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

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N.M. Environment Department
July 12, 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 Environment Department

New Mexico Department of Health

Office of the State Engineer
nm
Interstate Stream Commission

New Mexico Department of Agriculture

New Mexico Game & Fish

New Mexico Department of Homeland Security & Emergency Management

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New Mexico Water Resources Research Institute
A State-wide Consortium for Water Research, Education, and Outreach

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Earth science for the 21st Century

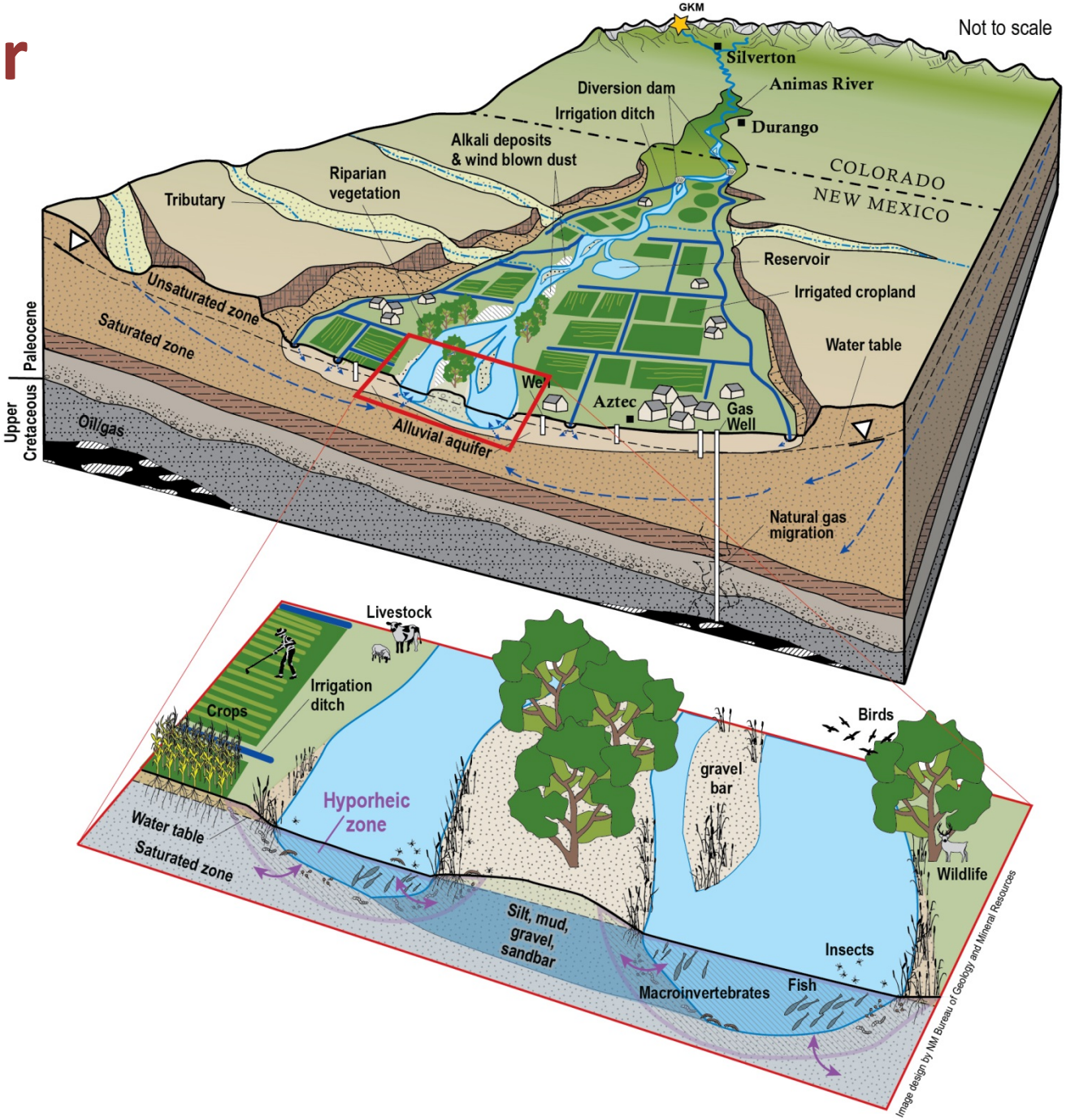
San Juan Soil and Water Conservation District

San Juan County
New Mexico
Since 1887

City of Farmington
NM

City of Aztec
New Mexico

Animas River Watershed System



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

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

Animas and San Juan Exposure and Risk Dashboard

Potential Exposure Pathway	Risk Level	Explanation
Public Drinking Water Supplies		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		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		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

