Mountain Studies Institute
SAN JUAN MOUNTAINS COLORADO

July 1, 2017

Megan Holcomb, Project Manager
Colorado Water Conservation Board
Department of Natural Resources
1313 Sherman Street, Room 718
Denver, CO 80203

RE: Final Report for WSRA Grant – POGG1 2016-794 -- Animas River Community Forum – Education and Outreach in the Southwest River Basin

Dear Ms. Holcomb:

We are pleased to present the Animas River Community Forum's (Forum) final report for the 2016 Water Supply Reserve Account (WSRA) Grant we were awarded last year. Grant identification information is provided below. We are grateful for the opportunity to serve the Animas River communities through your support.

Order #: POGG1 PDAA 20160000000000000794
POGG1 #: POGG1 2016-794
Basin: Southwest
Line #: 1
Description: WSRA GRANT PDAA 2500 Animas Riv Comm Forum Ed & Outreach
Service From: 06/09/16
Service To: 02/28/17
Grant Amount: $37,850.00
Schedule: NTP to 12/31/2016*****
****** *Reflects the "Target Start" and "Target Completion" dates submitted in the grant application; Actual completion date was June 30, 2017.*

We made tremendous progress in the way that our communities rallied together in response to the Gold King Mine spill to organize and collaborate in new ways. We have learned much from these last two years and we are looking forward to applying these renewed relationships to meet future challenges.

Please don't hesitate to call Shannon Manfredi, our coordinator at (970) 799-0616 or me, MSI's Executive Director of the Mountain Studies Institute, i.e., the Forum's fiscal agent (970) 387-5161.

Respectfully submitted,

M. Bidwell

Marcie Bidwell

cc: Mike Preston, Southwest Basin Roundtable

Mountain Studies Institute

SAN JUAN MOUNTAINS COLORADO

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WSRA-2016 FINAL GRANT REPORT

Animas River Community Forum

Education and Outreach in the Southwest River Basin

PREPARED BY:

AnimasRiverCommunityForum

FOR SUBMISSION TO:

THE COLORADO WATER CONSERVATION BOARD

Acronyms

ARCF	Animas River Community Forum
ARSG	Animas River Stakeholders Group
AWP	Animas Watershed Partnership
CAG	Community Advisory Group
CDPHE	CO Dept. of Public Health & Environment
CPW	CO Parks and Wildlife
CWCB	Colorado Water Conservation Board
DRMS	Division of Reclamation, Mining and Safety
EPA	Environmental Protection Agency
MGAT	Monitoring Gaps Analysis Team
MSI	Mountain Studies Institute
NPL	National Priorities List
Region 9 EDD	Region 9 Economic Development District
SJBPH	San Juan Basin Public Health
SJCPH	San Juan County Public Health
SJCWC	San Juan Clean Water Coalition
SWCD	Southwestern Water Conservation District
TAG	Technical Assistance Grant
TASC	Technical Assistance Services for Communities
TU	Trout Unlimited
USGS	United States Geological Survey
WSRA	Water Supply Reserve Account

On behalf of the Animas River Community Forum, we would like to express our sincere appreciation to the Colorado Water Conservation Board for supporting our efforts in the Animas River watershed.

The Animas River Community Forum (ARCF) is a community group that formed in response to the Gold King Mine spill in August 2015 to develop a positive unified response, recovery actions, and cohesive solutions for water quality in the Animas River. Our group includes participation from diverse Animas River stakeholders including conservation organizations, businesses, public health departments, emergency response teams, scientists, local elected officials, and local, state, tribal and federal government agencies. As stated in our 2016 grant application, ARCF's overall objective is to facilitate recovery by:

- ✓ promoting communication, coordination and collaborative action;
- ✓ fostering public confidence; supporting resiliency in our communities; and
- ✓ enhancing planning, improved public safety, and health for the future all while honoring the institutional authorities and decision making of governmental and community organizations.

Below we have detailed our accomplishments based on the four tasks outlined in our 2016 grant application, and included photos and attachments to give color to our story.

Task 1 – Gold King Mine Spill Long-term Solutions will facilitate dialog with ARCF participants, elected officials and stakeholders to evaluate lessons learned, share information, inform members of the recovery and opportunities, and facilitate important discussion regarding potential actions and legislation.

Task 1 Accomplishments:

A. ARCF Partners provided mine-relate information to local governments and stakeholders in the Animas watershed: An important development in the region in 2016 was that local governments, including San Juan County and Silverton, encouraged adding the Bonita Peak Mining District to the National Priority List for Superfund designation. ARCF Partners prepared and disseminated mine-related information to provide history and context to local governments and stakeholders exploring long term strategies, including:

- ✓ Map and explanation of "High-ranking Draining Mines and Waste-Rock piles,"
- ✓ Overview of "Legacy Mine Work Remediation," and
- ✓ Summary of "Possible Regulatory Pathways," including Superfund Designation and Good Samaritan Legislation.

This information (see Appendices A and B) was presented at Forum Meetings, and at meetings in Silverton/San Juan County with the EPA. Additionally, it was disseminated to the local and tribal governments in Colorado (i.e., County Commissioners, town Managers and tribal representatives), and made available for use by the local jurisdictions to support their negotiations and correspondence with State and Federal Agencies and elected officials. On September 9, 2016, with support from local and Colorado state government, the Bonita Peak Mining District was added to the National Priorities List of Superfund sites (NPL).

Lead ARCF Partners included: ARSG, CDPHE, DRMS, USGS, San Juan County, Town of Silverton, La Plata County, MSI and SJCWC

B. **ARCF coordinated an EPA Presentation on Superfund Community Resources:** During the June 2016 ARC Forum Meeting held in Silverton, the EPA presented details regarding three Superfund resources available to communities: Community Advisory Groups (CAG), Technical Assistance Grants (TAG), and Technical Assistance Services for Communities (TASC)
   - ✓ **Silverton and San Juan County** utilized the TASC to secure a ground water hydrologist technical advisor.
   - ✓ **La Plata County:** After the EPA presentation, Forum Partners met to discuss the merits and effectiveness of these resources to address downstream community needs. They determined at this time (July 2016), La Plata County already had access to expertise and resources (e.g., ARSG, DRMS, USGS) with more site specific knowledge of the existing conditions and challenges, than could be gained through these EPA resources. This decision was also influenced by the procedural and administrative requirements tied to the CAG, TAG and TASC, in that, the cost—both in time and to manage the resources would be more than would be gained. However, these resources can be requested at any time during the life of the BPMD superfund site; hence, there may be a specific need in the future when it would make sense to pursue one of them.

   Lead Forum Partners included: EPA, ARSG, SJCWC, AWP, SJBPH, and San Juan and La Plata Counties

C. **Legislative Support for Reimbursement:** Local representatives for Senator Bennet, Senator Gardner, and Congressman Tipton (i.e., participating Forum Partners), were kept informed of local government reimbursement challenges during ARCF bi-monthly meetings. Given the outstanding costs still to be reimbursed one year after the GKM spill, a group of bipartisan senators introduced an amendment to the Water Resources Development Act (WRDA) that included measures to expedite reimbursement of emergency response costs assumed by states, local governments and tribes impacted from the spill (see Appendix C-Bipartisan Group of Senators Introduce Measure to Expedite Gold King Mine Spill Recovery press release). As of April, 2017, San Juan County has been reimbursed $350,887 of the $357,365 they requested, and *La Plata County has been reimbursed for all costs incurred*, i.e., $208,709.

Task 2 – Community and Stakeholder Education: provide venues for the community and stakeholders both within the basin and statewide to learn from the Gold King Mine spill and benefit from the opportunities to learn about watershed risk, response, and recovery.

Task 2 Accomplishments:

A. **Animas River Early Notification and Alert System:** Forum Partners worked together after the incident to develop an early notification plan and alert system on the Animas River & had the system in place by spring 2016 to capture spring runoff levels. Additionally, the Forum Partners' collective efforts secured placement of two additional USGS gauges in the upper headwater reaches.

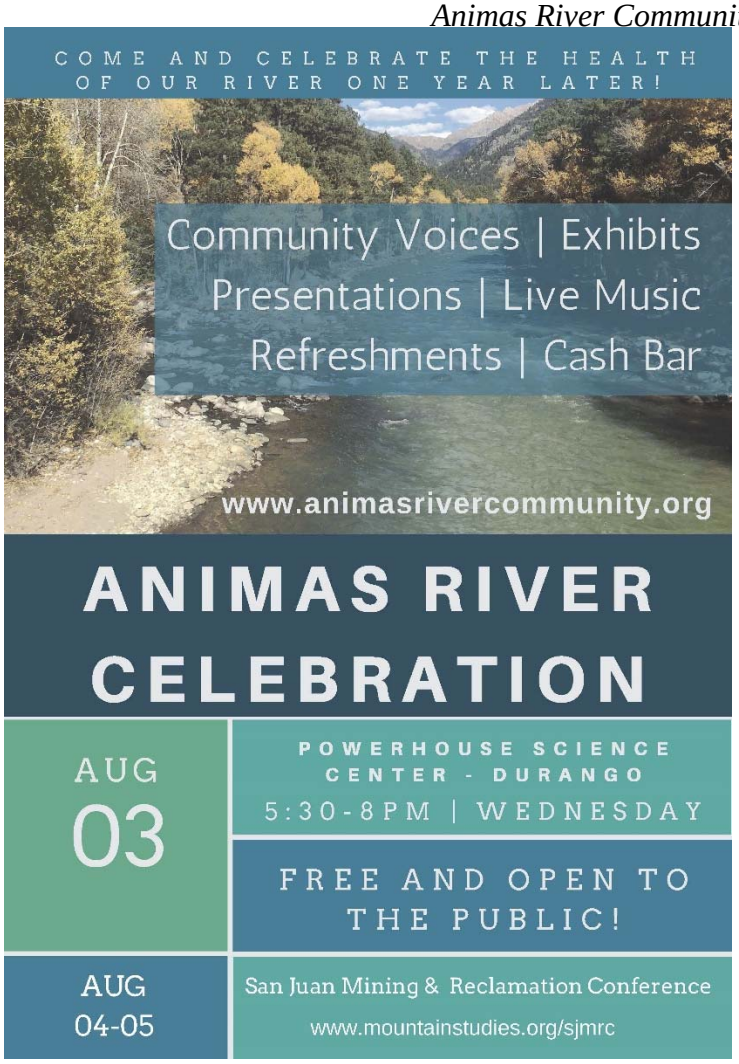
Lead Forum Partners included: *La Plata and San Juan County OEM, SJBPH, SJCPH, Town of Silverton, City of Durango, Southern Ute Indian Tribe, Ute Mountain Ute Indian Tribe, CPW, DMRS, USGS and Colorado Division of Homeland Security and Emergency Management*

B. **River Information Collaboration:** The ARCF Partners collaborated to develop and disseminate information addressing specific community concerns. During the first spring run-off after the Gold King mine spill, there was heightened public awareness and concern about the risk associated with use and exposure to river water. ARCF Partners, hosted Five (5) Spring Events prior to Spring Runoff including:

- ✓ April 7, 2016: The Animas Watershed: A Community Health Update hosted by SJBPH
- ✓ April 28, 2016 Public Mtg. hosted by SJBPH, MSI, CPW, CDPHE, OEM
- ✓ May 26, 2016 Public Mtg. hosted by MSI, City of Durango, SJBPH
- ✓ June 4, 2016 Spring Forum hosted by AWP
- ✓ June 6, 2016 Animas River Days-Conservation Tent hosted by AWP, MSI, TU, SJCWC, SJBPH

The meeting formats varied, but in general included a mix of presentations and open house style with information stations and opportunities to talk w/agency representatives. On average each meeting had approximately 40 attendees.

