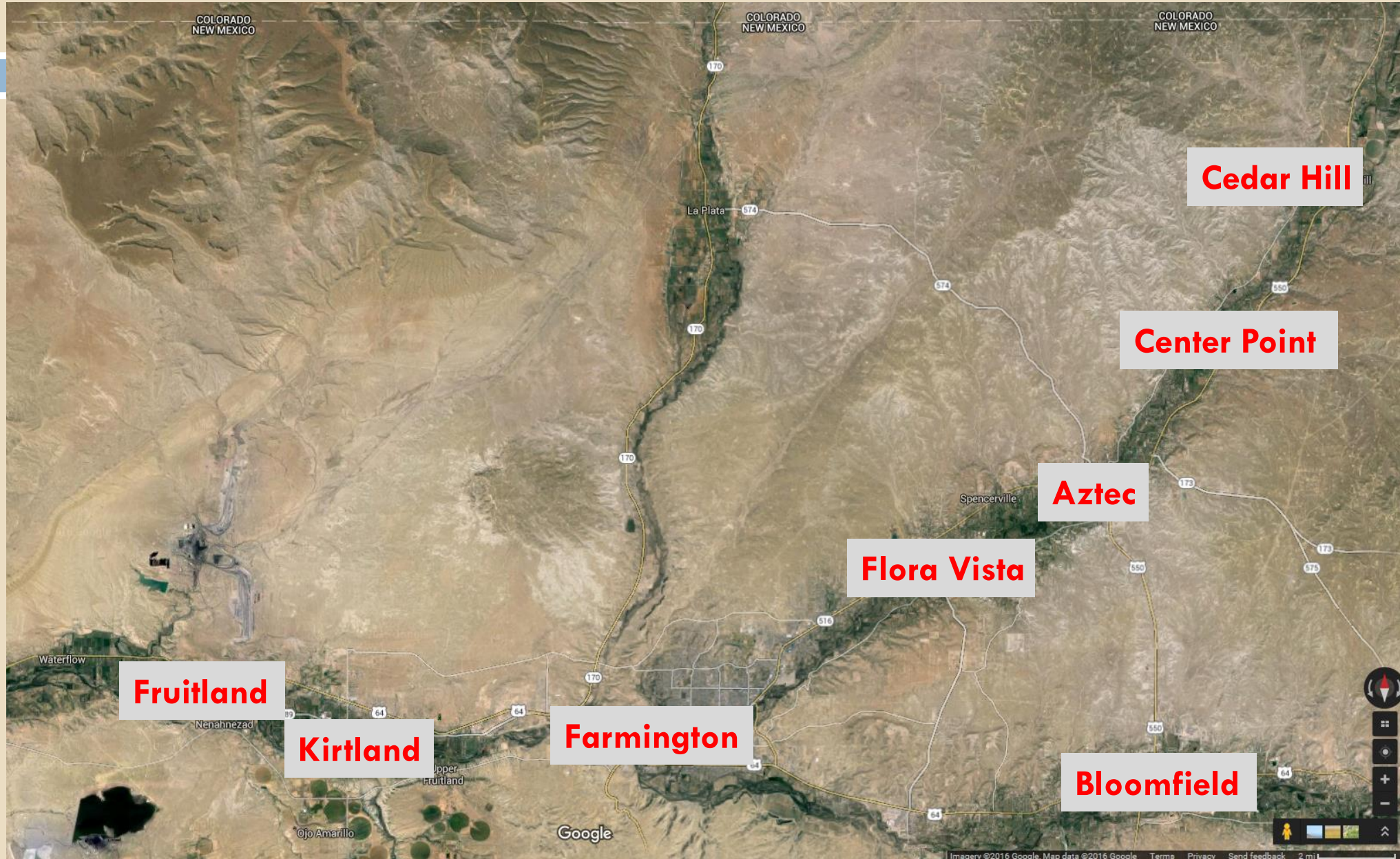
Leveraging of Four Corners States Biomonitoring Consortium

Biomonitoring Definition:

- A method of assessing human exposure to chemicals
- Can be used to determine environmental exposure directly rather than relying on testing air or drinking water samples
- Involves measuring environmental chemicals (or their metabolites or reaction products) in human tissues and fluids, such as blood and urine
- Integrates all pathways/routes of exposure (such as ingestion or inhalation) to chemicals from all sources, including chemicals in the air, water, food, soil, dust, and consumer products