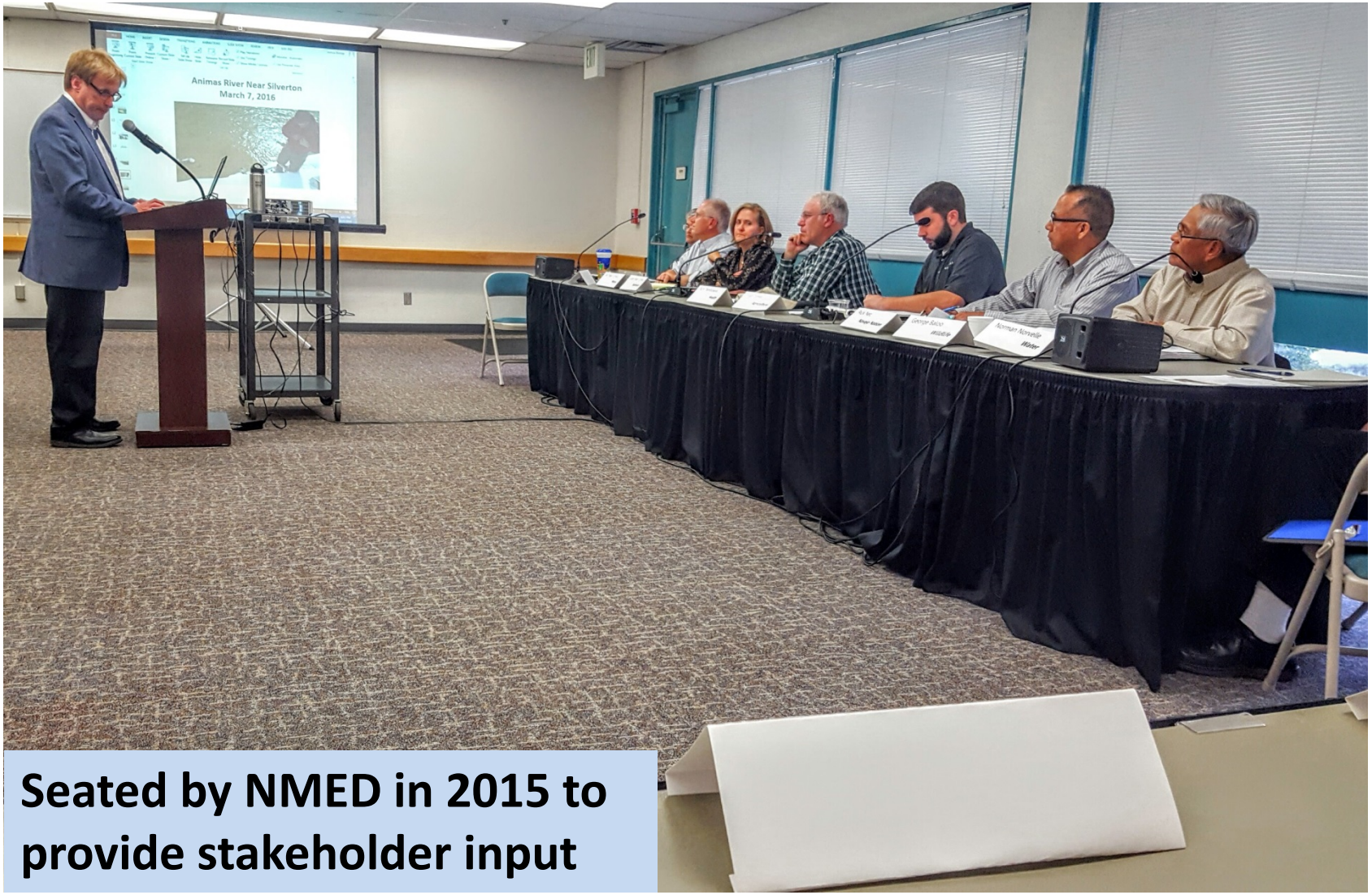
https://www.env.nm.gov/wp-content/uploads/2016/07/160708_Animas-San-Juan-Risk-Dashboard.pdf

Animas and San Juan Exposure and Risk Dashboard

River Water for Irrigation		River water presently complies with all standards for irrigated agriculture.
Crops		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		River water presently complies with all standards for livestock watering.
Livestock		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		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		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		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

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.**

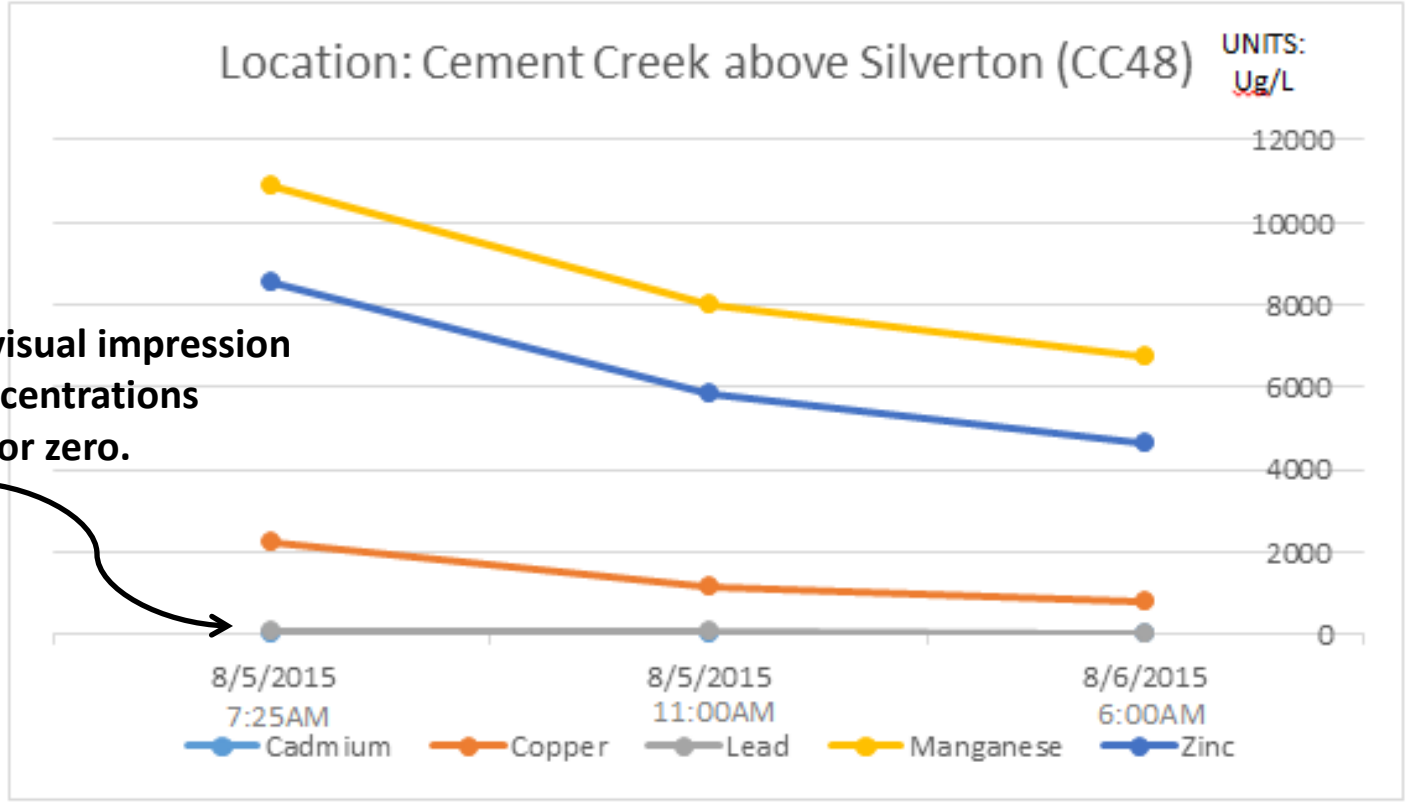
- **EPA is not holding itself to the same high standards for site investigation and cleanup that it routinely imposes on the regulated community.**

