

Protecting the Animas-San Juan Watersheds



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Governor Martinez Directed NMED to Lead the GKM Spill Investigation And Created a Long-Term Monitoring Team



New Mexico's GKM Spill Long-Term Impact Monitoring Team



New Mexico Department of Agriculture



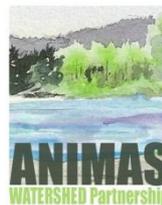
All About Discovery!
New Mexico State University

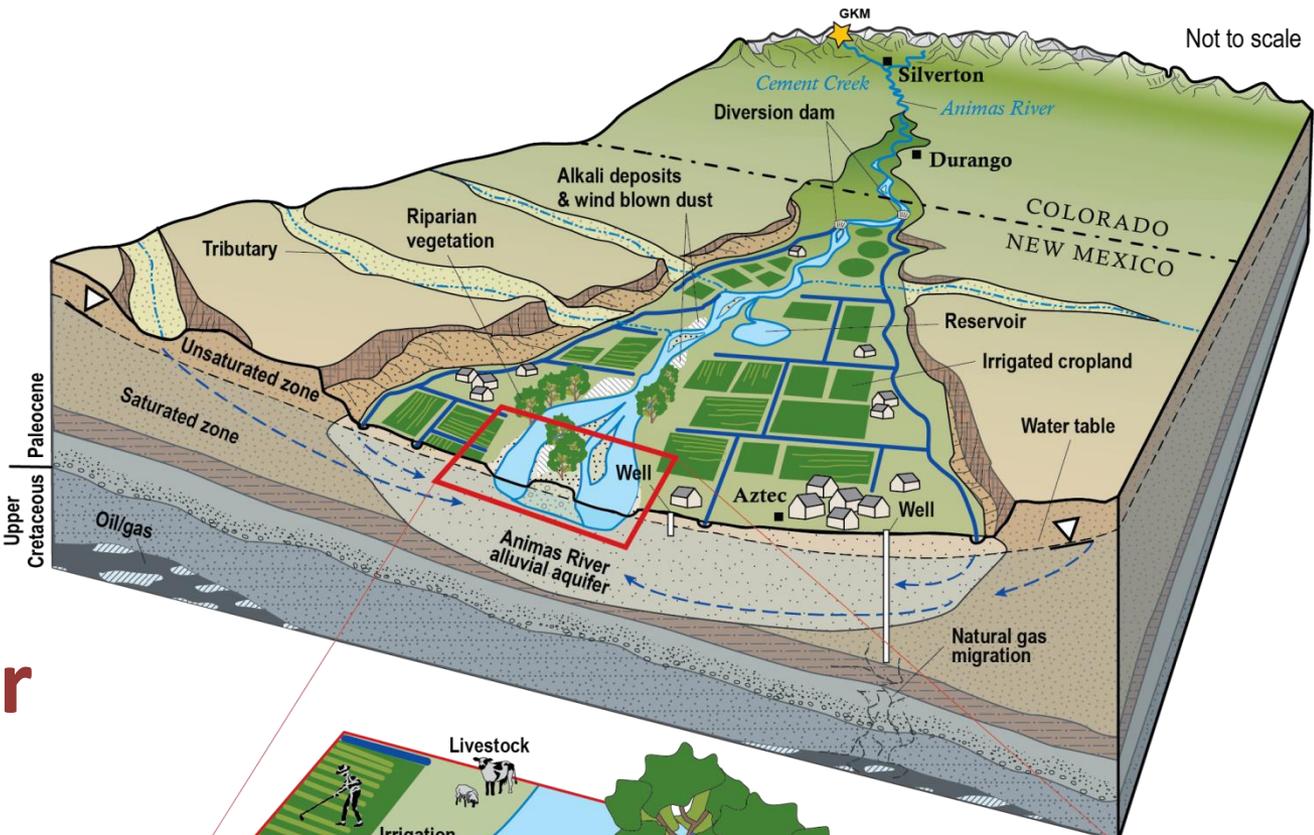