Lead Forum Partners included: *SJBPH, SJCPH, MSI, CPW, CDPHE, City of Durango, La Plata & San Juan County OEM, SJCWC, TU AWP, and CPW*



C. **Animas River Celebration—Aug. 3, 2016:** ARCF hosted an Animas River Celebration One Year Anniversary Event in Durango: In conjunction with the ***6th Annual San Juan Mining and Reclamation Conference***, the ARCF hosted an "Animas River Celebration-One Year Later" event. More than 100 people attended the event, which included opening remarks from La Plata County Commissioner Westendorff, and brief statements from agricultural, recreation, and business sector representatives regarding the impact to these sectors and their perspective going forward. The event also included informational tables hosted by five watershed partnerships in Colorado and New Mexico, food, drink and live music.

D. **San Juan Mining and Reclamation Conference—Aug.3-5, 2016:** In addition to the ARCF sponsoring the 1-Year Anniversary event/Kick-off event for the conference, the ARCF Coordinator served on the Conference organizing committee, and promoted the conference through the Forum's network of partners.

E. **Super FunDays—Aug. 6, 2016:** ARCF supported "Super FunDays" Silverton's One Year Anniversary Event by disseminating event announcements and river health and safety handouts at an event information table.

August 6th, 2016

All events at Memorial Park in Silverton

Live Local Music & Field Day Activities
10 a.m. Race Pre-Registration
10:15 Musical Performances Start
11:00 5K Color Run Starts!
11:30 – 2 Party in Memorial Park

And so much more!

- **Water Slide**
- **Old-Fashioned Games**
- **Life-Size Foosball**
- **Bouncy House**
- **Interactive information booths from:**
  - Environmental Protection Agency
  - CO Dept. of Public Health & Environment
  - San Juan County Public Health
  - Trout Unlimited
  - Animas River Community Forum

F. Disseminating Lessons Learned in Colorado and New Mexico.

The ARCF appreciates CWCB's willingness to extend our 2016 grant period. The extension has provided the time needed to disseminate lessons learned from the GKM spill to other communities with legacy mining in their watersheds. As of June 30, 2017, the ARCF has presented at one conference in Colorado and one in New Mexico; and is scheduled to present at the Sustaining Colorado Watersheds Conference in Avon, Colorado, October 10-12, 2017. Below are the two conferences that ARCF recently presented at; the conference programs are attached in Appendix D. ARCF would happily provide the PowerPoint presentations to the CWCB, if desired.

- 7th Annual San Juan Mining and Reclamation Conference in Ouray, Colorado (May 23-26, 2017): *Unity as a Response to Disaster: the Animas River Community Forum.*
- 2nd Annual Conference on Environmental Conditions of the Animas and San Juan Watersheds with Emphasis on Gold King Mine and Other Mine Waste Issues in Farmington, New Mexico (June 20—22, 2017): *Communicating River Data to the Public: the Animas River Community Forum Monitoring Gaps Analysis Committee.*
- The ARCF has also been invited to present at the).

Task 3 – Monitoring and Data Gaps Assessment: identify data and information needs for assessing the current state of the river and prioritize the need for additional monitoring and assessment.

Task 3 Accomplishments:

The Monitoring Gaps Analysis Team (MGAT) formed to address this task and has maintained regular monthly meetings since November 2015. The objective of the MGAT is to foster relationships, increase efficiency in sharing data resources among the different groups active in the watershed, and to identify data gaps. The Team has been led by Dr. Barb Horn of Colorado Parks and Wildlife and Ann Oliver of Animas Watershed Partnership. Over 10 ARCF Partners participate regularly in the monthly meetings. Below is a summary of their accomplishments to date.

A. **Community Survey:** A community survey, developed by the MGAT, was circulated to better understand the community's perspective about the health and resiliency of the river, as well as to understand the questions or type of information the public is seeking. Over 180 people participated in the survey, and Dr. Chara Ragland (ARCF Partner) produced a report summarizing the results (see Appendix E, Community Survey Report). Based on the survey results, the MGAT identified 10 questions of interest to the public that the MGAT is currently answering, utilizing data gathered through the monitoring inventory and data swap (described below). In 2017, the MGAT will produce a "Community Report" that responds to the questions identified in the Community Survey.

B. **Monitoring Inventory:** Through the collective knowledge of Partners, the MGAT developed a list of entities collecting monitoring data along the entire stretch of the Animas River. These entities were encouraged them to describe the parameters of their monitoring efforts, utilizing a web-based excel spreadsheet. The inventory has provided the most complete picture of the current monitoring activities on the Animas. Additionally, the MGAT's has used the inventory to assess the available existing data relative to appropriately answering community questions and validating river conditions. Utilizing multiple data sources to validate river conditions is of critical importance because the public's lack of trust, particularly with regarding to official statements about river health and safety, was one of the main themes that emerged from the Community Survey.

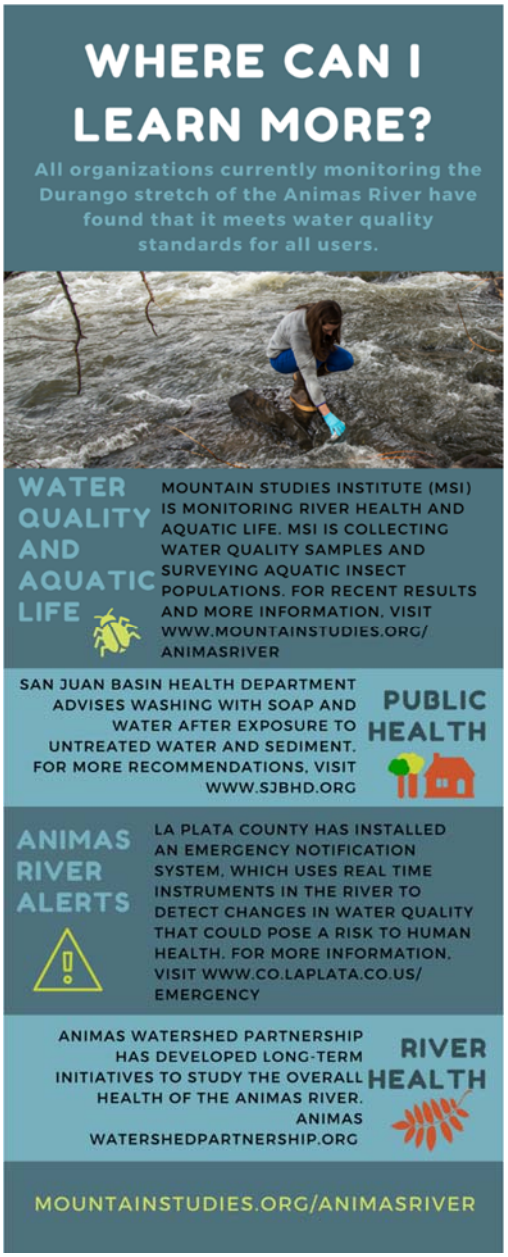
C. **Data Swap:** The MGAT hosted a ***Data Swap*** on October 21, 2016 which was attended by 18 different entities monitoring the Animas River—*a rather successful participation rate, given that "data-wonks" tend to be very protective of their data, for fear of it being used out of context.* Furthermore, the participation at the Data Swap is significant because it has laid the foundation for data-sharing and the broader goals of the MGAT to:
   - ✓ develop a monitoring collaboration and information system that makes relevant data available, to keep our community resilient (avoid crisis) and able to respond to a crises (beyond the Gold King Mine spill);
   - ✓ use existing resources and efforts to build community capacity; and
   - ✓ provide the right information, to the right people, at the right time, for timely response and to retain our quality of life.

Task 4 – Project and Coalition Management and Reporting: hire a coordinator to guide the group, manage actions and goals, and monitor funding, reporting, impact, and in-kind contributions.

Task 4 Accomplishments:

With CWCB support, the ARCF hired a coordinator, Shannon Manfredi, to help organize the ARCF collective efforts and coordinate sharing of information among the Partners. As the ARCF Coordinator, Shannon has:

- ✓ facilitated correspondences and information sharing among Forum members through email updates, web postings, and bi-monthly meetings;
- ✓ scheduled and planned logistics for five (5) bi-monthly ARCF meetings in 2016, as well as ARCF Committee meetings, including four (4) Steering Committee meetings, and five (5) Education and Communication Team meetings;
- ✓ facilitated and/or participated in ARCF committee meetings and work;
- ✓ prepared minutes and notes for Forum members;
- ✓ tracked ARCF accomplishments for utilization in presentations, grant reports and to facilitate a discussion regarding whether the ARCF's work was done or whether the Forum should continue in 2017; and
- ✓ monitored the ARCF budget and in-kind contributions.



Fund Utilization

The table below is the 2016 ARCF Budget and as reported in our 2016 Grant Application.