- **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)

Graph gives visual impression that lead concentrations are very low or zero.



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)

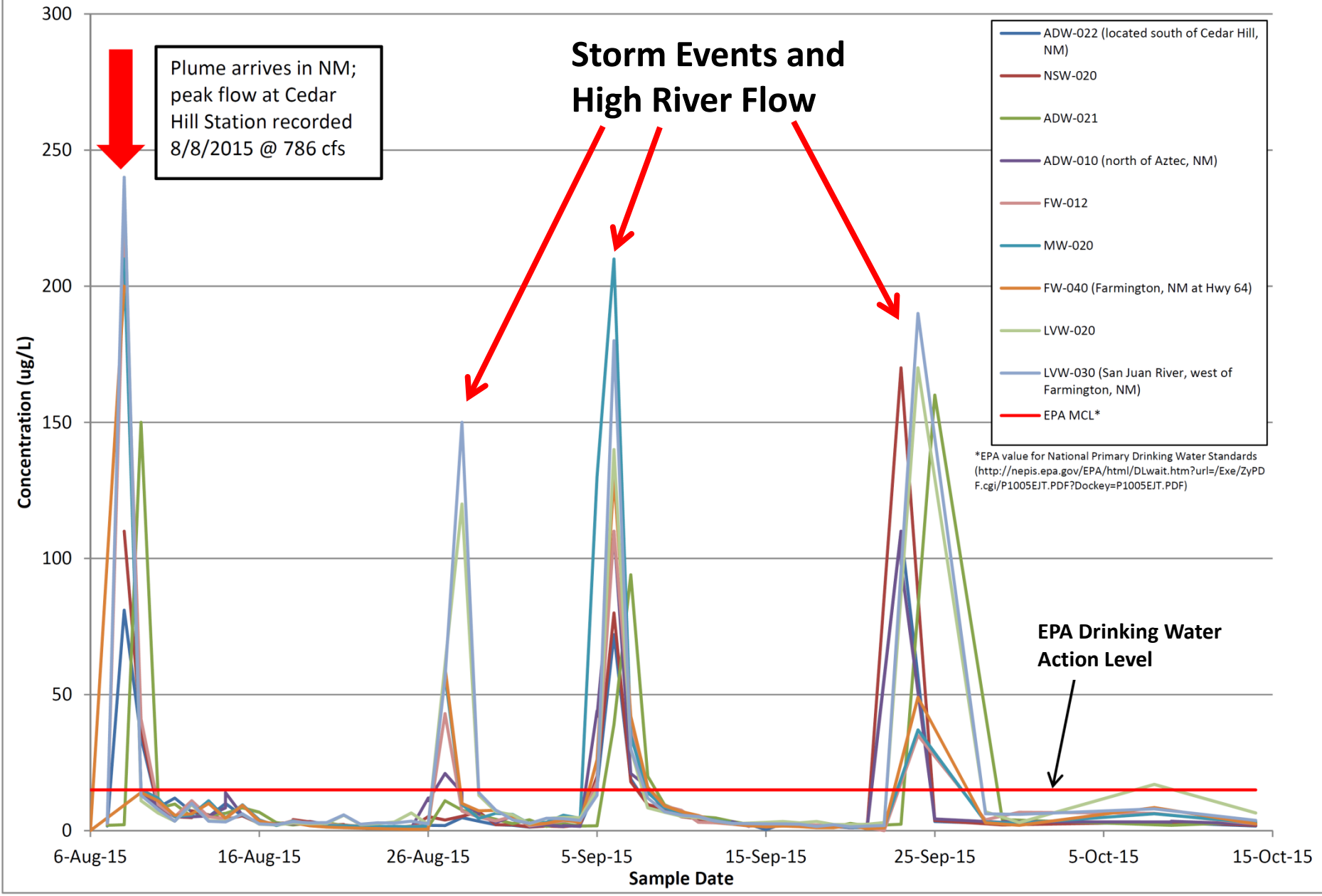
Unsubstantiated EPA Assertion

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

