



Protecting Public Health and the Environment in New Mexico from Colorado's Mining Waste



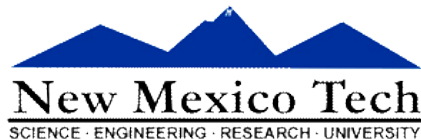
Ryan Flynn
Secretary of Environment
July 15, 2016

New Mexico's Team

Multi-jurisdictional agencies appointed by Governor Martinez, along with top science and engineering experts recruited from within the state, are working together to monitor the effects of CO mine waste in NM.



New Mexico Department of Agriculture



San Juan Soil and Water Conservation District



Animas River Watershed System

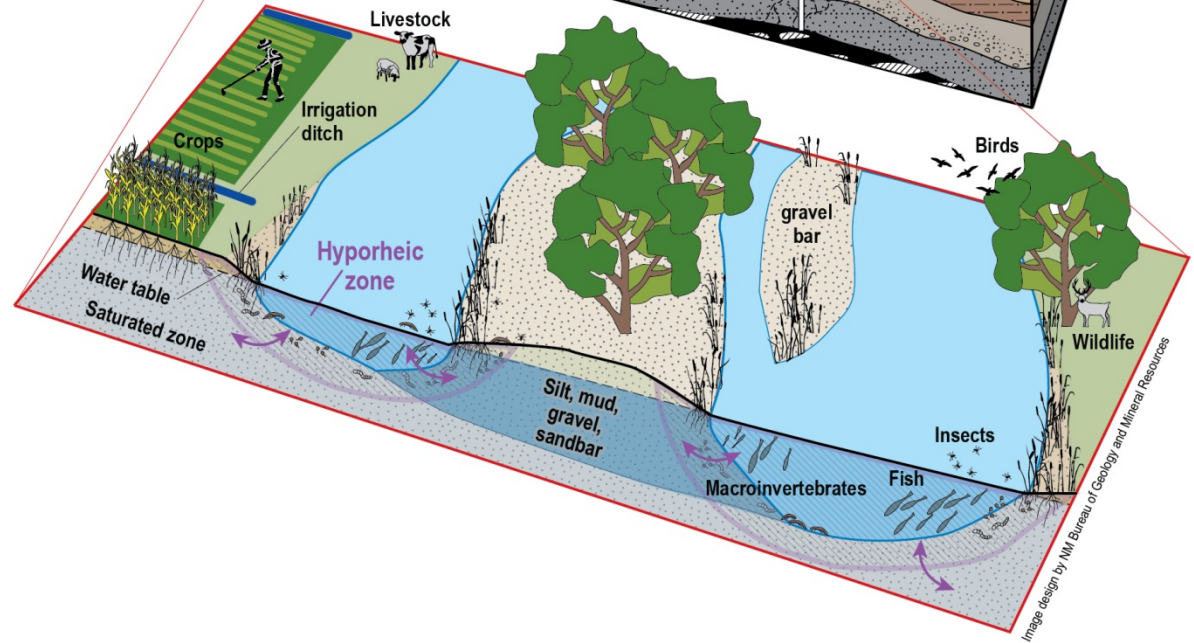
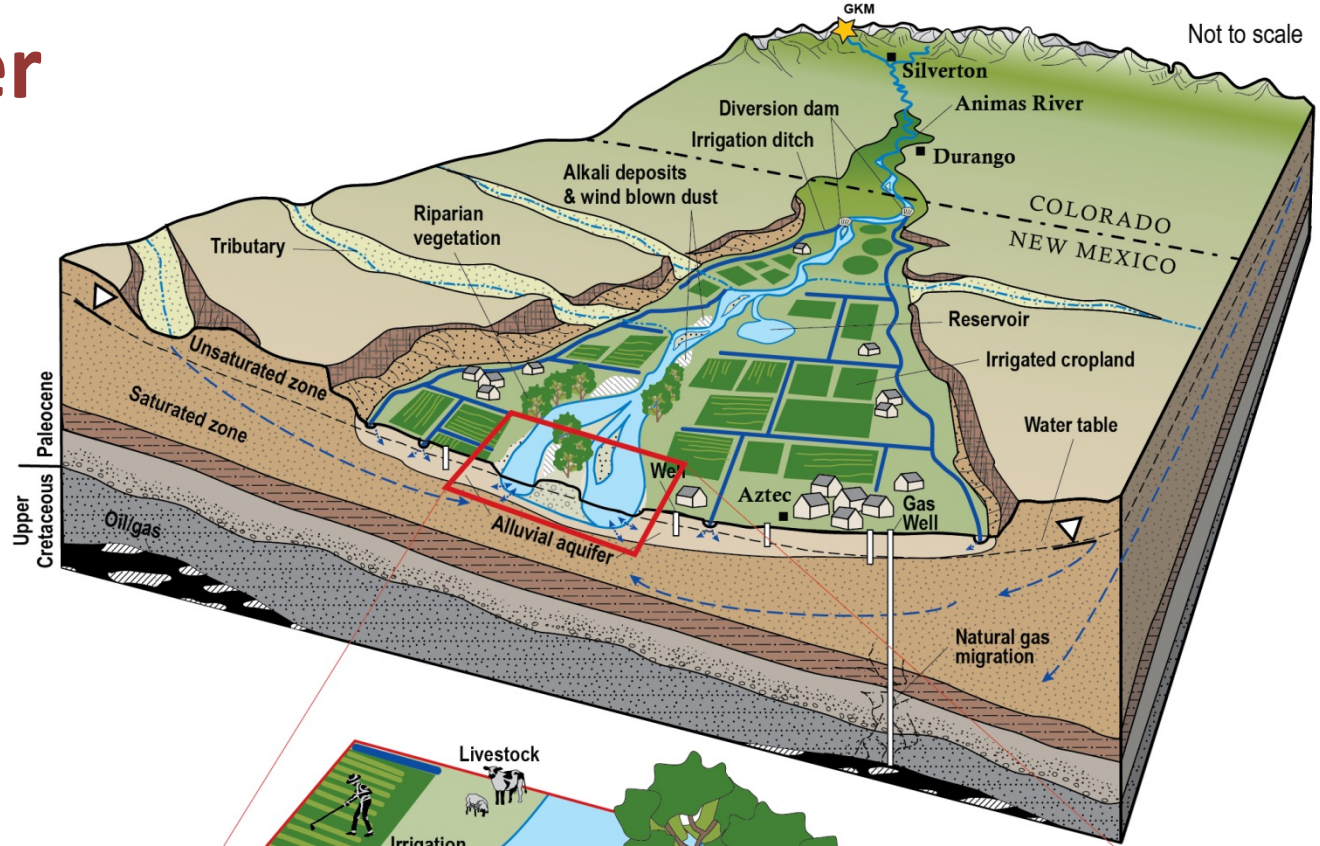