THE UNIVERSITY of
NEW MEXICO

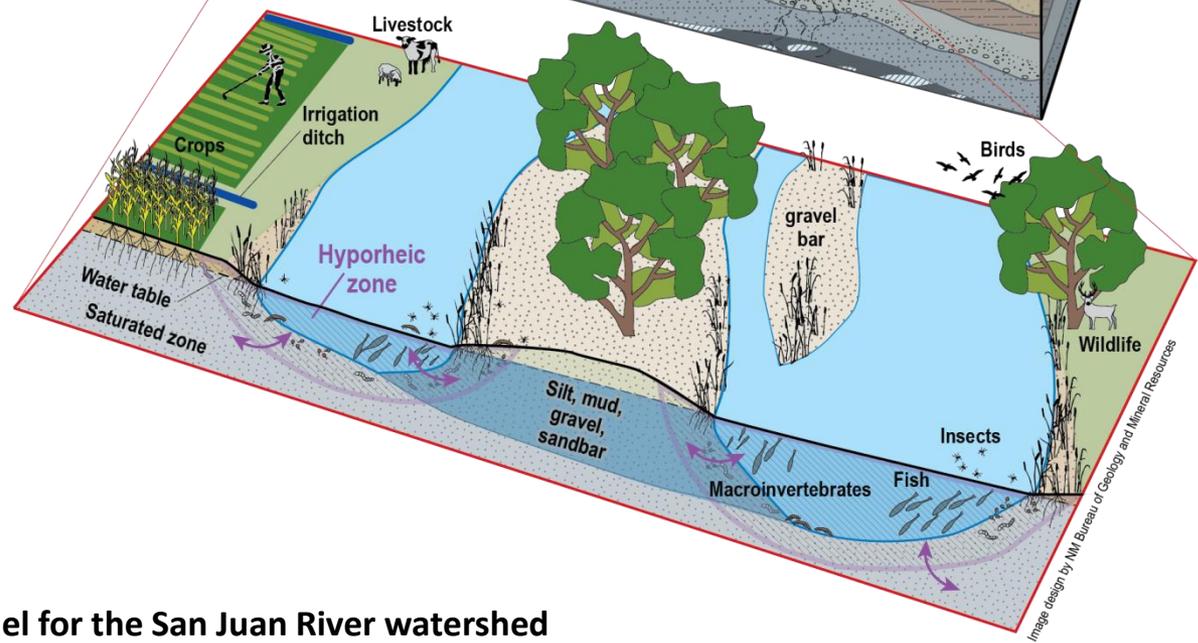


San Juan Soil and Water
Conservation District





Animas River Watershed System



Similar model for the San Juan River watershed

Background Issues

To the extent possible, differentiate between the effects from:

- Natural geologic acid rock drainage
- Legacy mine/mill waste discharges and spills
- August 5, 2015 GKM blowout