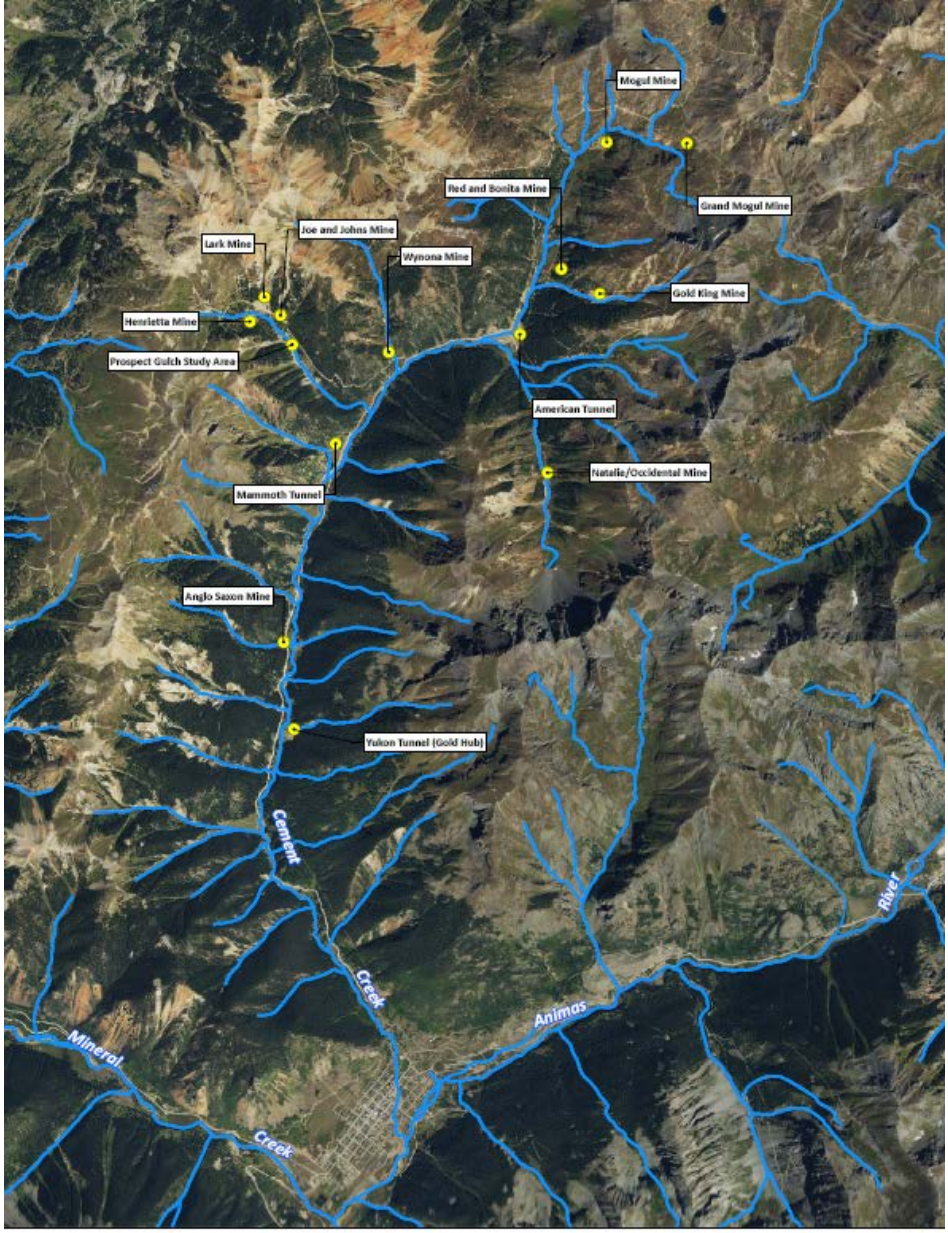


Figure 3. Bonita Peak Mining District
Cement Creek
Source Mine Locations

HRS Evaluated and Other Possible Sources
Perennial Streams
Intermittent Streams

Date: March 30, 2016

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

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

Colorado