Image design by NM Bureau of Geology and Mineral Resources

GKM Spill Emergency Response

- **The spill began on August 5, 2015. NMED was notified of the spill by the Southern Ute Indian Tribe on August 6.**
- **NMED was onsite, began testing water and issued public advisories before the plume arrived in New Mexico.**
- **NMED was in daily contact with public drinking water systems and conducted extensive testing. No consumers drank water contaminated by the GKM spill or ran out of water.**
- **NMED tested ~580 private domestic wells; no evidence of impacts from the spill. Groundwater monitoring continues.**
- **Contaminated irrigation ditches were flushed into the river.**
- **No evidence of unusual fish, livestock or wildlife mortality.**

Post-Spill Monitoring

- **NMED funded the NM Bureau of Geology to perform seasonal groundwater surveys.**
- **The City of Farmington and NMED installed 6 sondes into the Animas and San Juan Rivers to provide real-time water quality data to public water systems, farmers, ranchers and other water users. NMED and Farmington are also collecting river samples for lab testing.**
- **NMED led efforts to develop a regional Spring Runoff Preparedness Plan with other state, tribal, county and municipal stakeholders.**
- **At the request of a local authority in Colorado, NMED inspected and sampled discolored river sediment near Durango. This heavily contaminated sediment has the potential to migrate into New Mexico.**
- **NMED will conduct additional sampling in Colorado, as necessary, to protect public health and the environment in New Mexico.**

Post-Spill Monitoring, Continued

- **The Long Term Impact Team appointed by Governor Martinez submitted a \$6 million Clean Water Act grant application to EPA to fund the long term monitoring program.**
- **EPA approved \$465,000 of the \$6 million grant application, and has made an additional \$108,000 and \$122,000 available from other sources for a total of \$695,000.**
- **With inadequate funding from EPA the Long Term Impact Team is doing what it can with limited state resources.**

Spring Runoff Preparedness Plan

March 24, 2016



Navajo Nation
Environmental Protection Agency



San Juan Soil and Water
Conservation District (NM)



COLORADO
Division of Homeland Security
& Emergency Management
Department of Public Safety






<https://www.env.nm.gov/riverwatersafety/documents/animasspringrunprepplan.pdf>



Animas and San Juan Exposure and Risk Dashboard

https://www.env.nm.gov/wp-content/uploads/2016/07/160708_Animas-San-Juan-Risk-Dashboard.pdf

Potential Exposure Pathway	Risk Level	Explanation
Public Drinking Water Supplies	Use Caution	Public drinking water supplies in San Juan County, NM are subject to multiple protective requirements of the federal Safe Drinking Water Act (SDWA). These requirements include infrastructure construction standards, solids settling and treatment, disinfection, testing treated water, and New Mexico Environment Department (NMED) inspections. Recent inspections of the Morningstar and Harvest Gold water systems identified deficiencies which are being addressed by enforcement actions. Drinking water from all other public water systems is safe for all uses.
Private Domestic Wells	Use Caution	Private domestic wells are not subject to the protective requirements of the federal SDWA. Many private wells were not constructed in a sanitary manner or have deteriorated as the well has aged. These wells are at risk of contamination by bacteria, parasites or viruses. High levels of manganese, iron, sulfate and total dissolved solids existed in some wells prior to the Gold King Mine (GKM) spill. Elevated lead also has been detected in private water systems that have galvanized steel plumbing components or lead solder. Following the GKM spill, NMED tested more than 600 private domestic water wells in San Juan County, NM. There is no evidence that the GKM spill contaminated any water wells in New Mexico. NMED and the New Mexico Bureau of Geology continue to test private domestic wells that may be affected by GKM contaminants in the future.
River Water for Domestic Supply	Unsafe	Untreated river water should never be used for domestic supply, even if there are not visible signs of contamination. When you consume untreated water from surface sources, you run the risk of ingesting harmful bacteria, parasites or viruses. Untreated river water also may contain high levels of lead and arsenic during periods of high turbidity such as when storm events stir up contaminated river sediments.

 Safe	 Use Caution	 Unsafe
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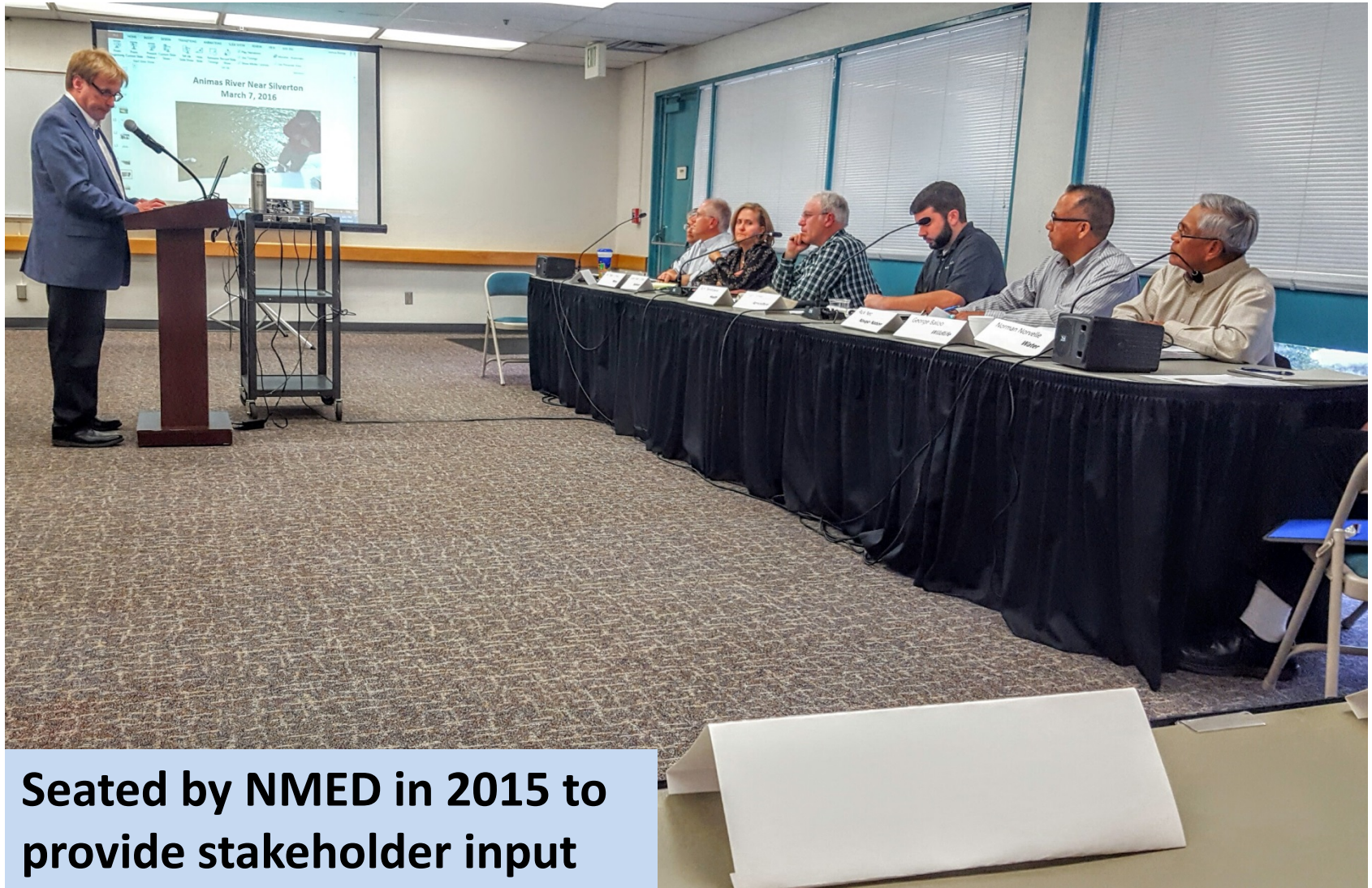