Task	Task Description	Labor	Travel, Expenses	Matching	Volunteers, Entities, Etc	Total Budget
1	1- Gold King Mine Spill Long Term Solutions	7,250.00	500.00	3,000.00	$7,200	$17,950
2	2- Community and Stakeholder Education	7,250.00	1,500.00	8,000.00	$5,760	$22,510
3	3- Monitoring and Data Gaps Assessment	7,250.00	-	3,000.00	$7,200	$17,450
4	4- Project and Coalition Management	13,100.00	1,000.00	3,000.00	$5,760	$22,860
TOTALS		**$ 34,850.00**	**$7,300.00**	**$17,000.00**	**$25,920.00**	**$80,770.00**
CWCB Grant Request		**$37,850.00**				

ARCF spent the $37,850 grant awarded by the CWCB as specified in our 2016 Grant Application and summarized below.

Expense	**Description of Fund Utilization**
Labor: $34,850	• ARCF Coordinator (S. Manfredi) • Monitoring Gaps Analysis Team Lead Support (A. Oliver) • Developing the Community Survey Report (C. Ragland) • Fiscal Management and oversight (MSI, S. Roberts, M. Bidwell & J. Abercrombie)
Materials, Travel and Expenses: $3,000	• ARCF expenses & supplies associated with hosting the Animas River Celebration 1-year Anniversary Event and light snacks at Forum Meetings. • Website hosting • Travel to/from Silverton

Match

In 2016, ARCF utilized the CWCB-WSRA funds to leverage a $17,000 Education Grant from the Southwestern Water Conservation District.

In-Kind Contributions

Below is a listing of the in-kind contributions tracked by the ARCF. Time is valued at $25.68, independent sector rate. In our grant application we estimated $25,920 would be donated. We are pleased to report a greater in-kind contribution value. The increased amount is due in-part to the extended grant period from December 31, 2016 to June 30, 2017. ARCF has kept a record for the contributions listed by category below. A detailed spreadsheet is available upon request.

Contribution June 2016—June 2017	**Value**
Partner Volunteer Time	$13,112.21
Partner Volunteer Time & Travel for Presentations	$4,622.40
VISTA Volunteer Time	$13,353.60
Donated Meeting Space	$1,690.00
Travel	$588.00
Total	**$33,366.21**

Final Payment

ARCF Invoices for April 2017 and June 2017 are included with this Final Grant Report. Please let us know if you have any questions or need additional information in order to close out the 2016 Grant and process payment for the April and May expenditures. Thank you.

Appendix A: High Ranking Draining Mines and Waste Rock Piles

Distribution of pH Values and Dissolved Trace-Metal Concentrations in Streams

By Winfield G. Wright, William Simon, Dana J. Bove, M. Alisa Mast, and Kenneth J. Leib

Chapter E10 of
Integrated Investigations of Environmental Effects of Historical Mining in the Animas River Watershed, San Juan County, Colorado
Edited by Stanley E. Church, Paul von Guerard, and Susan E. Finger

Professional Paper 1651

U.S. Department of the Interior
U.S. Geological Survey

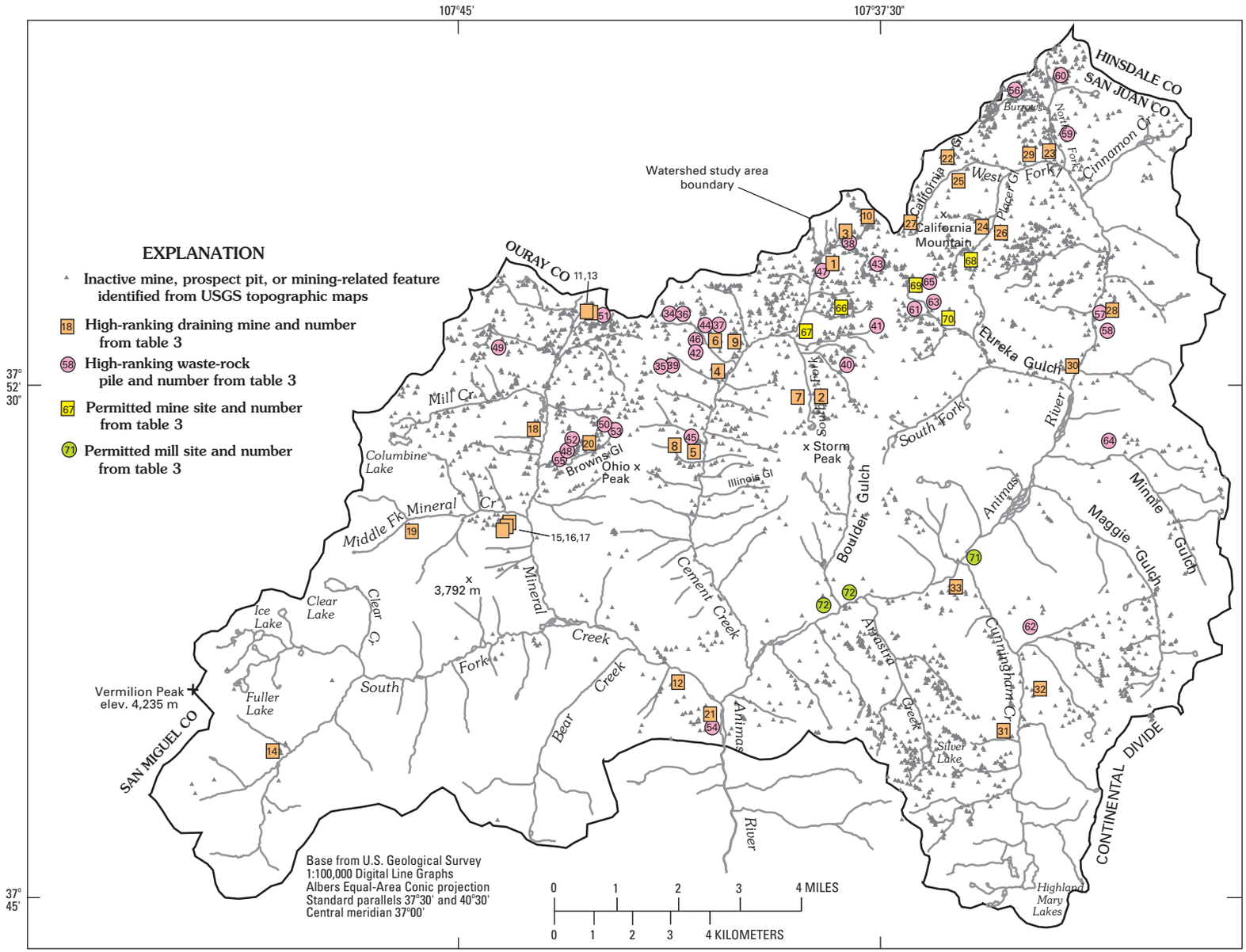


Figure 3. Locations of inactive mines, prospect pits, and mining-related features identified from topographic maps, high-ranking draining mines and waste-rock piles, and permitted sites (Unpub. report to Colorado Water Quality Control Commission, ARSG, 2001; Church, Mast, and others, this volume).

Table 3. Selected draining mines, waste-rock piles, and permitted mine and mill sites in the Animas River watershed study area.

[Unpub. report to Colorado Water Quality Control Commission, ARSG, 2001]

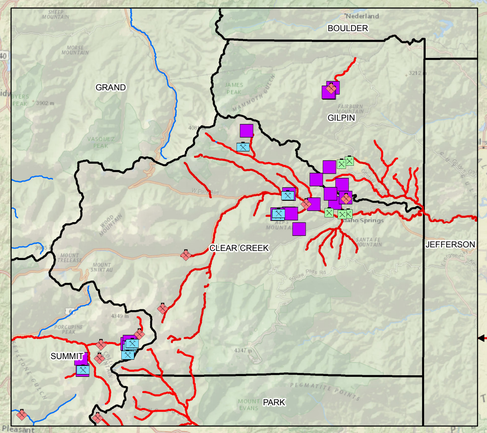
Map No. (fig. 3)	Mine or site name	Map No. (fig. 3)	Mine or site name
	Draining mines		**Waste-rock piles**
1	Mogul mine	34	Galena Queen mine, shaft
2	Natalie/Occidental mine	35	Kansas City #2 mine
3	Grand Mogul mine	36	Hercules mine, shaft
4	Mammoth tunnel	37	Upper Joe & Johns mine
5	Anglo-Saxon mine	38	Grand Mogul mine – East
6	Joe & Johns mine	39	Kansas City #1 mine
7	Big Colorado mine	40	Black Hawk mine
8	Porcupine mine	41	Lead Carbonate Mill
9	Eveline mine	42	Henrietta mine (level 3)
10	Columbia mine	43	Ross Basin mine
11	Koehler tunnel	44	Lark mine
12	North Star mine	45	Pride of the Rockies mine
13	Longfellow mine (Junction mine)	46	Henrietta mine (level 7)
14	Bandora mine	47	Mogul mine
15	Upper Bonner mine	48	Brooklyn mine
16	Bonner mine	49	Bullion King mine
17	Lower Bonner mine	50	Unnamed shaft mine, upper Browns Gulch
18	Ferricrete mine	51	Congress mine, shaft
19	Governor mine (Paradise portal)	52	Brooklyn mine, upper waste-rock pile
20	Brooklyn mine	53	Unnamed mine, upper Browns Gulch
21	Little Dora mine	54	Little Dora mine
22	Vermillion mine	55	Brooklyn mine, lower waste-rock pile
23	Columbus mine	56	Ben Butler mine
24	Lower Comet mine	57	Silver Wing mine
25	Unnamed mine	58	Tom Moore mine
26	Sound Democrat mine	59	Eagle mine
27	Mountain Queen mine	60	Lucky Jack mine
28	Silver Wing mine	61	Clipper mine
29	Frisco tunnel	62	Buffalo Boy mine
30	Senator mine	63	Ben Franklin mine
31	Royal Tiger mine	64	Caledonia mine
32	Pride of the West mine	65	Sunnyside mine
33	Little Nation mine		
			Permitted mine sites
	Permitted mill sites	66	Upper Gold King mine
71	Pride of the West Mill tailings	67	American tunnel
72	Mayflower Mill tailings	68	Gold Prince mine
		69	Sunnyside mine
		70	Terry tunnel

and mineralized rock was near peak 3,792 m (fig. 1), between Middle and South Forks Mineral Creek. In the vicinity of peak 3,792 m, quartz-molybdenite stockwork veins associated with intense quartz-sericite-pyrite (QSP) altered rock are cut by molybdenite-bearing quartz stockwork veinlets; these veinlets were postdated by base-metal veins, which are present mostly on the margins of the porphyry system (R.T. McCusker, Unpublished Mount Moly progress report, 1979–1980, Drill holes 1–6, 1982). The base-metal veins contain silver and some gold in sulfide ores consisting mainly of galena, sphalerite, and pyrite with lesser tetrahedrite-tennantite and chalcopyrite (Ringrose and others, 1986). A pervasive area of QSP-altered rock (3.5 km^2) is centered roughly on the summit and is zoned outward into weak sericite-pyrite (WSP) and then propylitic alteration assemblages. The weak sericite-pyrite assemblage is characterized by partial replacement of plagioclase by sericite, whereas biotite and pyroxene are altered to chlorite, sericite, and fine opaque minerals. The rocks are typically less silicified than QSP-altered rocks, and contain fewer quartz-sulfide stockwork veinlets.