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

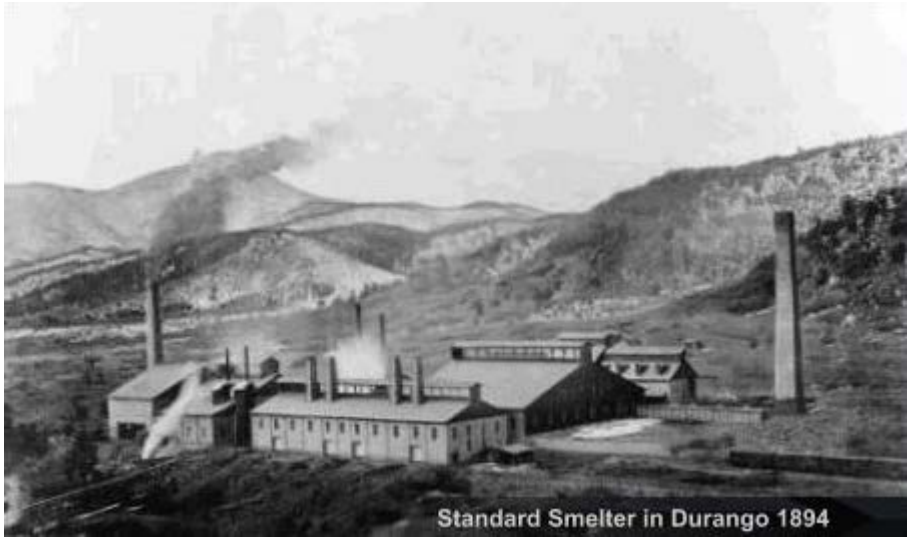
Long Term Monitoring Plan Elements

- 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

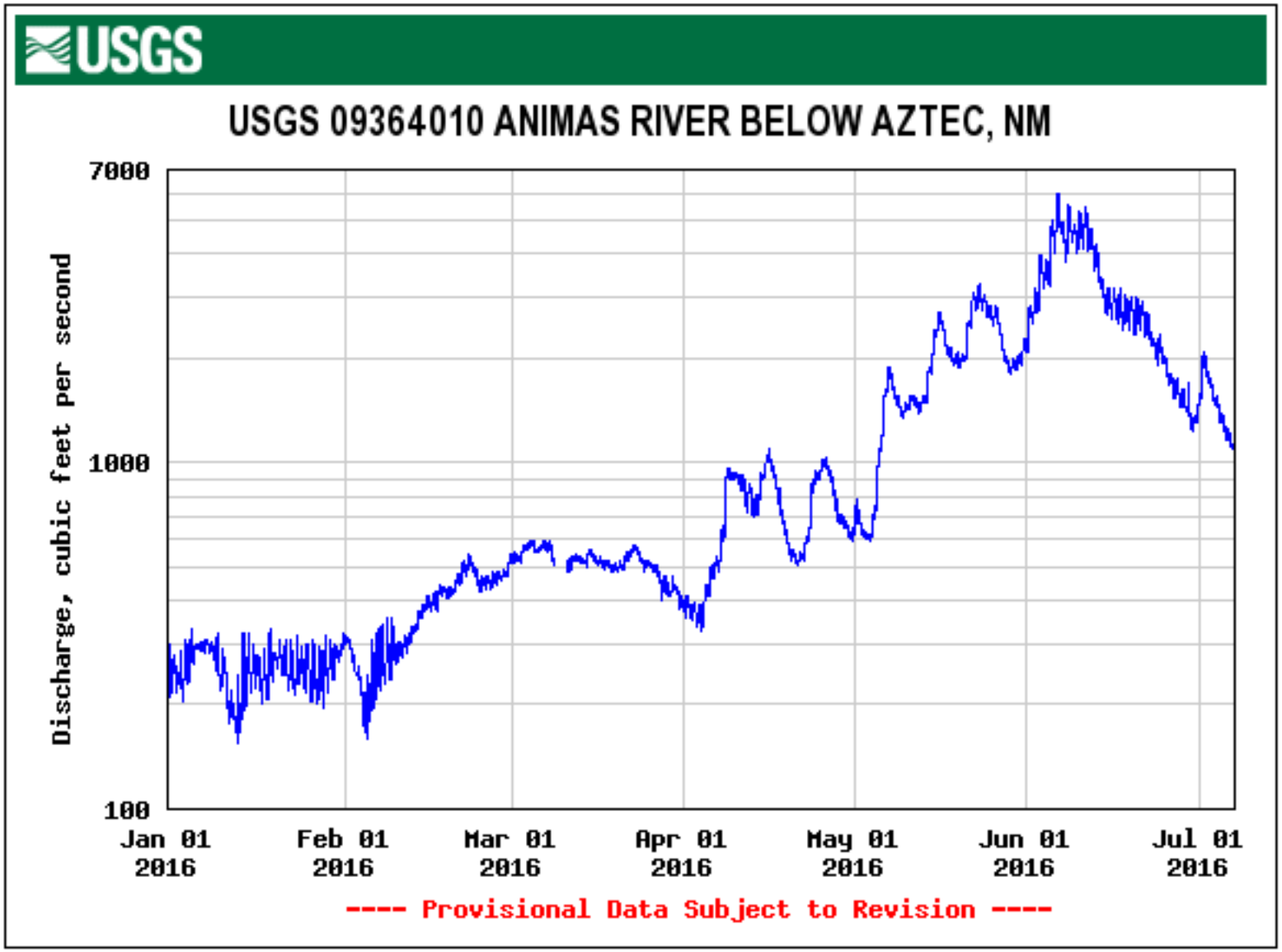
Natural Geological and Legacy Contamination

Ferricrete deposit in Cement Creek

Durango Smelter/Mill (lead, vanadium, uranium)