Animas and San Juan Exposure and Risk Dashboard

River Water for Irrigation	Safe	River water presently complies with all standards for irrigated agriculture.
Crops	Safe	Crops will be tested for heavy metal content by New Mexico State University during the 2016 growing season to ensure that they are safe for consumption by humans and livestock.
River Water for Livestock	Safe	River water presently complies with all standards for livestock watering.
Livestock	Safe	The New Mexico State Veterinarian, New Mexico Department of Agriculture Veterinary Diagnostic Laboratory, and local veterinarians are on the alert for any signs of unusual animal distress or illness that could result from GKM contamination.
River and Ditch Sediment	Use Caution	Sediment testing in San Juan County, NM has not identified any contaminant levels that exceed risk-based screening levels for residential exposures. Heavily contaminated sediment, however, exists in Colorado, and has the potential to migrate into New Mexico. Anyone who observes discolored sediment within or near the Animas or San Juan Rivers in New Mexico should notify NMED immediately by calling 1-800-219-6157.
Fish	Safe	The "Quality Waters" of the San Juan River below Navajo Lake are located upstream from the confluence with the Animas River and were not affected by the GKM spill. Fish tissue test results in the Animas River, and in the San Juan below the confluence with the Animas, show that heavy metals are within guidelines for human consumption. The New Mexico Department of Game and Fish will continue to monitor and test fish to ensure that they remain safe for consumption.
Recreational Activities	Use Caution	Contaminants released by the GKM spill do not presently pose hazards to people enjoying water sports, fishing and other recreational activities in and near the Animas and San Juan Rivers in New Mexico. Both rivers, however, may contain bacteria, parasites or viruses which could pose a health hazard to people who come into contact with river water. It is recommended that people wash thoroughly after going in the river, and avoid swallowing river water when swimming or doing water sports.

Safe	Use Caution	Unsafe
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Citizen's Advisory Committee



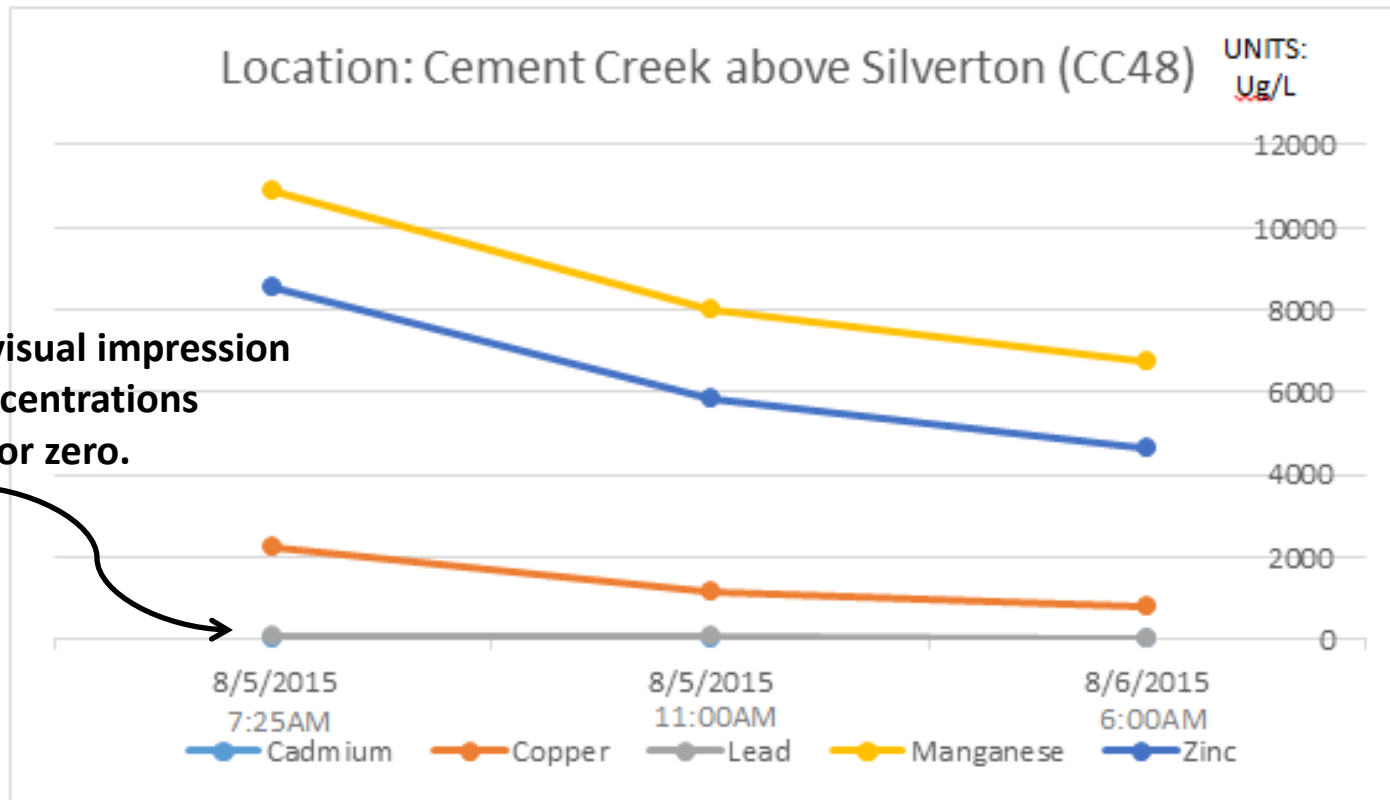
Seated by NMED in 2015 to provide stakeholder input