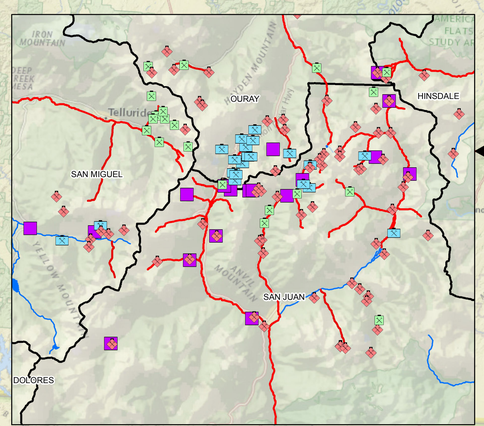
Appendix B: Overview of Legacy Mine Work Remediation

Colorado Mining Stream Impacts and Restoration Efforts

Summit and Clear Creek Area



Silverton Area



Legend

- Draining mines with active water treatment. (Division of Reclamation Mining and Safety) No. Sites = 47
- Draining mines under investigation or being remediated. (Division of Reclamation Mining and Safety) No. Sites = 35
- Draining mines that likely impact water quality with no active water treatment. (Division of Reclamation Mining and Safety) No. Sites = 148
- Nonpoint source mine reclamation projects. These projects do not provide active water treatment. Project examples include removing mine tailings, removing mine waste piles and stream restoration. (Water Quality Control Division) No. Projects = 63
- Mine Related Impaired Streams (Water Quality Control Division) No. of miles = 1645

Author: Scott McGowan
Date: 8/13/2015
Document Path: L:\RestorationProtection\Nonpoint Source\LegacyMineWork\LegacyMineWork.mxd

50 25 0 50 Miles

Use constraints: There are no restrictions and legal prerequisites for using this data set. The state of Colorado assumes no liability to the completeness, correctness, or fitness for use of this data set.

CDPHE COLORADO
Department of Public Health & Environment

Appendix C: Bipartisan Press Release

FOR IMMEDIATE RELEASE
September 12th, 2016

Bipartisan Group of Senators Introduce Measure to Expedite Gold King Mine Spill Recovery

Washington, DC – Senators Cory Gardner (R-CO) and Tom Udall (D-NM) along with Senators Michael Bennet (D-CO), Orrin Hatch (R-UT), Martin Heinrich (D-NV), and John McCain (R-AZ) today introduced an amendment to the Water Resources Development Act (WRDA) to address the response costs associated with the Gold King Mine spill, and direct the Environmental Protection Agency (EPA) to work with affected States, Indian tribes, and local governments on a long-term water quality monitoring program of the rivers contaminated by the spill. The Gold King Mine spill occurred on August 5, 2015 and resulted in the EPA's release of three million gallons of contaminated water into the Cement Creek, affecting waterways in Colorado, New Mexico, Utah, the Southern Ute reservation, and the Navajo Nation.

The bipartisan amendment expedites the reimbursement of emergency response costs assumed by States, Indian tribes, local governments, and individuals following the spill, and is intended to include costs that did not conclude by October 31, 2015. The EPA has stated the agency will not reimburse response costs after this date apart from limited exceptions.

Additionally, the amendment requires the EPA to pay out all costs eligible for reimbursement unless the agency proves with substantial evidence that the cost is not consistent with what is typically reimbursed under federal law. The measure also requires the EPA to pay out all claims within 90 days and notify parties as to whether or not it will pay the claim within 30 days of reaching its decision. Lastly, the amendment establishes a water quality monitoring program and authorizes the EPA to reimburse the States, Indian tribes, and local governments for this monitoring activity.

"The EPA is responsible for the Gold King Mine spill, and therefore I'll fight to hold the agency fully liable and to the same standard as a private company," **said Gardner.** "It is unacceptable the EPA has not fully reimbursed all costs associated with the spill and that's why I authored an amendment to the Water Resources Development Act that requires the EPA to expeditiously pay out all States, tribes, and individuals for emergency action in response to the spill.

Furthermore, the EPA must work in coordination and pay for long-term water quality monitoring, and this measure makes sure of it. I'm proud to lead a bipartisan group of Senators, whose constituents have also been affected, in demanding accountability and transparency from the EPA and fighting to ensure all outstanding costs are addressed."

"The Navajo Nation and many others in the Northwestern corner of New Mexico were devastated by the Gold King Mine spill over a year ago, and this bipartisan measure will help repair some of the many mistakes that have been made since then. Although the EPA has publicly taken responsibility, it has not done enough to make things right. Reimbursements for response costs to Tribal and state governments have taken far too long, and the state and federal government have struggled to set up and fund transparent, long term monitoring of the rivers to avoid a future public health crisis," **Udall said**. "This amendment requires the EPA to begin the process of reimbursing the Navajo Nation and the state of New Mexico. It also takes important steps to help rebuild confidence in the quality of the water in the San Juan and Animas rivers through longterm monitoring. But this is just a beginning — many Navajo farmers and others across the region have not seen a dime to compensate them for their losses. More needs to be done to compensate individuals for the damages they suffered, and I will continue fighting to ensure everyone impacted by the spill gets the help they need."

"It's been more than a year since the Gold King Mine spill and it's unacceptable that the EPA still hasn't fully reimbursed Colorado communities for their costs. We've been pushing the EPA to fulfill their long overdue commitment to the State, Indian tribes, and local governments who responded quickly to the spill," **Bennet said.** "The communities in southwest Colorado paid out of their own pockets to maintain drinking water, provide for extra staffing costs, keep the public updated, provide water for irrigation, and monitor water quality. This amendment ensures that the EPA fully reimburses these communities and works collaboratively to institute a robust long-term water quality monitoring plan."

"Last year the EPA inadvertently spilled millions of gallons of waste into the Animas River in Colorado, exposing the local environment to toxic heavy metals. This spill had a significant adverse impact on many downstream communities and businesses throughout multiple Western states—including Utah. This legislation, if enacted, will instruct the EPA to reimburse states and tribes for related costs they incurred and hold EPA accountable for this spill," **said Hatch.**

Heinrich added, "It's been over a year and families are still recovering from of the Gold King Mine spill. The pace of reimbursement to those impacted by this terrible incident is unacceptable. This measure ensures that state, local, and tribal governments will be fully reimbursed for their emergency response costs and establishes a long-term water quality monitoring program in cooperation with local stakeholders. We must also take action to reform outdated policies in order to clean up the hundreds of thousands of similarly contaminated mines across the West and Indian Country that are leaking toxins into our watersheds. And we shouldn't wait for more disasters to strike. Western communities deserve full and complete protection of their water, land, and livelihoods. Our nation owes it to these communities to clean up these sites once and for all."

"There's no question as to the EPA's responsibility for the Gold King Mine disaster, which has devastated lands and livelihoods across Indian Country," **said McCain**. "The Navajo Nation and other tribes should not be left on the hook to pay for the EPA's failure. This amendment would ensure that impacted states and tribes are quickly and fully reimbursed for all damages and emergency response activities connected to the Gold King Mine spill, while building a water quality and sediment monitoring system they need to protect all citizens. Most importantly, this amendment sends an important message from the United States Congress that the EPA should be held fully accountable for this disaster."

###

Appendix D: Conference Programs

2017 Conference Agenda

May 23, 2017	**OPENING RECEPTION**	**WRIGHT OPERA HOUSE**
6:30pm Doors 7:00pm Program	Mining Lore – A Community Reception featuring Tall Tales about Deep Subjects	Cash bar and tapas.
May 24, 2017	**PLENARY**	**OURAY COMMUNITY CENTER**
8:00am – 8:30am	Registration & Presentations Upload	Refreshments
8:30am – 8:50am	Welcome & Opening Remarks	Dennis Murphy, Uncompahgre Watershed Partnership, Pam Larson, Mayor City of Ouray
SESSION I	**Making a Difference**	**Tanya Ishikawa, Uncompahgre Watershed Partnership**
8:50am – 9:10am	Making a Difference in the Uncompahgre Watershed	Agnieszka Przeszlowska, Uncompahgre Watershed Partnership
9:10am – 9:30am	Reviving Upper Mineral Creek	Peter Butler, Animas River Stakeholders Group
9:30am – 9:50am	Successful Revegetation Techniques for Legacy and Active Mine Sites	Brent Hardy, ACF West
9:50am – 10:10am	Establishing Natural Background Levels in Historic Mining Districts: Technical and Legal Issues	Winfield G. Wright, Southwest Hydro-Logic and Paul Nazaryk, WestSky Environmental
10:10am – 10:40am	BREAK	Refreshments
SESSION II	**Mine Waste Management**	**Elizabeth Stuffings, San Miguel Watershed Coalition**
10:40am – 11:00am	Implementation and Early Performance of the Revenue Passive Treatment with Groundwater Infiltration	Briana Greer, Solid Solution Geosciences LLC
11:00am – 11:20am	Mine Waste Reclamation and Floodplain Development at the Akron Mine, Whitepine Colorado	Jason Willis, Trout Unlimited
11:20am – 11:40pm	Targeted Remediation: Mine Water Source Controls	Rory Cowie, Mountain Studies Institute
11:40pm – 12:00pm	Cost Effective Plans for Successful Mine Land Reclamation	Andy Jung, Profile Products
12:00pm – 1:30pm	LUNCH	On your own.
SESSION III	**Future of Reclamation**	**Peter Butler, Animas River Stakeholders Group**
1:30pm – 1:50pm	Good Samaritans – We didn't cause the problem, but we want to fix it.	Ty Churchwell, Trout Unlimited
1:50pm – 2:10pm	Unity as a Response to Disaster: the Animas River Community Forum	Shannon Manfredi, Animas River Community Forum
2:10pm – 2:30pm	Closing the Waste Loop - Waste Rock to Biomineral Fertilizer	Andrew Harley, Duraroot Environmental Consulting/H-2 Enterprises
2:30pm – 2:50pm	The San Juans and the Reshaping of CERCLA and Hard Rock Mining	Anthony D. Edwards, Sholler Edwards, LLC
2:50pm – 3:20pm	BREAK	Refreshments