2016 Spring Runoff in the Animas River

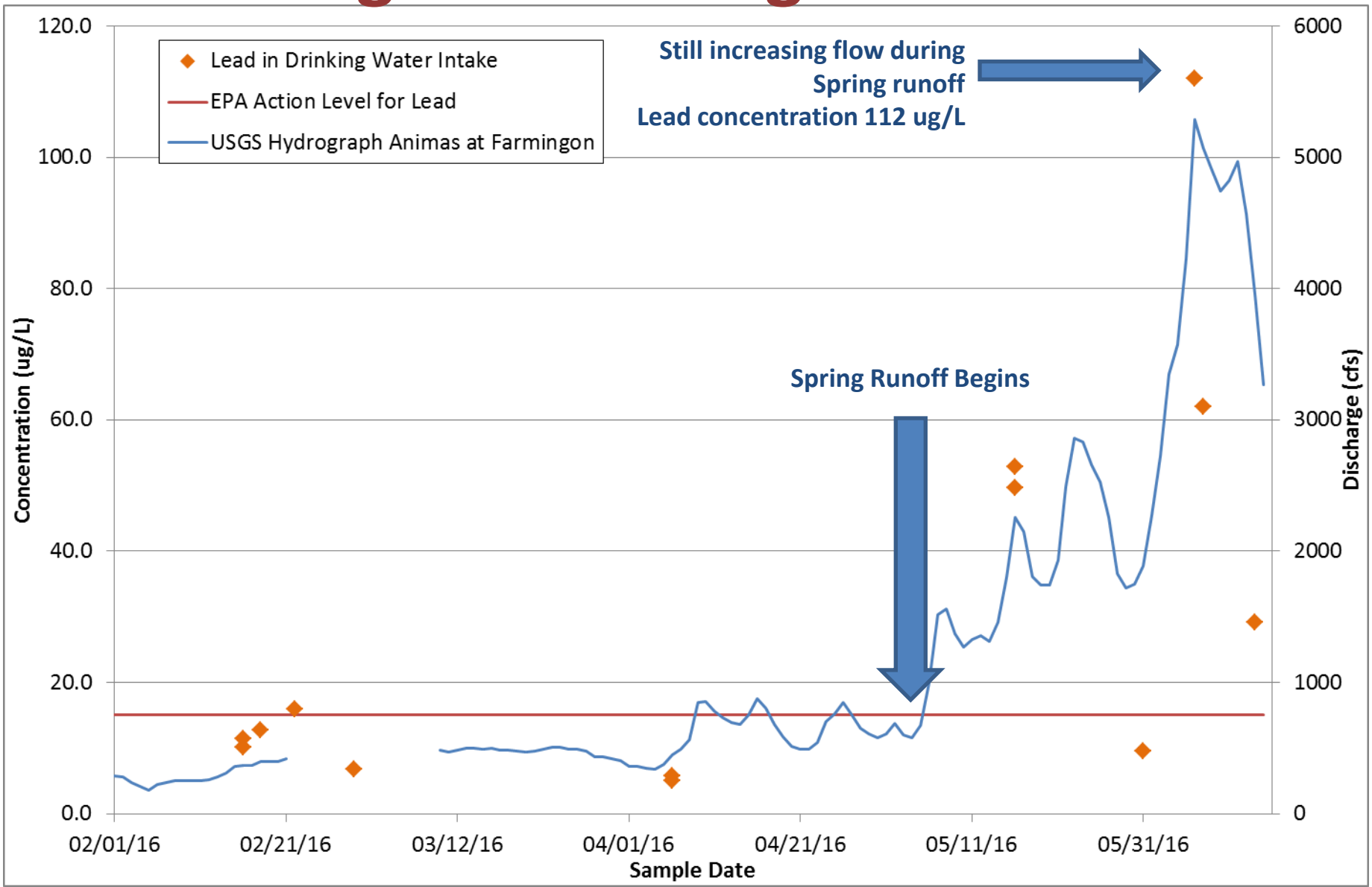


On-Going River Monitoring

1. **Sondes in the river for turbidity, pH, specific cond. and temp.**

2. **Grab samples for lab analysis**

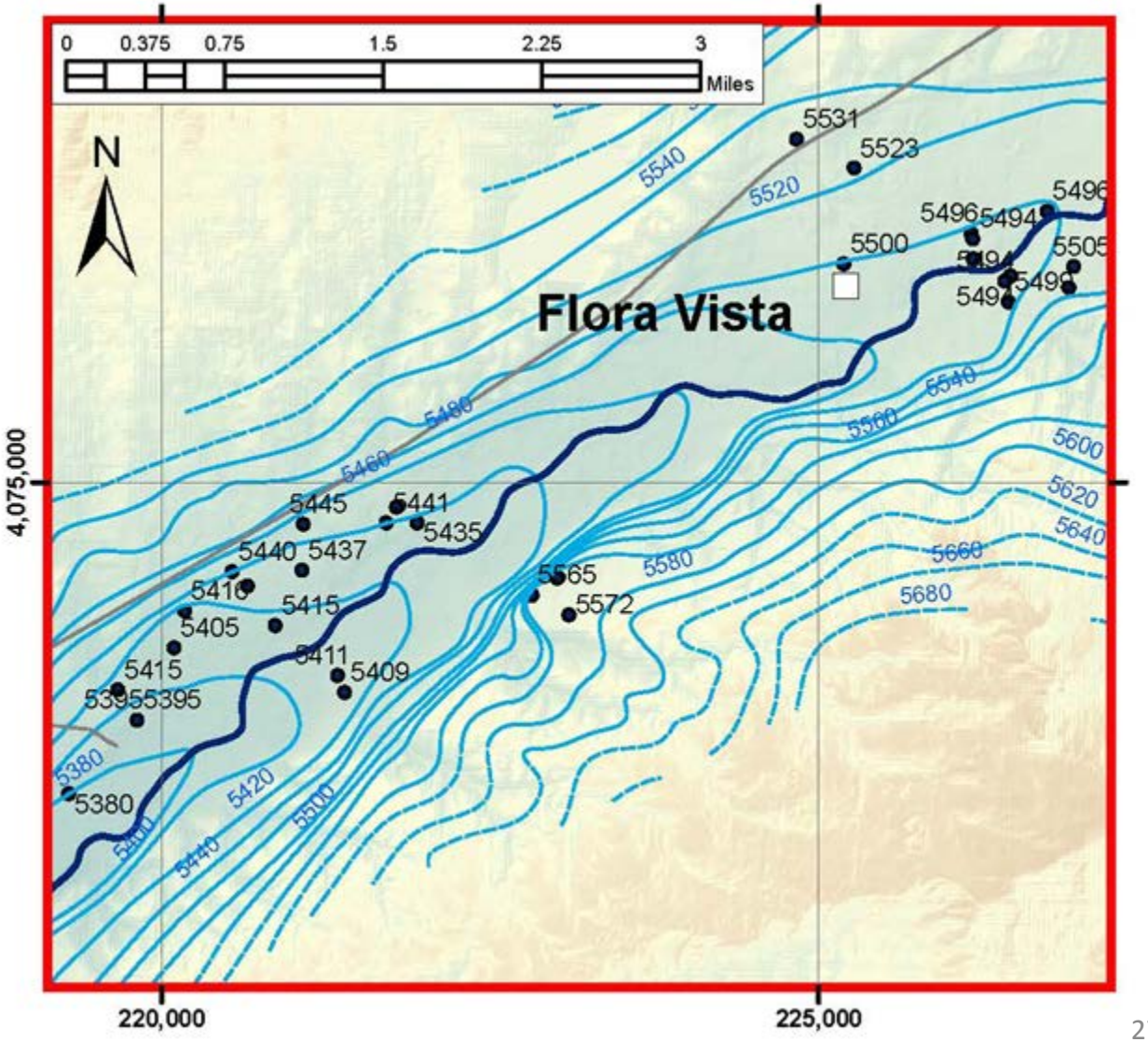
Lead in Animas River at Farmington Drinking Water Intake