**Ferricrete deposit
in Cement Creek**



EPA Statement on Agriculture

“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**

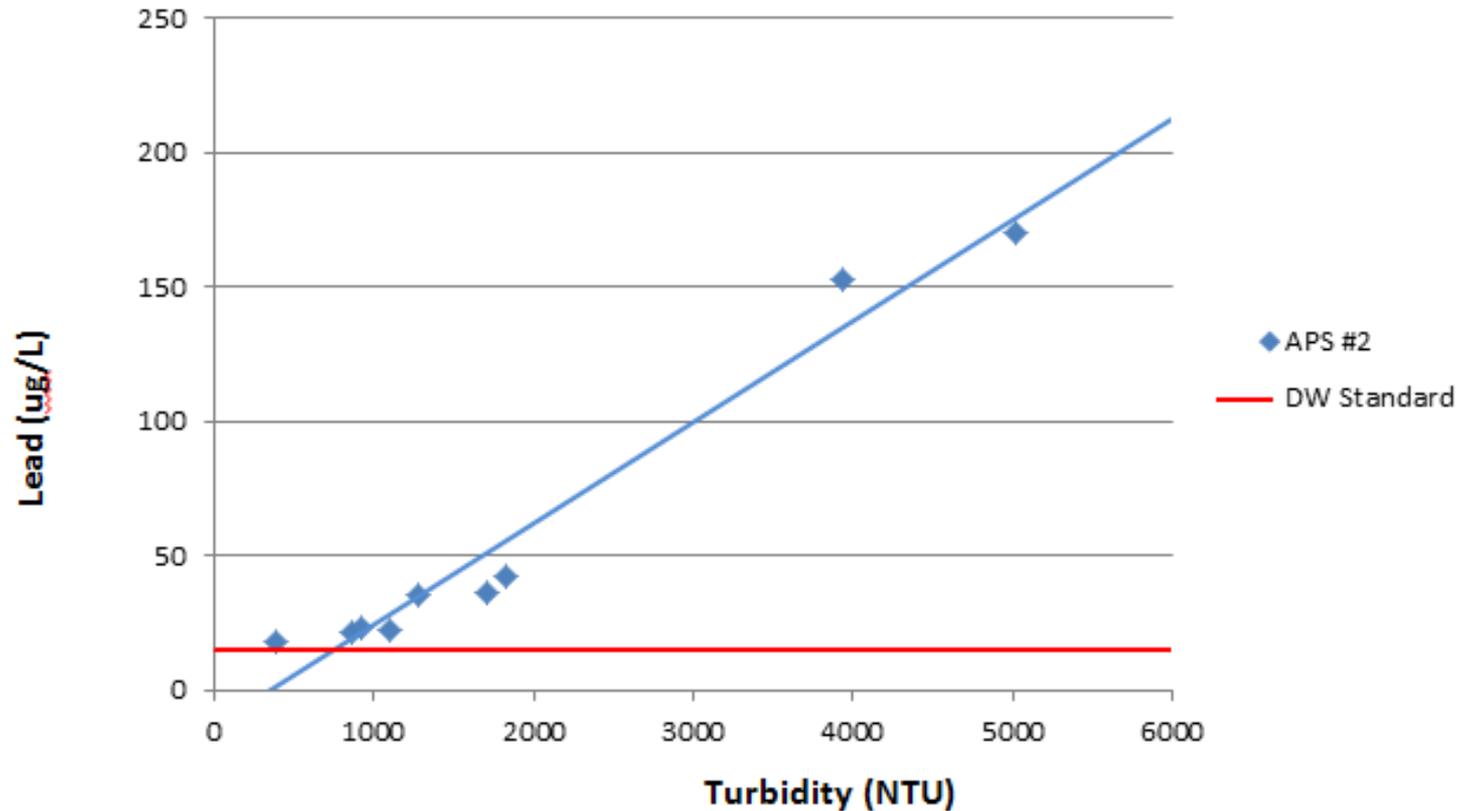
Unsubstantiated EPA Assertion

**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...”

- **EPA has not defined background conditions.**
- **Critical data that undermine this conclusion were excluded from the supporting information that EPA submitted.**
- **The excluded data strongly suggest that metals in surface water and sediment have not returned to pre-event conditions.**