2017 Conference Agenda

May 24, 2017	**PANEL & EXHIBITS**	**OURAY COMMUNITY CENTER**
SESSION IV	**Future of Mining Panel**	**Rory Cowie, Mountain Studies Institute**
3:20pm – 4:20pm		Bob Larson, Monadnock Mineral Services, LLC David Beling, Bullfrog Gold Frank Filas, Filas Engineering and Environmental Services, LLC Pat Willits, Trust for Land Restoration Russ Means, CO Division of Reclamation, Mining & Safety
4:20pm – 4:30pm	Closing Remarks and Field Tour Logistics	Rory Cowie, Mountain Studies Institute
POSTER & EXHIBIT SESSION		
4:30pm – 6:00pm	Posters, Exhibits and Networking Opportunities	Cash bar and tapas.
May 25, 2017	**IDARADO SPECIAL SESSION & FREE FIELD TOURS**	**OURAY COMMUNITY CENTER & FIELD**
8:30am – 8:40am	Welcome & Opening Remarks	Jeff Litteral, CO Division of Reclamation, Mining & Safety
8:40am – 10:30am	Water Quality Improvements Resulting from the Idarado Mine Remediation Project	Camille Price, CO Division of Reclamation, Mining & Safety
	Idarado Mine Remediation – A Discussion of Remedial Alternatives and Developing a Viable Path Forward	Devon Horntvedt, Worthington Miller Environmental
Tour 1: 11am – 1pm	Idarado Quick Tour, Red Mountain Creek	Camille Price, CO Division of Reclamation, Mining & Safety and Devon Horntvedt, Worthington Miller Environmental
Tour 2: 11am – 4pm	Ouray Silver Mines & Atlas Mill Sites, Sneffels Creek	Brian Briggs, Ouray Silver Mines; Briana Greer, Solid Solution Geosciences LLC; Jeff Litteral, CO Division of Reclamation, Mining & Safety; Bill Coughlin, Western Stream Works, Agnieszka Przeszlowska, Uncompahgre Watershed Partnership
May 26, 2017	**OURAY SILVER MINES SPECIAL TOURS**	
8:30 AM	Limited to 10 People: Underground tour of Revenue Mine and Mill	Meet in front of Ouray Community Center. On-line registration & shuttle ride are required.
10:00 AM	Limited to 10 People: Underground tour of Revenue Mine and Mill	Meet in front of Ouray Community Center. On-line registration & shuttle ride are required.
11:30 AM	Limited to 10 People: Underground tour of Revenue Mine and Mill	Meet in front of Ouray Community Center. On-line registration & shuttle ride are required.
1:00 PM	Limited to 10 People: Underground tour of Revenue Mine and Mill	Meet in front of Ouray Community Center. On-line registration & shuttle ride are required.

2nd Annual Conference on

Environmental Conditions of the Animas and San Juan Watersheds with Emphasis on Gold King Mine and Other Mine Waste Issues

June 20-22, 2017
Henderson Fine Arts Center, San Juan College, Farmington, NM

PROGRAM

Monday, June 19

5:00 pm – 6:30 pm **WELCOME RECEPTION**
Henderson Fine Arts Center lobby

Tuesday, June 20 Morning Session

8:30 am **WELCOMING REMARKS**
Kevin Lombard, NMSU, on behalf of NM WRRI Director Sam Fernald
David Sypher, Public Works Director, City of Farmington

8:45 **CONGRESSIONAL STATEMENTS VIA VIDEO**
Senator Tom Udall
Senator Martin Heinrich
Congressman Ben R. Lujan

9:00 *New Mexico's Scientific Response to the Gold King Mine Spill*
Nelia Dunbar, Director, NM Bureau of Geology and Mineral Resources

9:10 *Geologic Setting and History of Mining in the Animas River Watershed, Southern Colorado*
Virginia T. McLemore, NM Bureau of Geology and Mineral Resources (Abstract 16)

9:30 *Let's Not Wait for Catastrophic Spills to Happen: Holistic, Long-Term, Multi-Jurisdictional Monitoring in Legacy Mining Areas*
Dennis McQuillan, NM Environment Department (Abstract 20)

10:00 *Characteristics of Metals Concentrations in the Animas and San Juan Rivers During Passage of the Gold King Mine Release Plume*
Kathleen Sullivan, U.S. Environmental Protection Agency, Athens, GA (Abstract 19)

10:20 **BREAK AND POSTER SESSION**

11:00 *The Gold King Mine Spill in the Context of Historical Water Quality Impacts to Utah's San Juan River and Lake Powell*
Christopher L. Shope, Utah Division of Water Quality (Abstract 3)

11:20 *An Overview of the Gold King Mine Release and its Transport and Fate in the Animas and San Juan Rivers*
Kathleen Sullivan, U.S. Environmental Protection Agency, Athens, GA (Abstract 17)

11:40 *The Colorado Data Sharing Network: A Useful Tool for Visualizing Water Quality Data in the Animas Watershed*
Melissa May, San Juan Soil & Water Conservation District (Abstract 5)

12:00 pm **LUNCHEON**

Tuesday, June 20 Afternoon Session

1:30 pm *Surface Water Geochemistry During Snowmelt and Monsoons in the Animas and San Juan Rivers*
Johanna M. Blake, U.S. Geological Survey (Abstract 8)

1:50 *Potential Surrogate Methods for Monitoring Concentration of Metals in Real-time, Animas and San Juan Rivers, Northwestern New Mexico*
Jeb Brown, U.S. Geological Survey (Abstract 9)

2:10 *Illustration of a Fingerprinting Method to Isolate Gold King Release Metals from Background Concentrations in the San Juan River*
Kathleen Sullivan, U.S. Environmental Protection Agency, Athens, GA (Abstract 18)

2:30 *Continued Monitoring of the Animas River Valley Groundwater Level After the Gold King Mine Mine-water Release of 2015*
Ethan Mamer, NM Bureau of Geology and Mineral Resources (Abstract 15)

2:50 **BREAK**

3:10 *Geochemical Characterization of Shallow Groundwater Near the Animas River, Northwestern New Mexico*
Talon Newton, NM Bureau of Geology and Mineral Resources (Abstract 22)

3:30 *Source Identification for Metals in the San Juan River System*
Logan Frederick, University of Utah (Abstract 21)

3:50 pm **ADJOURN**

Wednesday, June 21, Morning Session

9:00 am *Mine Spills and Antibiotic Resistance – What is the Connection?*
Jean E. McLain, University of Arizona Water Resources Research Center (Abstract 7)

9:20 *Ecological and Chemical Analysis of Heavy Metal Transduction in* Salix exigua *on the Animas and Florida Rivers*
Magena Marzonie, Fort Lewis College (Abstract 1)

9:40 *Application of Newly Identified Solar-Atmospheric Connections Towards Improved Forecasts of the Animas River and Other Streams in the Western US*
Michael Wallace, MW&A (Abstract 2)

10:00 *Water Quality and Sediment Monitoring of the San Juan River, Three Major Tributaries, and Two Irrigation Canals within the Navajo Nation*
Steve Austin, Navajo Nation EPA (Abstract 30)

10:20 **BREAK**

10:40 *Lead and Arsenic Concentrations in the Lower Animas Irrigation Ditch Sediments*
Sam Fullen, New Mexico State University (Abstract 24)

11:00 *Metal Concentrations in Soil and Sediments after Gold King Mine Spill*
Gaurav Jha, New Mexico State University (Abstract 25)

11:20 *AML Project: Inventory and Characterization of Inactive/Abandoned Mine (AML) Features in New Mexico*
Virginia T. McLemore, NM Bureau of Geology and Mineral Resources (Abstract 13)

11:40 pm **LUNCHEON**
Tó'Łítso, the water is yellow: Water quality results of the San Juan River on the Navajo Nation one year after the Gold King Mine Spill
Karletta Chief, University of Arizona (Abstract 26)

Wednesday, June 21 Afternoon Session – Open to the public at no charge

1:15 pm *Communicating River Data to the Public: the Animas River Community Forum Monitoring Gaps Analysis Committee*
Chara Ragland, Querencia Environmental (Abstract 27)

1:35 *Three-Minute Summary Talks by Conference Presenters*
Moderated by: Stacy Timmons, NM Bureau of Geology and Mineral Resources

Stacy Timmons, NM Bureau of Geology and Mineral Resources
Virginia T. McLemore, NM Bureau of Geology and Mineral Resources
Jean McLain, University of Arizona Water Resources Research Center
Melissa May, San Juan Soil & Water Conservation District
Kate Sullivan, U.S. Environmental Protection Agency, Athens, GA
Johanna Blake, U.S. Geological Survey
Jeb Brown, U.S. Geological Survey
Ethan Mamer, NM Bureau of Geology and Mineral Resources
Talon Newton, NM Bureau of Geology and Mineral Resources

Tom Schillaci, Producer of Environmental Documentary Videos
Karletta Chief, Department of Soil, Water and Environmental Science, UA
Chara Ragland, Querencia Environmental

2:30 **BREAK**

3:00 Panel: *Making the Community Whole Again*
Moderated by Virginia T. McLemore, NM Bureau of Geology and Mineral Resources

Kim Carpenter, San Juan County
Karletta Chief, Department of Soil, Water and Environmental Science, UA
Rich Dembowski, Gold King Mine Citizens' Advisory Committee
Dennis McQuillan, NM Environment Department
Steve Austin, Navajo Nation EPA
Kevin Lombard, New Mexico State University, Farmington
Bonnie Hopkins, New Mexico State University, San Juan County

4:30 pm **ADJOURN**

Thursday, June 22 Field Trip

6:45 am – 9:00 pm (see itinerary https://animas.nmwrri.nmsu.edu/2017/tour/)

Appendix E: Community Survey Report

ANIMAS RIVER COMMUNITY FORUM

MONITORING GAPS ANALYSIS SURVEY REPORT

Prepared by: Querencia Environmental

Chara J Ragland, Ph.D.