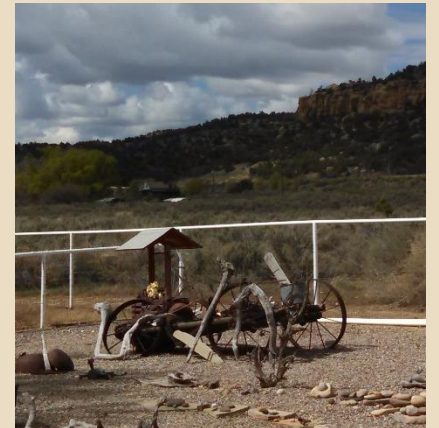


Where did we sample? – San Juan County, NM



San Juan County, October 2015

- Adults, 18 years and older
- Study of metals in urine and drinking water from private wells
 - ▣ 83 participants, 58 households
 - Complete questionnaires (demographics and exposure history)
 - Provide urine samples
 - Will be analyzed for creatinine, metals (arsenic (As), cadmium (Cd), manganese (Mn), mercury (Hg), selenium (Se), and uranium (U)), and phthalates (14 metabolites)
 - ▣ 86 water samples
 - Analyzed for total As and speciated As, Cd, Mn, Hg, Se, and U



San Juan County water results – October 2015[^]

Metal	Range (mg/L)	Mean (mg/L)	Proportion with metal detected in water (n=58)	MCL/HAL* (mg/L)	Proportion with concentration ≥ MCL/HAL* (n=58)
Arsenic (total)	<0.001 – 0.001	<0.001	3% (2)	0.010	0% (0)
Arsenic (III)	<0.001 – <0.001	<0.001	0% (0)	-	N/A
Cadmium	<0.001 – <0.001	<0.001	0% (0)	0.005	0% (0)
Manganese	<0.001 – 2.200	0.084	59% (34)	0.300	7% (4)
Mercury	<0.0002 – <0.0002	<0.0002	0% (0)	0.002	0% (0)
Selenium	<0.005 – <0.005	<0.005	0% (0)	0.050	0% (0)
Uranium	<0.001 – 0.021	0.005	97% (56)	0.030	0% (0)

*MCL=Maximum Contaminant Level; HAL=Health Advisory Level (manganese)

[^]Water samples from domestic wells tested

Mn in 2015 San Juan County water samples

- Manganese (Mn) is the only metal in San Juan County private well samples in 2015 that is above a health-based standard (health advisory level, HAL)
- While 4 untreated private well water samples were above the HAL,
 - ▣ 2 households only drank water treated with reverse osmosis
 - ▣ 1 household only drank bottled water
 - ▣ 1 household drank untreated water, but received information about how Mn could be removed

Mn and health

- There is not much data on health effects from ingesting manganese
- Consuming water with Mn at concentrations below 0.3 mg/L over a lifetime is considered safe.
- Consuming water with Mn at higher concentrations (> 2 mg/L) over a long period of time (10 years or more) may result in some neurological symptoms like weakness/fatigue, gait disturbances, tremors



How will urine results be interpreted?

- Examine the level of metals in participants' urine and compare to all other community members who participated in the study for general information.
- Examine the level of metals in participants' urine and compare to a representative sample of residents in the US.
- Make recommendations to participants about how to reduce exposure if urine at levels higher than in most people in the general US population.
- Provide information about potential health outcomes.

San Juan County 2016 Sampling

- Continued interest for well water testing
- April 27, 2016 – April 30, 2016
- Same requirements as October 2015
 - ▣ Individuals who use a private well water for domestic purposes, such as drinking and/or cooking
 - ▣ Adults, 18 years and older
- 39 participants
 - ▣ Completed questionnaires & provided urine samples
- 23 households (28 total water samples)



Conclusions

- Based on results from the NMDOH 2015 San Juan County private well samples, there is no evidence that the GKM spill impacted these wells:
 - ▣ Residents with high Mn knew it was present before spill
 - ▣ Cadmium and mercury not present; arsenic at very low concentrations in 2 wells
- Once urine results are available, residents will be provided with recommendations on exposures that may need to be reduced.

Questions?

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- More information

www.4csbc.org

https://nmtracking.org/en/environ_exposure/exposure-data_biomonitor/