Total Lead and Turbidity in Untreated River Water



City of Farmington monitoring data

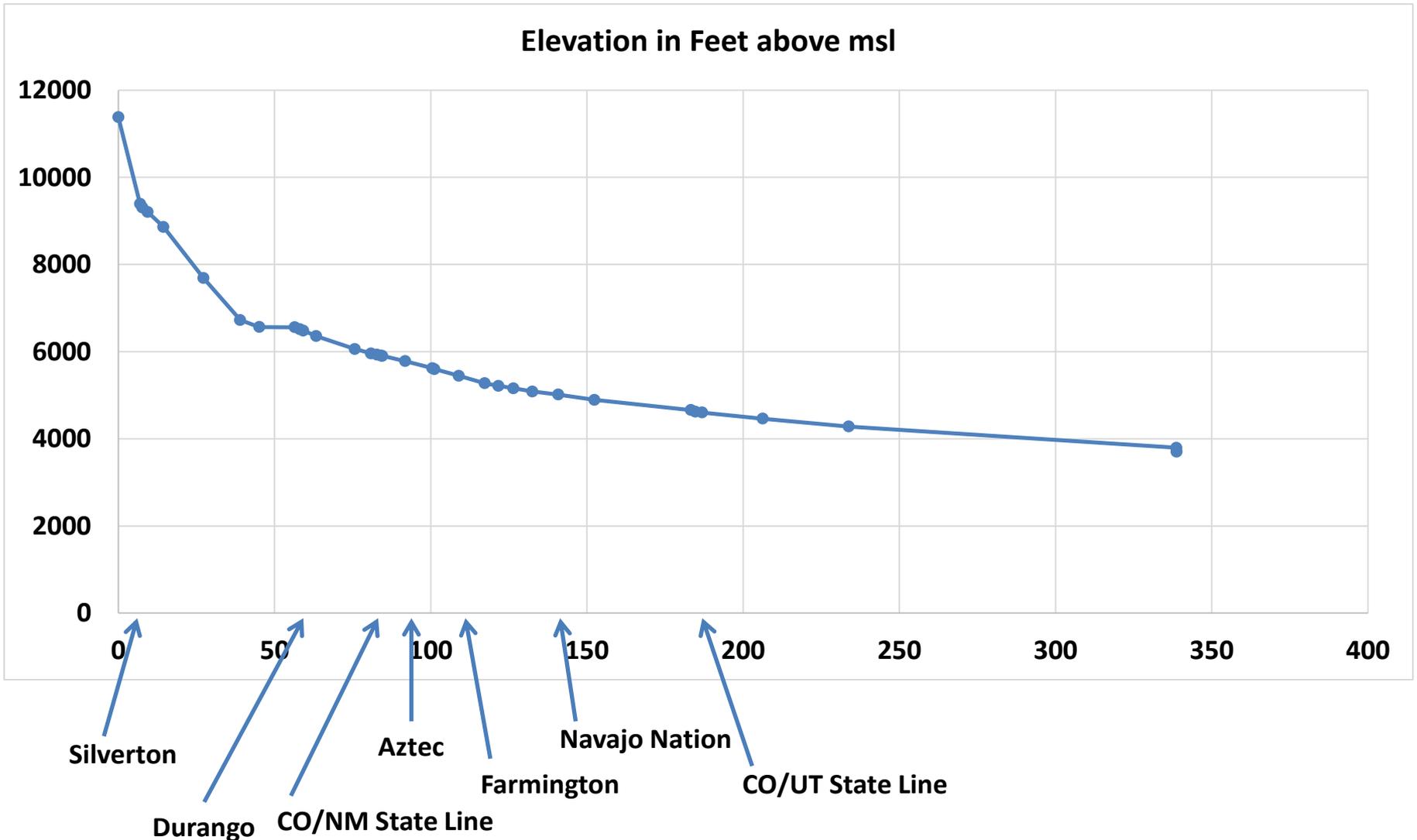
Metals are Stored in River Sediment and Re-Suspended in High-Flow Events