Durango, CO

July 2016

Executive Summary

This Animas River Community Forum (ARCF) is a stakeholder group whose purpose is to promote communication, coordination and collaborative action; foster public confidence; and enhance planning, improved public safety and health for the future; while honoring the institutional authorities and decision making of governmental and community organizations (animasrivercommunity.org). This report summarizes responses of the ARCF Monitoring Gaps Analysis Team survey designed to identify monitoring questions that address top river related concerns of community members. Survey questions focused on perceptions of Animas River health or resilience, public health concerns, and any other concerns. The survey also included questions regarding how individuals use the river and how respondents would prefer to access information about these topics. La Plata County disseminated the survey electronically, and 188 responses were received and analyzed.

Respondents were fairly evenly split between male (59%) and female (41%), and among age groups. Most respondents were from La Plata County, with the remainder representing San Juan County, New Mexico, San Juan County, Colorado, and other counties. When asked which river segment they were concerned about (check all that apply), greater than 50% were concerned with all sections of the river in Colorado, and more than 40% were concerned about river sections in New Mexico. Greatest concern was voiced for the section within the city of Durango. Respondents self-affiliated primarily as community members and river recreationists. In response to the question of how they used the river, 76% are involved in some sort of boating activity (rafting, tubing, kayaking or paddle boarding), 49% are anglers, and <2% are pedestrian users of the river.

The top concerns regarding public health, health or resilience of the river and other concerns was pollution – from mining, sewage contamination (municipal, septic systems, and recreation), and agriculture – accounting for almost 37% of all expressed concerns. Trust issues were often included in comments about pollution, and framed as responsibility, accountability, multiple messages, lay terms for understanding, and clear messaging. Lack of trust was expressed as needing 'honesty in reporting of conditions', veracity of data reporting, and perceptions of mishandling of mine and sewage pollution incidents. Other top concerns included negative impact on fish populations, negative impact on wildlife, loss of system resilience, too much

recreation, and issues of trust regarding honesty of water quality reporting and health assurances. Themes that emerged from the responses to the river health and resilience question included: 1) the river system is at or near a critical threshold as a resilient system or its ability to withstand more abuse from mining and other human impact; 2) action needs to be taken to ensure continued river health; and 3) mention of 'system interactions'.

This survey did not capture detailed suggestions as to the type of monitoring data that should be collected. There was emphasis on timely and long-term data measurements. As monitoring data provides the basis for decision making efforts and action regarding the river, top monitoring priorities identified include:

1. Monitoring data should serve various purposes such as river use (daily and weekly); river health (quarterly or yearly); and agricultural use (quarterly.

2. Short term priority: Is the river safe? Monitoring efforts should facilitate addressing safety for river users in real time.

3. Long term priority: Is the river healthy? Monitoring efforts should address the overall health of the river regarding physical and biological parameters

4. Trends regarding river health. Monitoring efforts should address changes in the river over longer periods of time (e.g. decades).

5. Quality of life questions should be addressed through monitoring.

Communication should use language that is understandable to the lay public, and that focuses on the river as a system. Communication Priorities:

1. Data Sharing: Cooperative data sharing should occur. This would involve efforts from groups reporting data in similar forms from multiple sites in the watershed.

2. Transparency: of monitoring methods, from multiple sources, providing reliable data, and communicated in easy to understand language, with feedback or question availability.

3. Accessibility: data should be accessible online and through the newspaper, and in language that is understandable regardless of level of expertise.

4. Usefulness: what do the data mean in terms of people's use and enjoyment of the river?

Background

This Animas River Community Forum (ARCF) is a stakeholder group formed in response to the Gold King Mine spill incident of August 2015. The Forum's purpose is to promote communication, coordination and collaborative action; foster public confidence; and enhance planning, improved public safety and health for the future; while honoring the institutional authorities and decision making of governmental and community organizations (animasrivercommunity.org). A community that is able to respond to disasters that impact the environment, economy and quality of life needs to have relevant data and be able to translate that data into timely, useful, accessible information for decision makers and the public. The ARCF Monitoring Gaps Analysis Team (hereafter referred to as the Gaps Analysis Team) was formed to analyze data gaps regarding the Animas River within the Forum goals (members listed in Appendix I). The survey discussed in this report was designed by the Gaps Analysis Team to identify monitoring questions that address top river related concerns of community members. Survey questions (see Appendix II) focused on perceptions of Animas River health or resilience, river use, public health concerns, river health or resilience concerns, and general concerns. The survey also included demographic questions about who responded to the survey, river sections of concern, and questions about how respondents would prefer to access information.

The survey was disseminated electronically by La Plata County using Survey Monkey. An introductory email with the survey link was sent to all forum members to forward to their membership and was highlighted in several community forums during a 4-week period. A total of 188 responses were received and analyzed.

Analysis Methods

I used NVIVO 11 qualitative analysis software (QSR International) to thematically review all responses in the survey. The first step involved running a word frequency query for each set of question responses. The search criteria included a minimum of 3 letters per word and grouped synonyms as a single category (e.g., talk, talking, and speak would comprise a single category). Building on the themes that emerged from the word frequency queries, I coded responses into identified and emergent thematic categories. This report reflects this theme overlap across questions, but is a first pass – in other words, I have duplications of themes such as resilience that emerged as responses to river health, public health concerns, and health and resilience of the Animas River as a system questions. In future analysis, I would go back and coalesce the themes to delve deeper into the overlap of rich information gathered by this survey. Coding was done on the level of the phrase, rather than the entire response, inflating the total possible responses to a number greater than the total number of surveys received.

Survey questions are included at the end of the report for reference (Appendix II).

Demographics of Survey Respondents

Respondents were fairly evenly split between male (59%) and female (41%), and among age groups (Figure 1). Seventy-eight percent of respondents were from La Plata County, with the remainder representing San Juan County, New Mexico (10.7%), San Juan County, Colorado

(4.5%), and other counties (6.8%). When asked which river segment they were concerned about (check all that apply), greater than 50% were concerned with all sections of the river in Colorado, and more than 40% were concerned about river sections in New Mexico. Greatest concern was voiced within the city of Durango (75%) (Figure 2).

Respondents self-affiliated primarily as community members and river recreationists (Figure 3). In response to the question of "How do you use the Animas River in your living and working life?" 49% identified fishing in their use of the Animas River. This high percentage of anglers should be kept in mind in light of numerous survey responses regarding fish health, fish population status, fish monitoring, and regulatory action regarding fish stocks in the Animas River. In 2008 in the state of Colorado, 82% of state revenues (estimate of $1.8 billion) from fishing were estimated to derive from residents (The Economic Impacts of Hunting, Fishing and Wildlife Watching in Colorado. Sept. 26, 2008, Colorado Division of Wildlife). Despite the importance of fishing, it seems more likely that the survey received greater response from fishing groups such as Trout Unlimited, rather than almost half of the local population fishing the Animas River. Responses to this question also revealed that 76% of river users are involved in some sort of boating activity: rafting, tubing, kayaking or paddle boarding. Again, this may reflect a bias in the population of survey respondents. There was surprisingly low response (<2%) from pedestrian users of the river, such as those who walk the Animas River Trail.

Figure 1. Age Range of respondents (97.8% response rate).

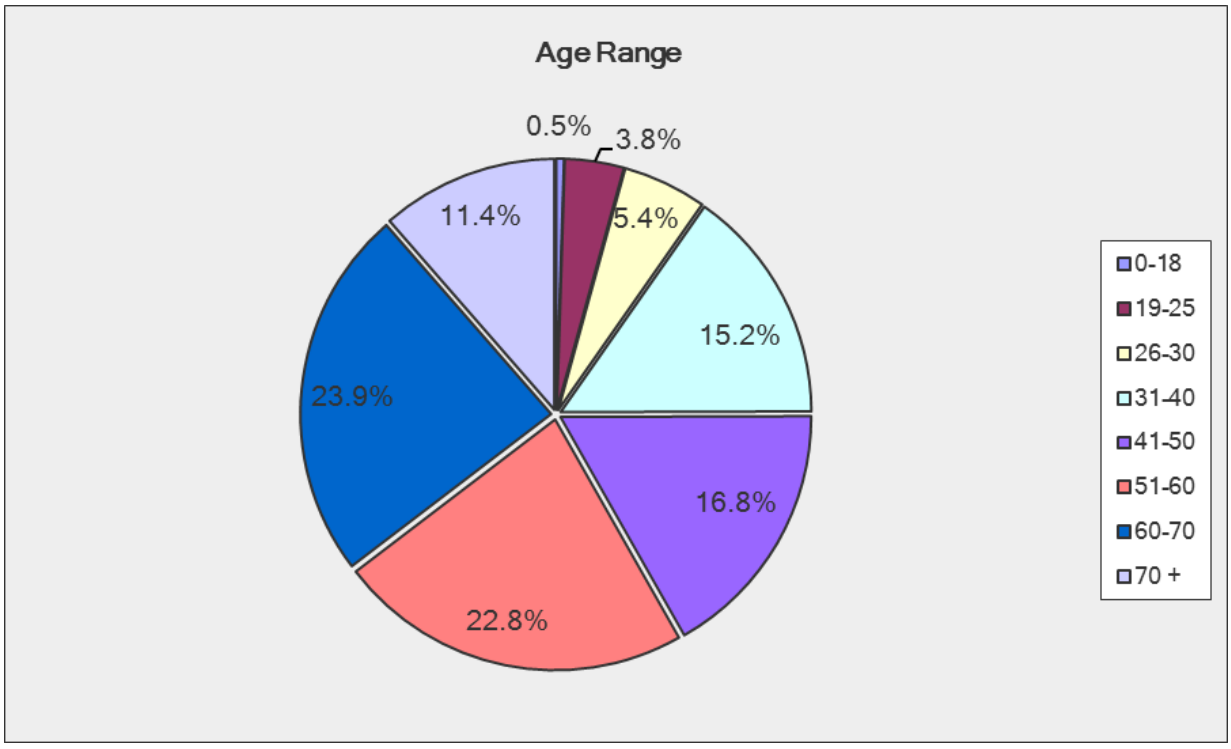


Figure 2. Responses to the question: What segment of the Animas River are you most concerned about (check all that apply)? There is some variation in segments of concern, but all segments are of concern to 40% or more of respondents.