Water Table Mapping

Define groundwater flow and aquifer-river interactions

Water levels in 80 wells measured seasonally



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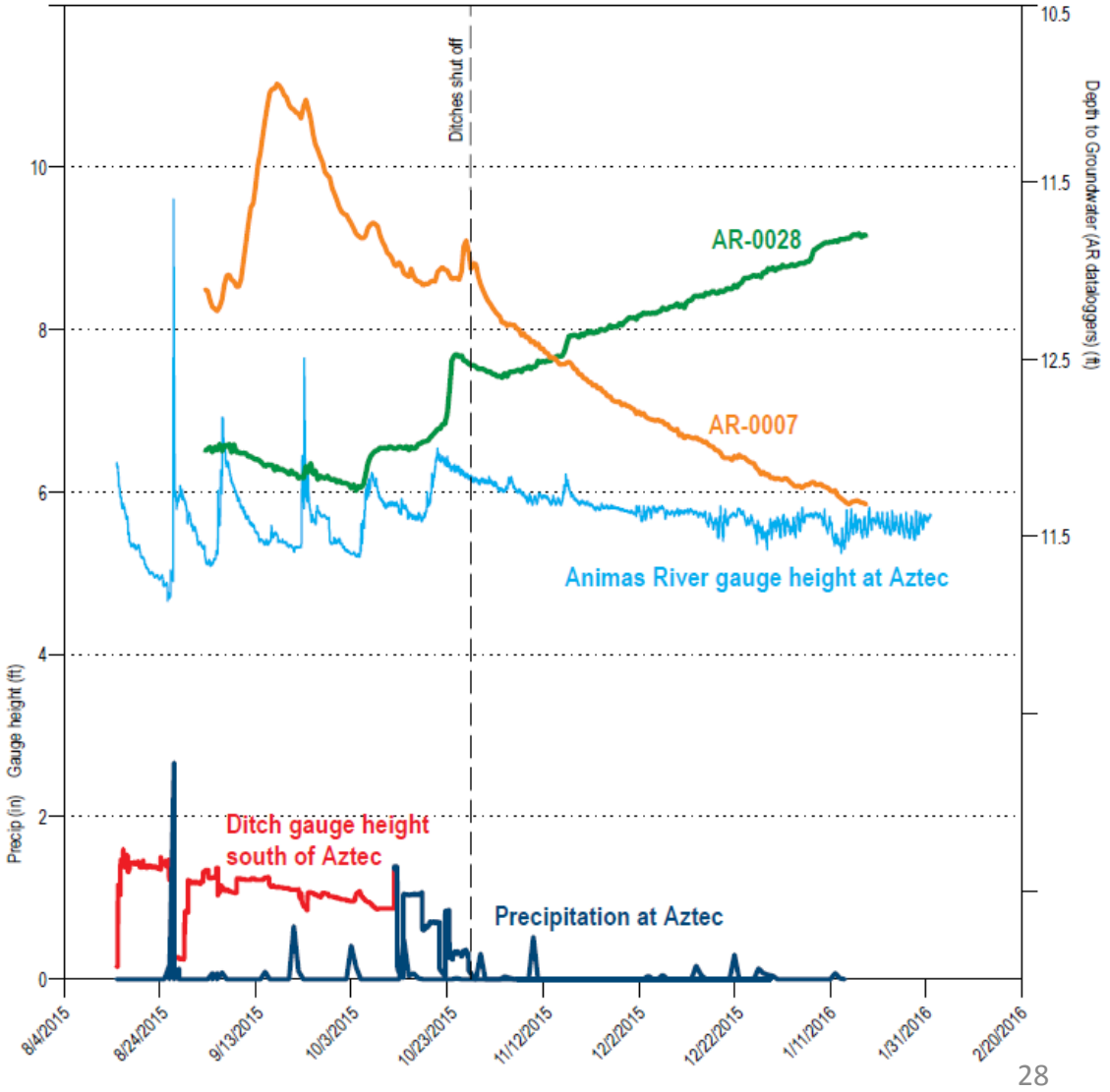
River-Aquifer Interaction

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

Data collected underlines importance of continued monitoring of groundwater.