Animas/San Juan Rivers Profile

~GKM to Lake Powell~

Elevation in Feet above msl

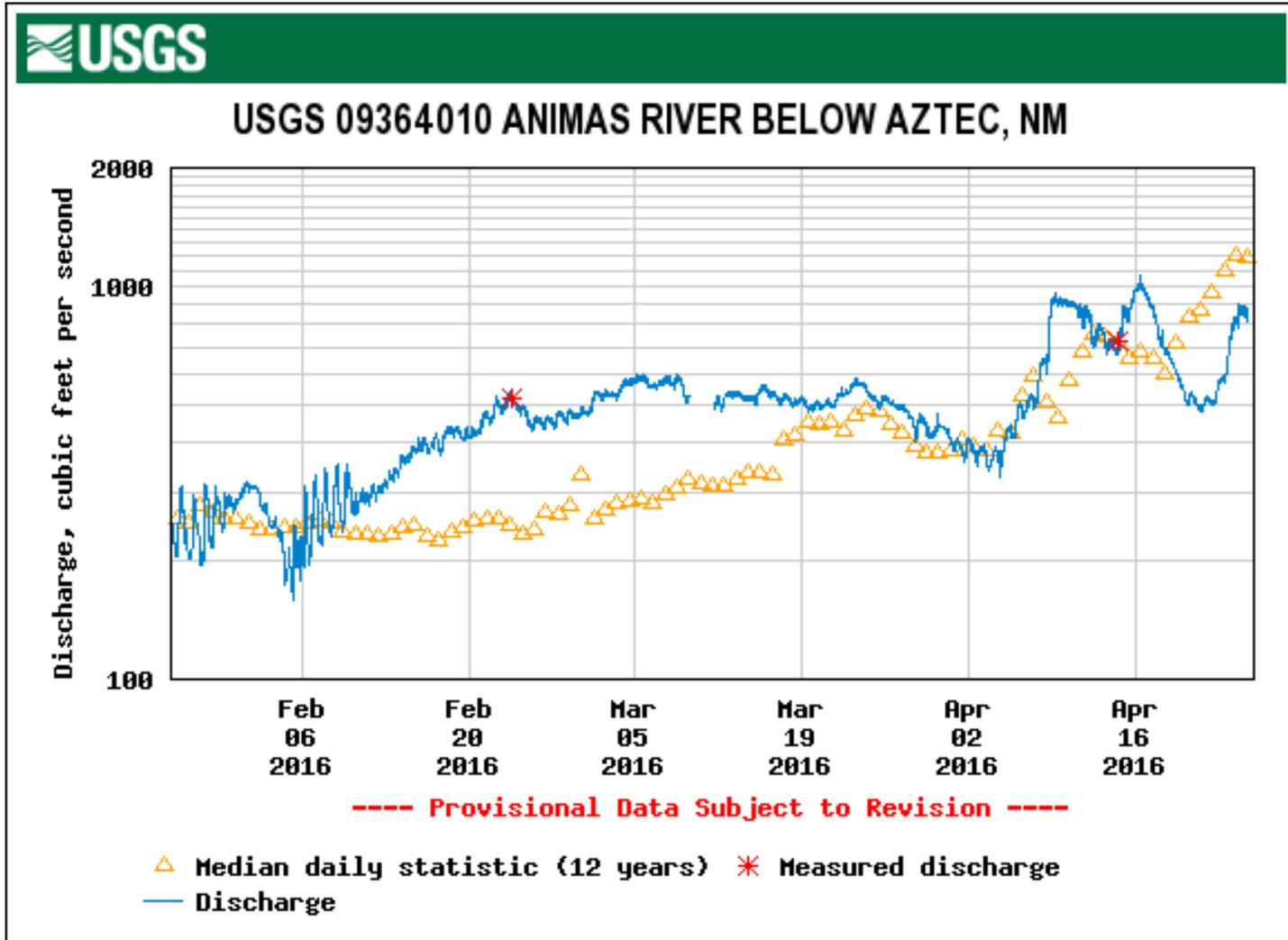


Snowpack at Gladstone, CO

March 7, 2016



90-Day Hydrograph Animas River Below Aztec



Cement Creek Near Silverton

March 7, 2016



Animas River Near Silverton

March 7, 2016



Animas River Sediment Near Durango February 2016



Animas River Sediment Residential Area Near Durango February 2016



EPA Risk Levels for Lead in Sediment

mg/Kg (parts per million)

- EPA developed a 20,000 mg/Kg risk screening level for lead in soil, specific to the GKM spill, that is based only on recreational exposure.
- EPA has been using the 20,000 mg/Kg screening level for comparison with sediment data, while virtually disregarding other risk screening levels designed to protect human health in residential areas as well as plants and wildlife.