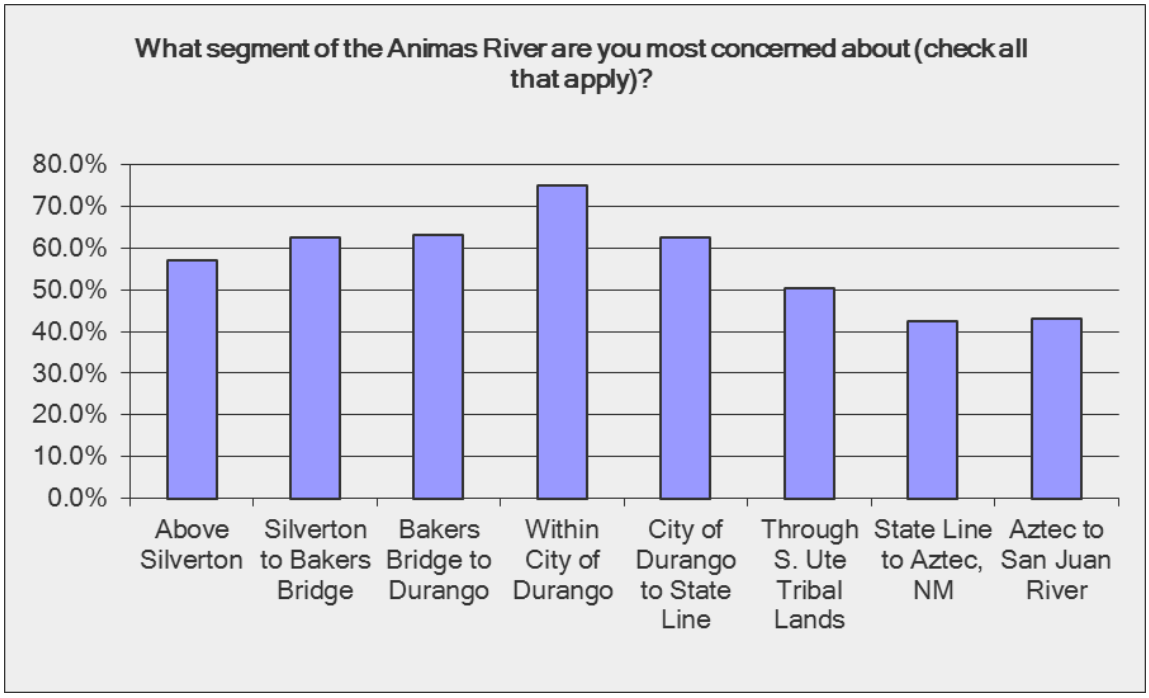
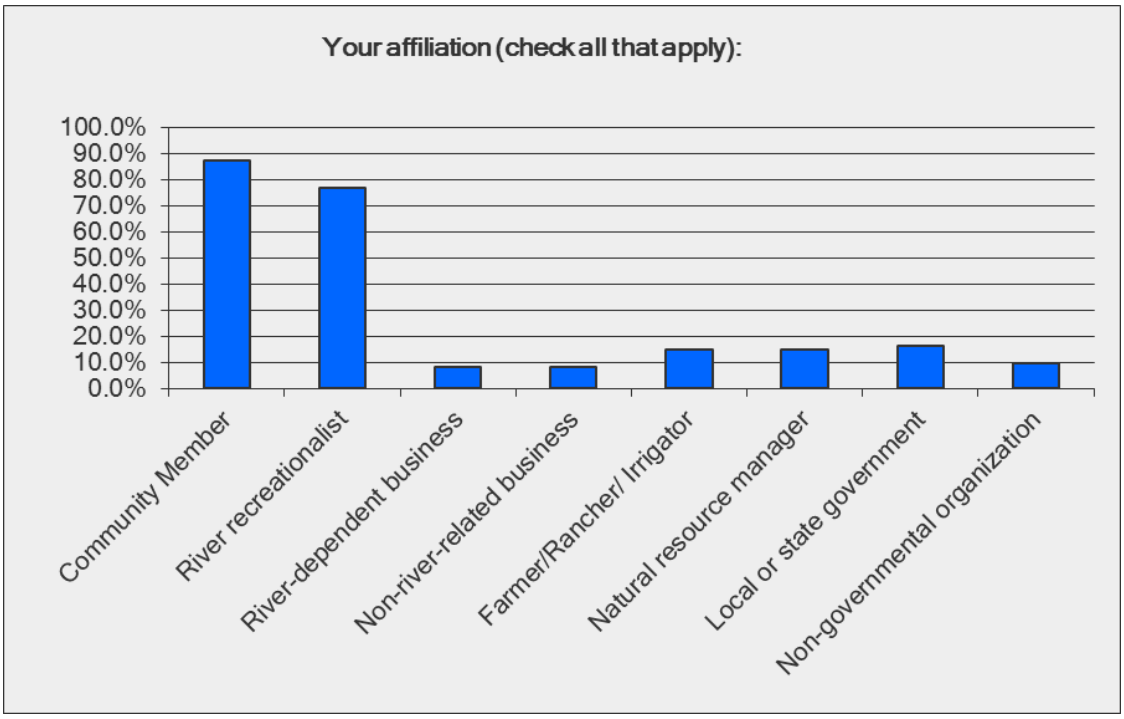


Figure 3. Responses to the question: Your affiliation (check all that apply). (94.7% response rate).



In response to the question "Your affiliation (check all that apply)", 87% selected the Community Member category and 77% selected River Recreationist, likely reflecting the life roles of survey respondents (Figure 3). Other affiliation categories showed a 8-16% response rate, with lowest numbers for non-governmental organizations.

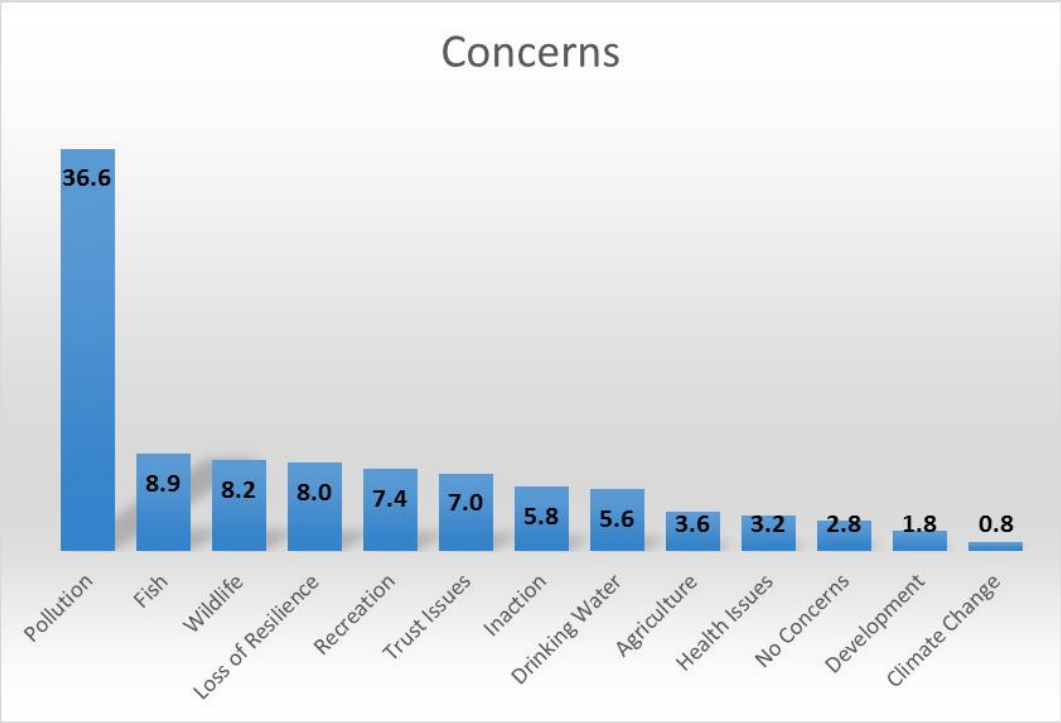
Monitoring Priorities

The Gaps Analysis Team designed this survey to identify monitoring questions that address top river related concerns of community members. The top concern across all questions was pollution – from mining, sewage contamination (municipal, septic systems, and recreation), and agriculture – accounting for almost 37% of all expressed concerns. Other top concerns, all less than 10% of expressed concerns, included negative impact on fish populations, negative impact on wildlife, loss of system resilience, too much recreation, and issues of trust regarding honesty of water quality reporting and health assurances (Figure 4).

Pollution concerns were focused in the areas of mine contamination, both in the water and sediment. A number of comments suggested that water flow diluted the heavy metals in the water column, but exposure to the sediment through recreational activities or ingestion of foods from irrigated soils were a potential long-term threat to humans and other organisms. The second prominent pollution or contamination concern centered around sewage from municipal waste in Durango as well as sub-standard septic systems along the Animas waterway. Nutrient loading from agriculture was mentioned a number of times, but was not as high a concern.

With regard to the question on river health and resilience, responses were more often phrased as relationships between pollution (mining or human) and the aquatic system (aquatic life, fish, human consumption). Again, pollution, specifically from mining was cited as the largest concern regarding river health and resilience (51% of responses citing pollution). Respondents questioned whether the system was at a critical threshold as a resilient system or able to withstand much more abuse (mining and other human impact). Fully 95% of the respondents considered the system to be near its threshold for recovery or questioned whether the system was at this threshold. A final factor that emerged from this question was the need for action. Responses about the Animas River as "a resilient system – capable of recovering from human-induce pollution", included the caveat that action needed to be taken to ensure continued river health. Several comments addressed the degradation of the channel and riparian zone as contributing factors in river resilience and health. This was echoed in responses regarding decreased flow due to increased agricultural and other human demands, as well as changing climate altering flows.