EPA and Colorado

- **The responses of EPA and the State of Colorado to the GKM spill continue to be grossly inadequate, biased, and consistent with an agenda to deny and downplay the seriousness of the contamination resulting from the spill.**
- **EPA is not holding itself to the same high standards for site investigation and cleanup that it routinely imposes on the regulated community.**
- **An independent, holistic and watershed-scale monitoring program is needed.**

Misleading EPA Data Presentation

(Dissolved metals graph provided by EPA to NMED on August 7, 2015)



Baseline Average	Cadmium	Copper	Iron	Lead	Manganese	Zinc
	4.31	73.93	7870	14.71	1952	1251

Total Metals in Surface Water

Plume Arrived in NM



µg/L	Drinking Water Standard	8/5/15 Cement Creek	8/5/15 Animas in CO	8/7/15 Animas in N.M.	8/8/15 Animas in N.M.
Arsenic	10	8,230	1,080	ND	21
Cadmium	5	165	28	ND	ND
Lead	15	179,000	25,600	3	350

Total (unfiltered) metals in micrograms per liter (µg/L)

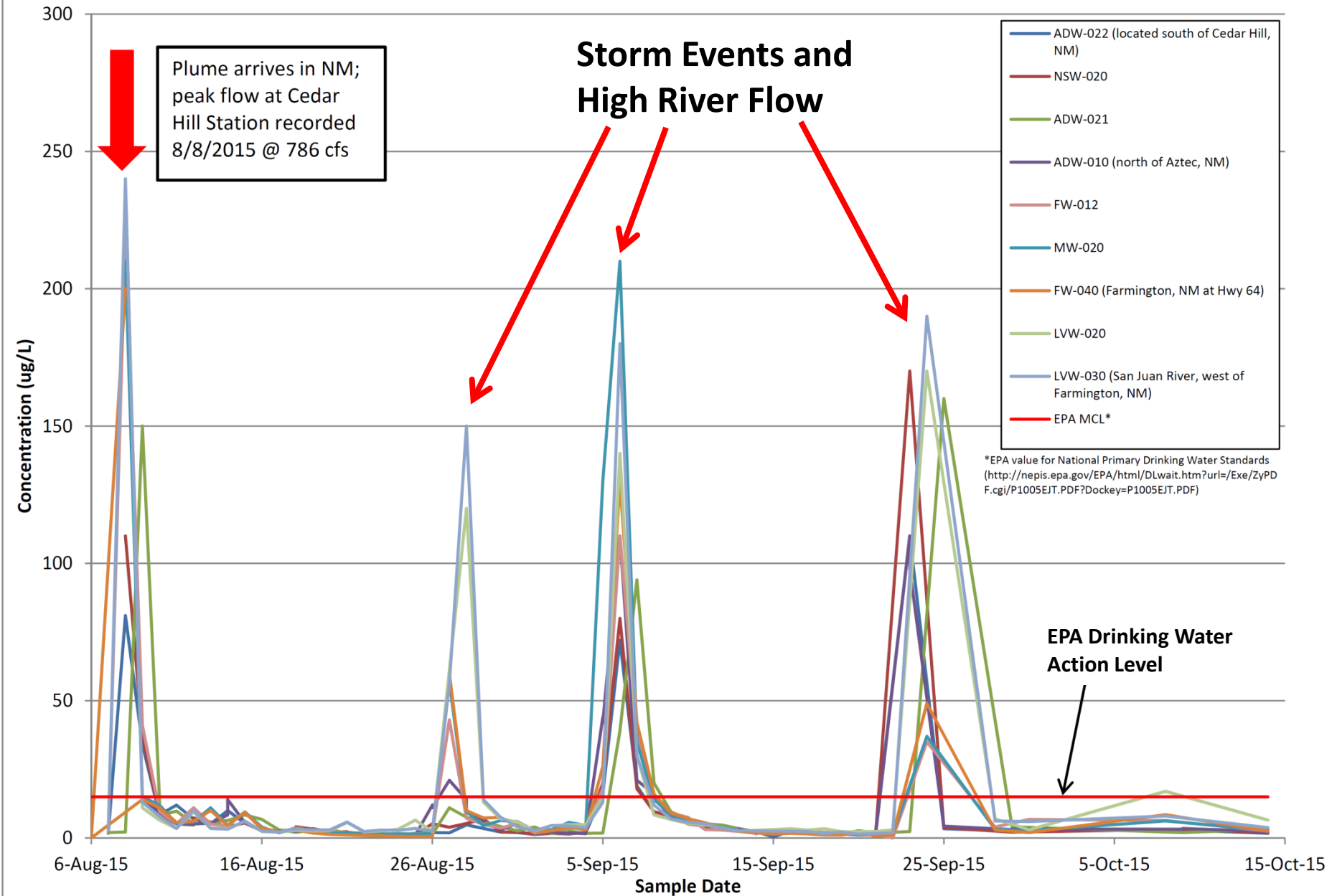
Unsubstantiated EPA Assertion

**EPA statement regarding the Animas and San Juan Rivers,
November 13, 2015:**

“...metals including arsenic, cadmium, lead and mercury in surface water and sediment have returned to pre-event conditions...”

- **The Animas and San Juan watersheds contain 1,100,000 pounds of metals that were not there on Aug. 4, 2015.**
- **EPA’s monitoring data strongly suggest that metals in surface water and sediment have not returned to pre-event conditions.**

Total Lead in the Animas and San Juan Rivers New Mexico





EPA Risk Screening Levels for Lead in Soil

mg/kg (parts per million)

GKM Spill (recreational exposure)	Residential Soil	Plants	Soil Invertebrates	Birds	Mammals	EPA Superfund Cleanup Level (sites in NM and TX)
20,000	400	120	1,700	11	56	500

It is profoundly hypocritical that EPA would propose a screening level for lead in soil for the GKM spill that grossly exceeds numerous other levels that EPA has developed for the United States.

NMED is not going to allow children in New Mexico to be exposed to more than 500 mg/kg of lead in soil in their back yards.

Many Families Live Along the Animas River



Residents have the river in their back yard and drink groundwater from alluvial wells.

EPA Misrepresentation

“We are certain that crops are safe for consumption. When the plume came through, irrigation ditches that impacted crops and livestock were shut down.”