EPA Screening Level for GKM Spill	EPA Screening Level for Residential Soil	EPA Screening Level for Plants	EPA Screening Level for Soil Invertebrates	EPA Screening Level for Birds	EPA Screening Level for Mammals	EPA Superfund Cleanup Level (Dallas, TX site)
20,000	400	120	1,700	11	56	500

Private Domestic Wells

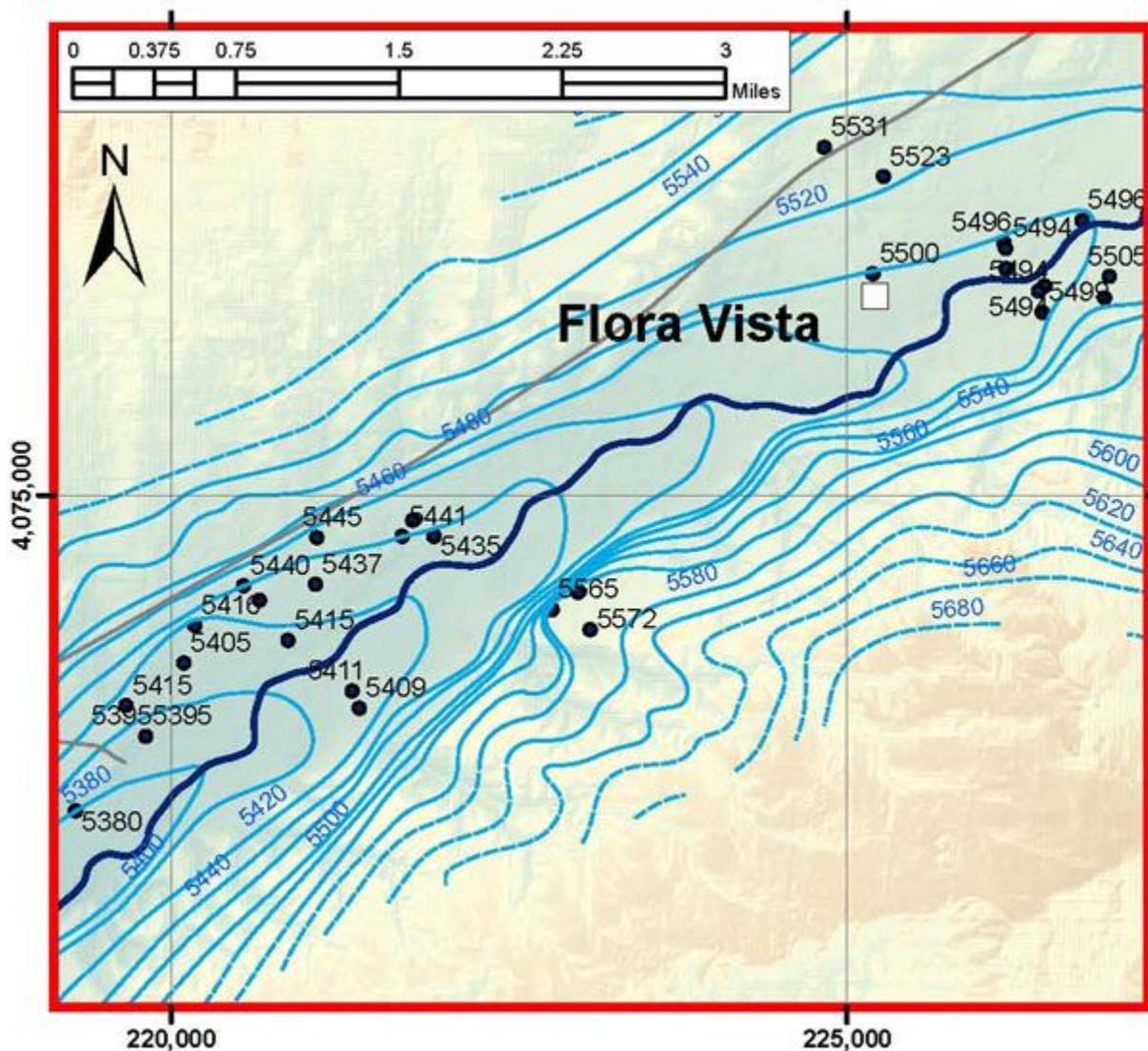


Identify wells that may be under influence of surface water.