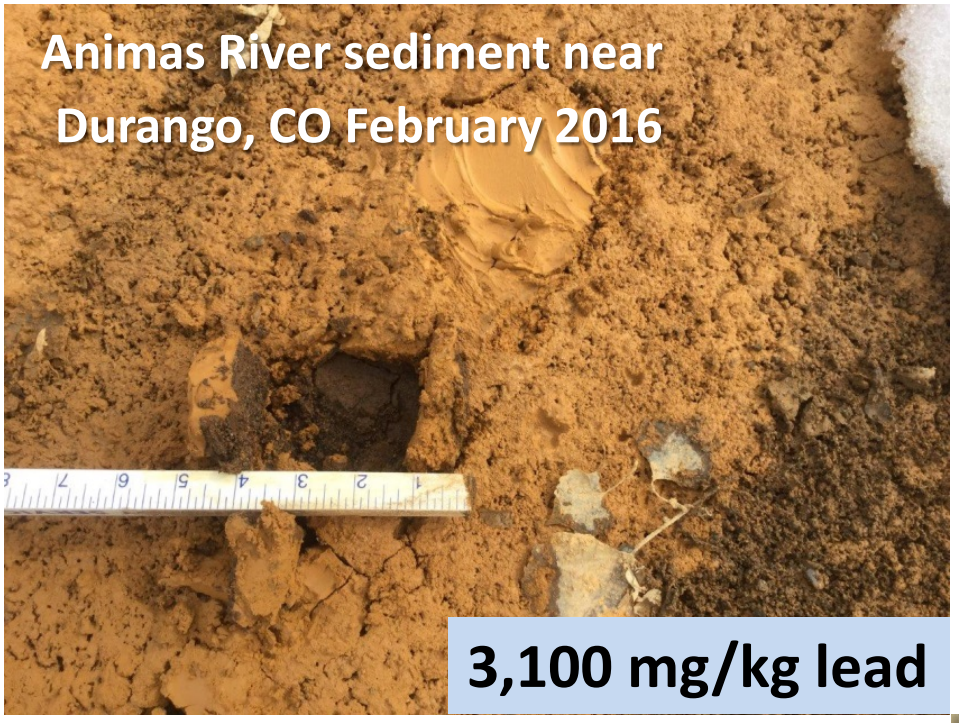


Water-Table Mineralization at Aztec Drinking Water Diversion Channel

2,400 mg/kg lead in mineral layer

Evidence that surface water contaminants entered groundwater near the river

Transport and Fate of GKM Metals



- 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

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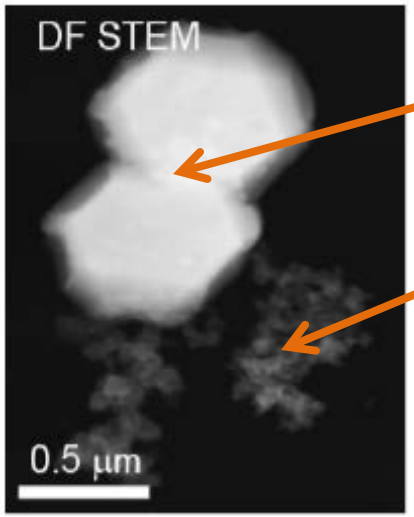
GKM Solids Analysis



Jarosite crystals

Clay-rich material

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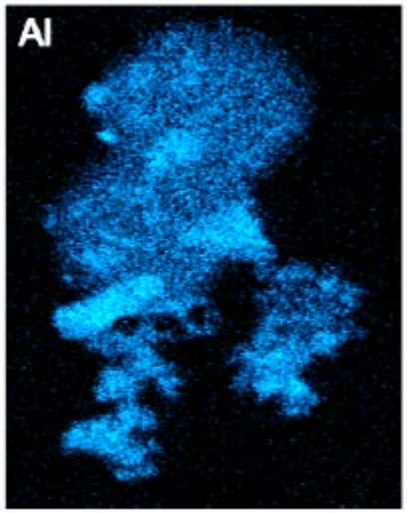

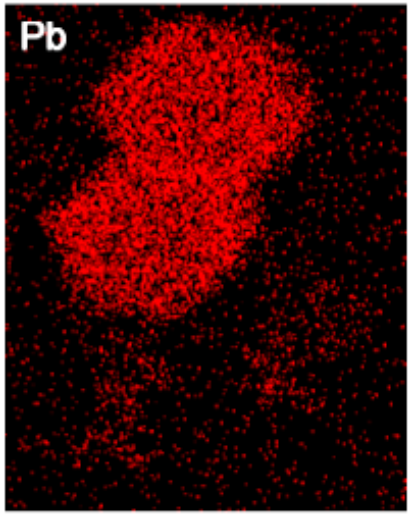

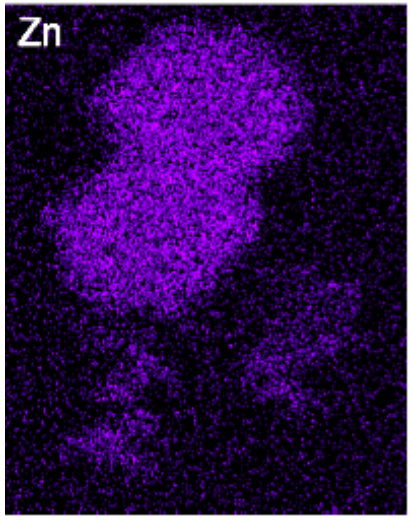

Jarosite grains also contain aluminum, lead and zinc (STEM X-ray)

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