<http://www2.epa.gov/goldkingmine/frequent-questions-related-gold-king-mine-response>



**Willett Irrigation
Ditch**

**Farmington, NM
August 8, 2015**

Litigation

- **State of New Mexico on behalf of NMED v. EPA, Gina McCarthy, Environmental Restoration, LLC, Kinross Gold Corporation, Kinross Gold USA, Inc., Sunnyside Gold Corporation (US District Court)**
<https://www.env.nm.gov/wp-content/uploads/2015/12/complaint.pdf>
- **State of New Mexico v. State of Colorado (US Supreme Court)** <https://www.env.nm.gov/wp-content/uploads/2016/01/160604-for-filing.pdf>

Bonita Peak Mining District: Cement Creek

Proposed by EPA for Superfund Listing

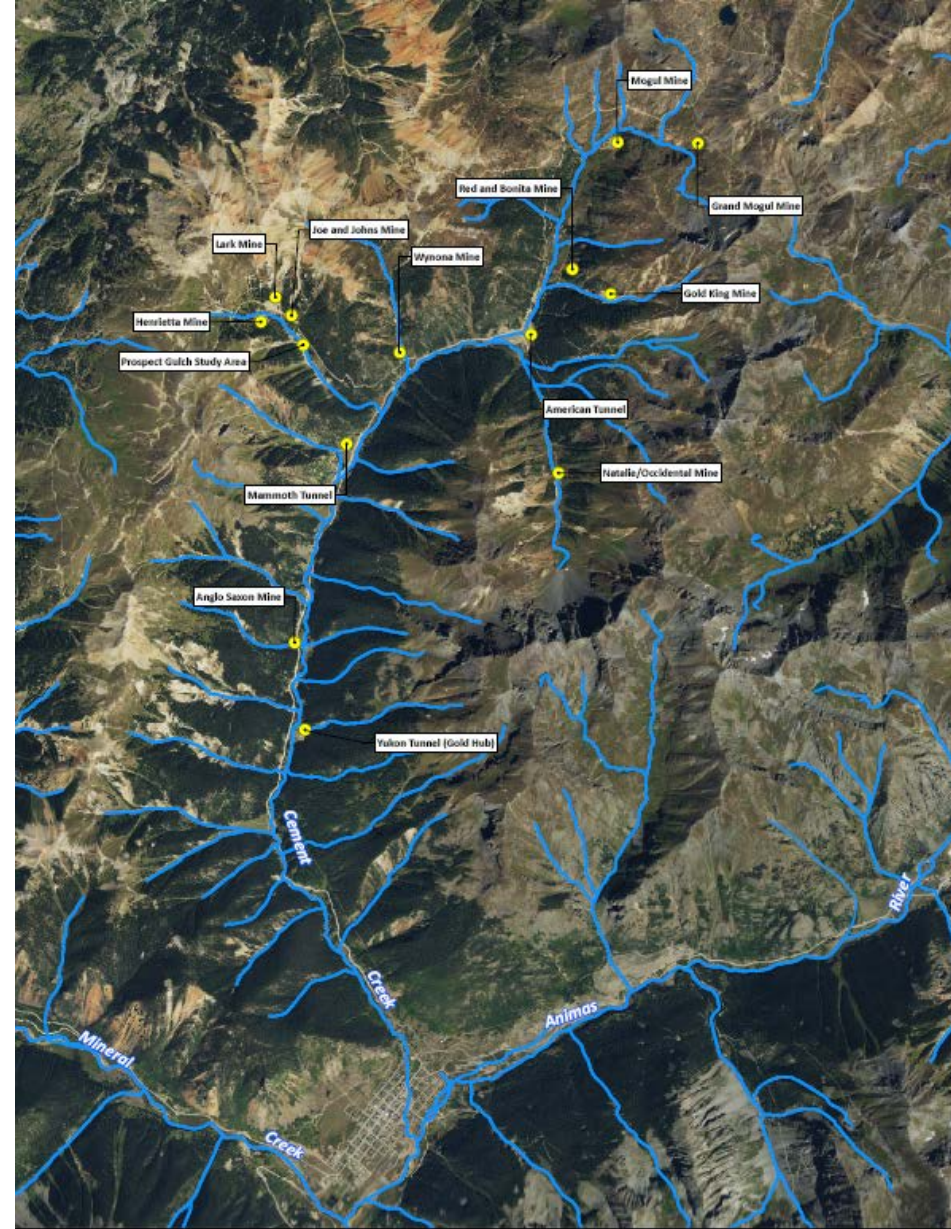
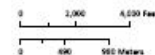


Figure 3. Bonita Peak Mining District
Cement Creek
Source Mine Locations

- HRS Evaluated and Other Possible Sources
- Perennial Streams
- Intermittent Streams



Date: March 30, 2015

Data Sources:
Mine Locations - U.S. EPA
Region 8 (Ref. 66; 59)
Streams - CDDW
(Ref. 34, pp. 1-8)
Base Map - USDA NAIP Imagery 2015
San Juan County, Colorado (Ref. 48)

Map Projection: UTM, Meters, Zone 13N, NAD83



Area of Interest

New Mexico's Demands of EPA for the Superfund Process

1. EPA must fully fund states and tribes to perform independent monitoring free of any bias or interference from EPA.
2. EPA must provide stakeholders downstream from Colorado a seat at the table for the Superfund process.
3. EPA must communicate with stakeholders and the public in a clear, timely and truthful manner.
4. EPA must use good science.

<https://www.env.nm.gov/wp-content/uploads/2016/01/2016-06-13-NMED-comments-EPA-HQ-OLEM-2016-0152.pdf>

Long Term Monitoring Plan Elements

- **Public Drinking Water Systems**
- **Surface Water Quality**
- **Soil/Sediment (rivers, irrigation ditches, croplands)**
- **GKM Solids**
- **Hyporheic Zone**
- **Regional Water Table Mapping & Aquifer-River Hydraulics**
- **Groundwater quality**
- **Ongoing and future mining area discharges**
- **Airborne Dust**
- **Plants and Animals**
 - **Benthic, aquatic and riparian organisms**
 - **Fish tissue**
 - **Wildlife**
 - **Livestock**
 - **Crops**
- **Human Biomonitoring**