Groundwater Elevation Near Flora Vista August 2015

Animas River was gaining water from the alluvial aquifer in August.

Need to monitor aquifer-river hydraulics during spring runoff.



Alluvial Groundwater Quality

Widespread occurrence of manganese and sulfate exceeding aesthetic standards

Domestic water well treatment system



Durango Uranium Mill Monitoring 1958

TABLE V.—Radioactivity of River Mud

Station	Mileage Below Mill	Radioactivity ($\mu\mu\text{c/g}$)*		
		Gross Alpha	Gross Beta	Radium
1	-1.0	18	110	1.7
2	2.0	1,250	1,350	171
3	(Tributary)	17	70	1.5
4	23	395	450	52
5	28	285	430	37
6	59	42	83	7.0

* Dried weight.

TABLE VI.—Radioactivity of Aquatic Biota

Station	Radioactivity ($\mu\mu\text{c/g}$)					
	Algae			Insects		
	Alpha	Beta	Radium	Alpha	Beta	Radium
1	23	450	4.8	30	880	4.2
2	3,910	5,760	390	1,820*	4,110*	71*
3	33	640	4.3	11	430	3.4
4	1,520	2,160	150	1,190	2,260	160*
5	910	2,010	90	360	830	68*
6	120	290	26	75	400	15

* Single result.

Comparison of NMED and EPA Monitoring Plans

Parameter	New Mexico Plan	EPA Plan
Background definition	✓	Partial
Public drinking water quality	✓	✓ EPA funds NMED
Metals accumulation in public water system treatment infrastructure	✓	
Surface water quality		
Base flow	✓	✓
Spring runoff	✓	✓
Storm events	✓	2 total in 2015-2016
Real-time stream field parameters	✓	
Communication/alert system for SW users	✓	
Nutrients and E. coli	✓	
Stream sediment	✓	✓
Lake and reservoir sediment	✓	
Irrigation ditch sediment	✓	
Soil in irrigated fields	✓	
Riverbed and alluvial aquifer interactions	✓	
Solids characterization and reactivity	✓	
Regional water table mapping	✓	
Private domestic well quality	✓	
Radium in solids and groundwater	✓	
Airborne dust	To be determined	
Aquatic algae	✓	
Nutrient processing	✓	
Aquatic invertebrate population	✓	one event in Fall 2016
Aquatic invertebrate tissue	✓	
Fish population	✓	one event in Fall 2016
Fish tissue	✓	one event in Fall 2016
Riparian plants	✓	
Riparian invertebrates	✓	
Wildlife	✓	
Livestock	✓	
Crops	✓	
Human biomonitoring	CDC funds NM DOH	
Ongoing and future discharges	✓	
Citizen Advisory Committee	✓	

Spring Runoff Preparedness Plan

- **Three states, three tribes, several county or municipal agencies cooperating**
- **Emergency operations and Incident Command**
- **First responders will work with environmental agencies**
- **Reverse 911 triggers and messages**
- **River monitoring**
 - **Sondes to provide real time data**
 - **Integrated sampling**
- **Public drinking water monitoring and sharing**
- **Nobody on public system will run out of water, or drink contaminated water**
- **Aquifer and water well monitoring**
- **Contingency for flooding of residential areas**
 - **Well disinfection and NMED testing**
- **Stakeholder training**

Terrero Mine in Pecos, NM Before Cleanup

- Acid rock drainage into Willow Creek
- Periodic fish kills in the Pecos River



Terrero Mine After Cleanup