Natural Geological and Legacy Contamination



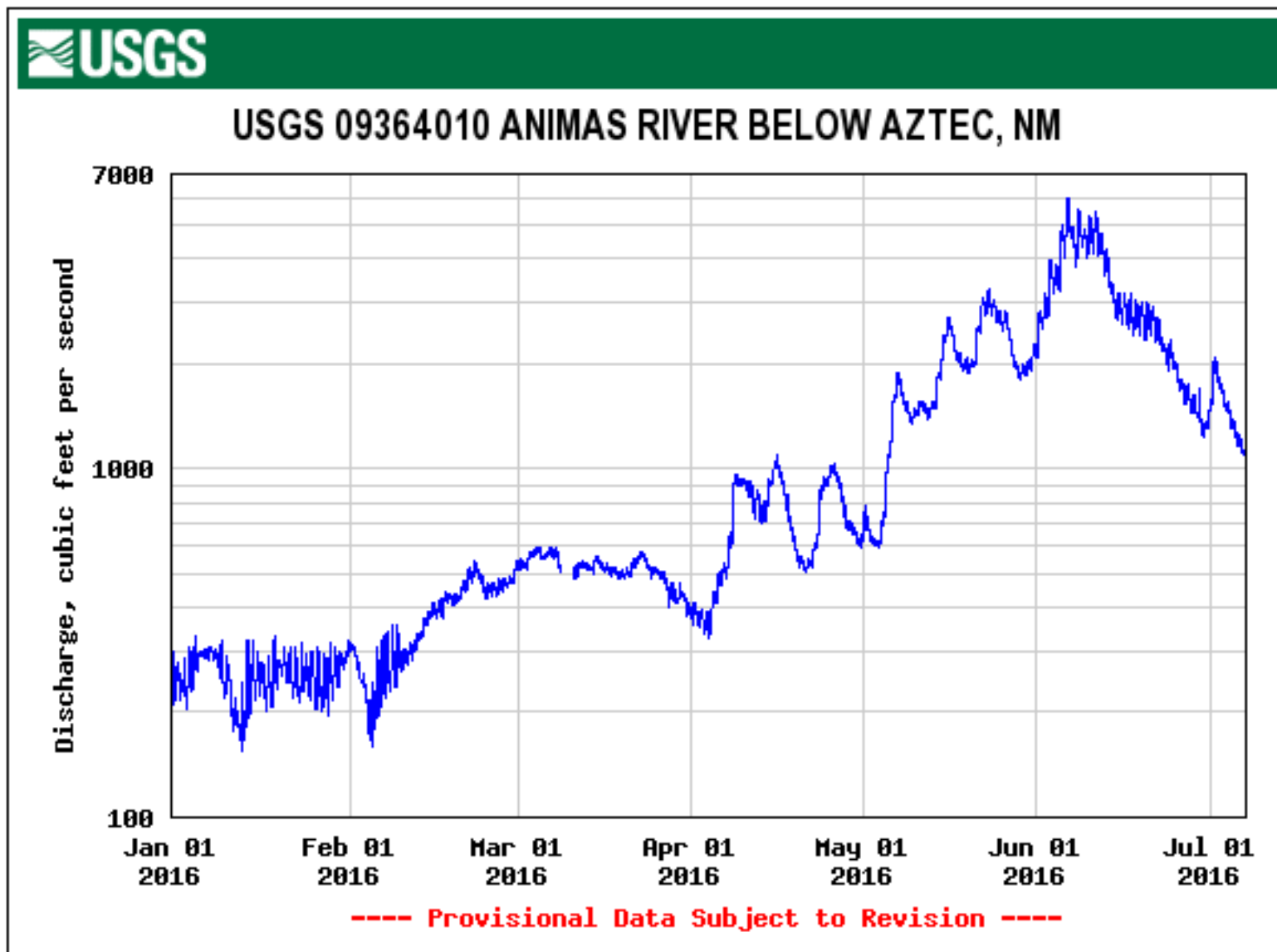
**Ferricrete deposit
in Cement Creek**

**Durango Smelter/Mill
(lead, vanadium, uranium)**



Standard Smelter in Durango 1894

2016 Spring Runoff in the Animas River

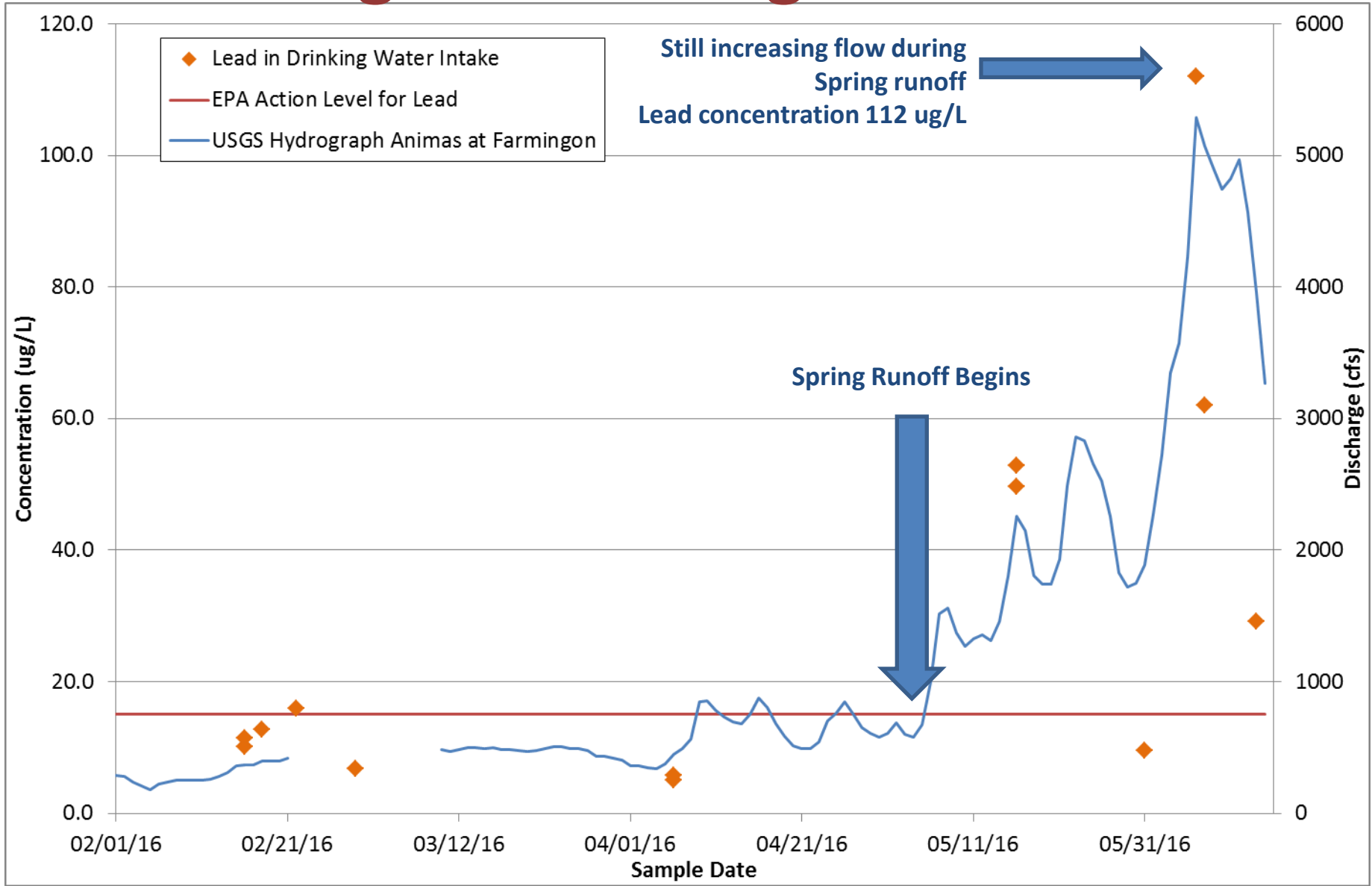


On-Going River Monitoring

1. Sondes in the river for turbidity, pH, specific cond. and temp.
2. Grab samples for lab analysis



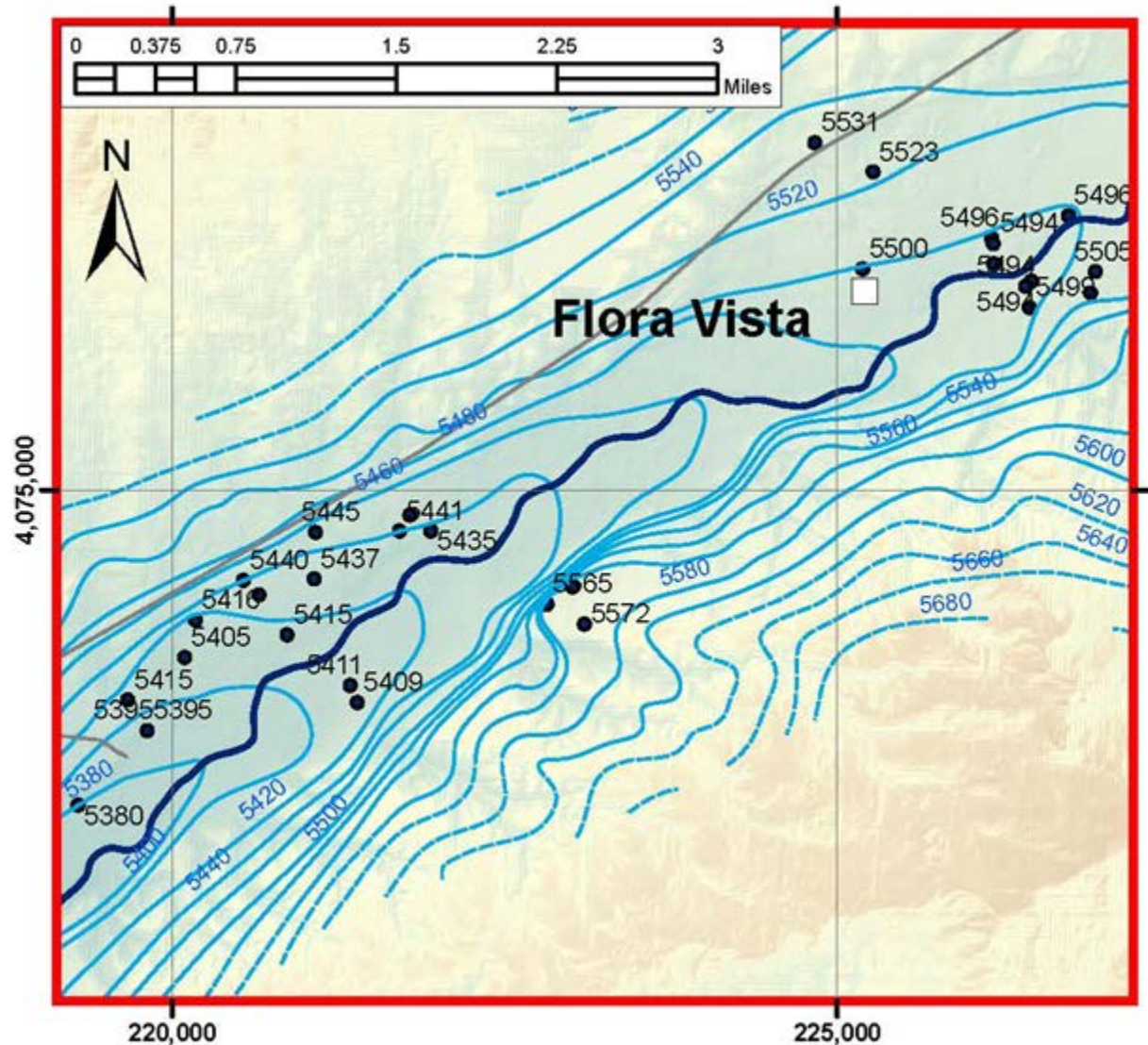
Lead in Animas River at Farmington Drinking Water Intake



Water Table Mapping

Define
groundwater
flow and aquifer-
river interactions

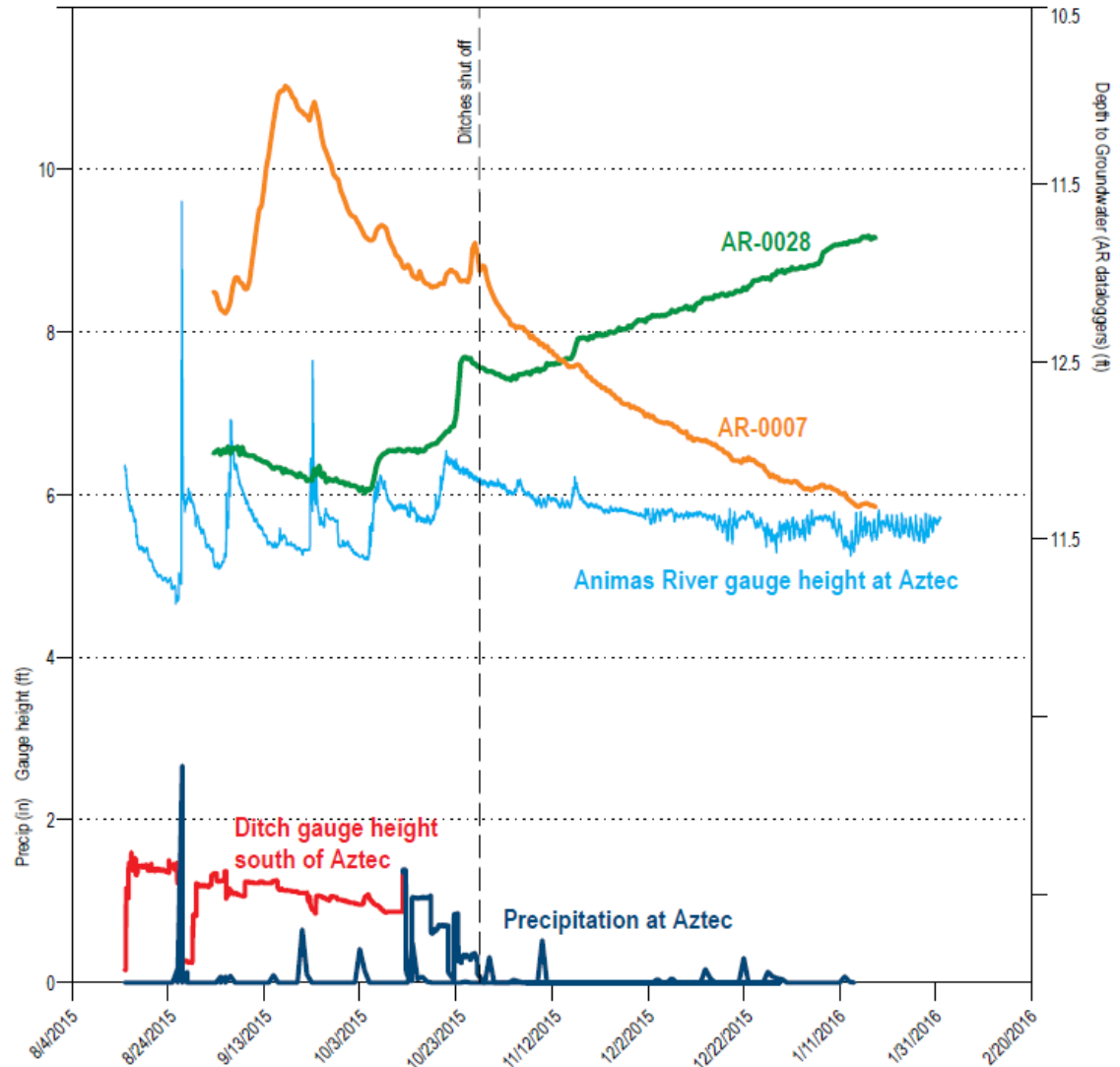
Water levels in 80
wells measured
seasonally



River-Aquifer Interaction

Irrigation ditches have a strong influence on groundwater – sources of recharge.

Data collected underlines importance of continued monitoring of groundwater.



Water-Table Mineralization at Aztec Drinking Water Diversion Channel



2,400 mg/kg lead in mineral layer

Evidence that surface water contaminants entered groundwater near the river



Transport and Fate of GKM Metals

Animas River sediment near Durango, CO February 2016

3,100 mg/kg lead

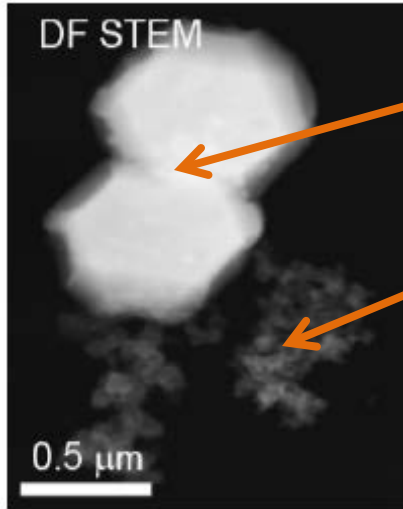
- Metals stored in sediment can be re-suspended in high flow
- Contaminated sediment can release metals into surface water
- Metals may sequester into groundwater
- Some sediment contains metals exceeding residential risk levels

- NMSU and NMED purchased hand-held XRF analyzers
- Soil, sediment and crop tissue sampling for heavy metals

XRF testing of Animas River sediment near Cedar Hill, NM



GKM Solids Analysis

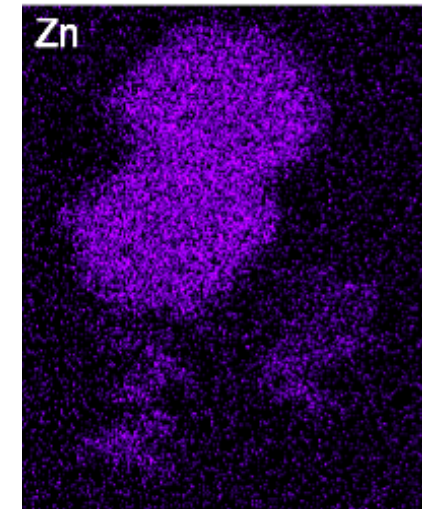
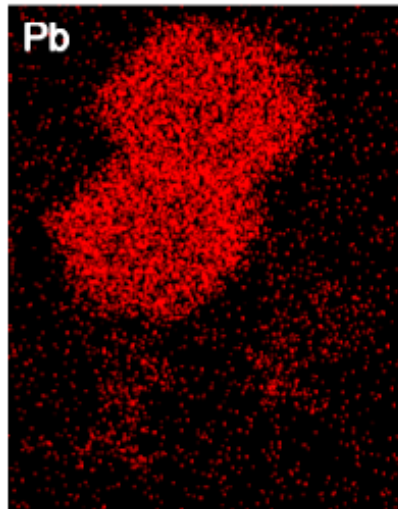
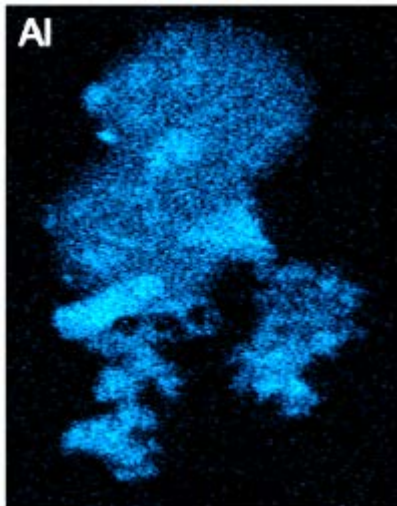
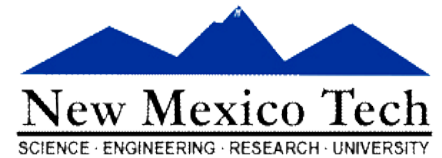


Jarosite crystals

Clay-rich material



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Jarosite grains also contain aluminum, lead and zinc (STEM X-ray)

Fish, Livestock and Wildlife Protection

- No evidence of unusual livestock or wildlife mortality.
- Heavy metals in tissue of sport fish are within recommended guidelines for human consumption.
- Investigations of algae nutrient processing and metals uptake into the food web are needed.



New Mexico Department of Agriculture



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For More Info

www.NMEDRiverWaterSafety.org