Figure 4. Concern categories across three questions relating to respondent concerns: public health concerns, river health and resilience concerns, and other concerns (question 4 in Appendix II). Numbers in each category are percent of all concerns coded.



A final theme regarding river health and resilience was the need for long-term monitoring of river health and the effects of mining and human pollution on human health through system interactions. This theme of 'system interactions' was not as prevalent in responses regarding public health or river status. Framing future river communications in terms of system dynamics provides an opportunity to reinforce systems thinking among a larger audience. Also prevalent in responses to river health and resilience were action words such as 'protect', 'regulate', and 'clean-up'. The tone of these comments were 'If we take action… then things will improve'. Respondents commented they wanted to understand the state of the river as a system in order to make informed decisions as to how to interact with the river, how to protect the river, and how to respond to communications about the river.

Trust issues are a significant part of indicators and concerns, and were often included in comments about pollution. Lack of trust was expressed as needing 'honesty in reporting of conditions', veracity of data reporting, and perceptions of mishandling of mine and sewage pollution incidents. Communication strategies have the potential to alleviate lack of trust. Phrases used by respondents that relate to trust include: responsibility, accountability, multiple messages, lay terms for understanding, and clear messaging. Respondents asked for cooperation and agreement between reporting sources: they want to know that sources are trustworthy and consistent. This would suggest that both monitoring and communication of results should be

presented as a cooperative effort of multiple trustworthy sources. There were also several comments regarding the San Juan Basin Health Department tip to river users that "It is always a good public health practice to wash with soap and water after exposure to untreated river water or sediment" (sjbhd.org/public-health-news/animas-river-health-updates/frequently-asked-questions/). This message was perceived as 'scary' and confusing. Respondents wanted specifics as to how to wash adults, children, and dogs: after what degree of exposure, and what to do if water was ingested. Citizens want to "be able to make their own decisions for exposure" so communication needs to define "exposure" and what 'safe' means.

Impacts to fish were a strong concern. Fish were also prominent in monitoring responses and calls to action for river clean-up. Opinions ranged from fish perceived as a 'canary in a coal mine' indicator species to a general concern of anglers. Regardless, anglers are likely to be a strong voice as regards river issues.

This survey did not capture detailed suggestions as to the type of monitoring data that should be collected. Rather, responses reflect general monitoring data categories such as water chemistry, population surveys of fish and invertebrates, water quality monitoring, and flow monitoring. There was emphasis on timely and long-term data measurements. (neither specifically defined). Another theme regarding monitoring was that the data should be used as a basis for action or decisions regarding Animas River policies. This was described as "regulations in place", "plans for cleanup" and other accountability factors. In other words, data should be used as a means for action implementation.

Communication

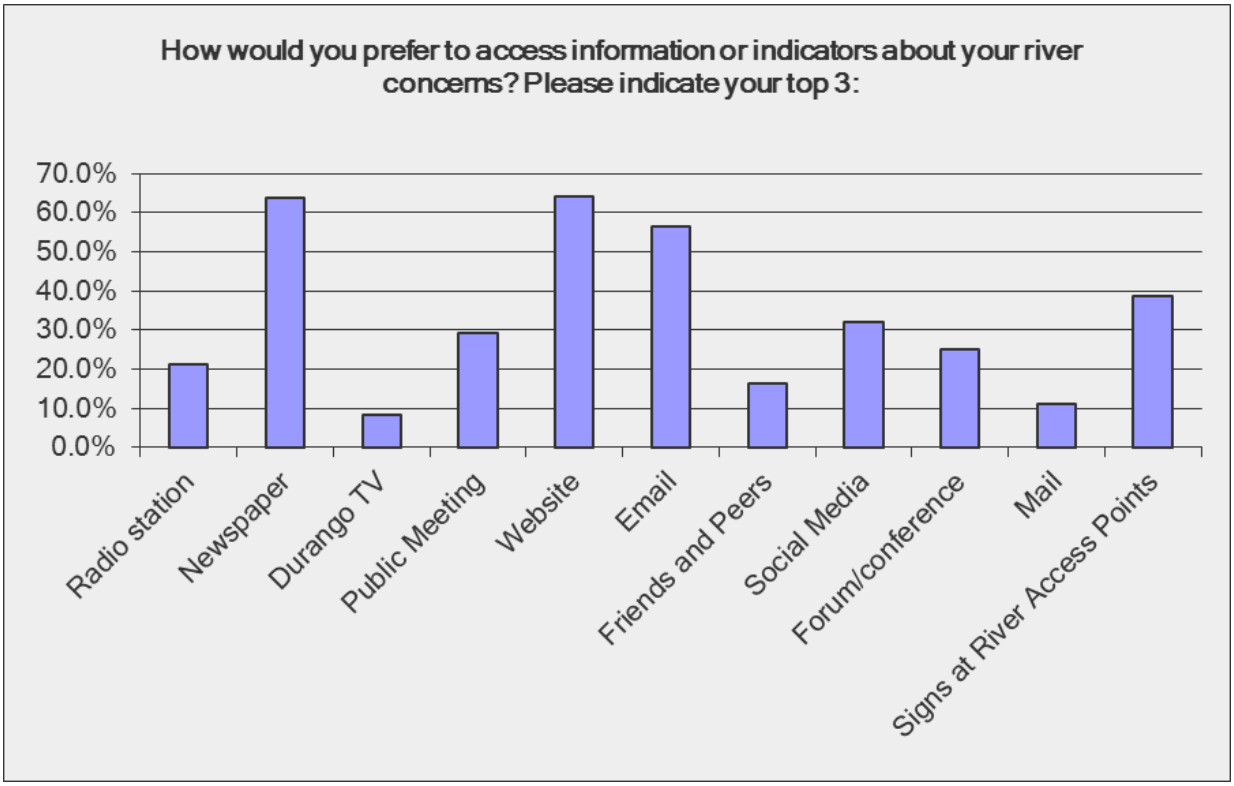
Effective communication in a participatory process involves mutual understanding, continued dialogue, and shared goals. Through this survey, we have a better idea of concerns and motivation of the people who responded. As we move forward with monitoring, careful consideration of who should be involved in collecting data, disseminating results, and sharing information is imperative. Based on responses to the question "Who should be involved in this conversation?", the clear answer is to be as inclusive and transparent as possible. Responses defined stakeholders as regards the Animas River: government officials, 'concerned' individuals, businesses, all affected, - anyone with time. There was overwhelming consensus that inclusivity rather than exclusivity was to be the goal. People – at least the respondents to this survey - want to be involved in the process and not rely on government representatives to make decisions. Another way to interpret these data s as to who should be involved, is to assume is that responses highlighted those that they felt were not involved. Single groups specifically mentioned included government officials, citizens, and youth. Perhaps then, these are audiences that need to be targeted as the Animas River Community Forum moves forward. The few negative comments about involvement suggested that federal government officials, including EPA officials, were not to be trusted as participants moving forward. This is likely due to trust issues that emerged elsewhere in the survey, and should be kept in mind as stakeholder and action groups move forward. In all likelihood, their inclusion may facilitate trust building so long as federal stakeholders are not given greater power within the structure of stakeholder groups.

A substantial theme that emerged from the question regarding Animas River use concerned quality of life factors (28% of respondents cited quality of life factors in their responses). This theme acknowledged the Animas River as contributing to overall quality of life, aesthetic value, cultural value, heritage value, the natural environment, and the ability to enjoy the river on a daily basis by living and working near the river. Keep in mind that all other factors, including recreation, tourism livelihood, and the river as a water source all contribute to quality of life. In making decisions, groups often weigh economic or other factors, but quality of life brings commitment and passion to the table.

Based on responses to the question of preferred methods to access information or indicators about your river concerns, the most frequent responses were newspaper, websites, and email (Figure 5). Respondents mentioned multiple websites as access points, all giving similar information. This suggests an opportunity for a single group, such as the Animas River Community Forum, to serve as a clearinghouse linking to other, more focused information sources. As an example, a clearinghouse website might have shorter versions of updates on metal content, flow, water quality, and exposure responses, but provide links to other websites (USGS, Trout Unlimited, Tribal websites, Mountain Studies Institute, and San Juan Basin Health Department) for greater detail. Responses also mentioned the ability to comment on the veracity of the facts through a phone app or feedback mechanism within the website. This format might allow monitoring for reliability and transparency (where comments can be seen by all). Respondents expressed the desire to learn more through access to online information, and they also want to be heard.

What respondents want to know more about, emerged from the question "What information or data would help you evaluate your concerns?" Responses mirrored concerns, but specified that information be in the form of fact sheets on specific topics in understandable (i.e., lay terms), and accessible online or using mobile phone apps. The current Mountain Studies Institute fact sheets were mentioned as a desirable format.

Figure 5. Coded themes in response to the question regarding preferred types of communication methods (as a percentage of all coded responses). Because each person was instructed to choose their top 3 choices, percentages exceed 100%.



Recommendations:

After review of the survey data, the Gaps Analysis Team identified monitoring and communication priorities to be used as the team moves forward in the process of forming a monitoring data collaboration that has the ability to generate relevant data and turn it into useful information for decision makers and the public.

Monitoring Priorities:

1. Daily and weekly (described in responses as 'real time'), quarterly, and yearly data should be gathered to serve various purposes. This might include data useful for river use (daily and weekly) such as metal loading, flow, water quality; river health (quarterly or yearly) factors such as invertebrate and fish populations; and agricultural use (quarterly) factors such as bacterial loading and metals present in soil samples.
2. Short term priority: Is the river safe? Monitoring efforts should facilitate addressing safety for river users in real time.
3. Long term priority: Is the river healthy? Monitoring efforts should address the overall health of the river regarding physical and biological parameters
4. Trends regarding river health. Monitoring efforts should address changes in the river over longer periods of time (e.g. decades). For example, how do water quality and biological indicators (fish, macro-invertebrates) now compare to data collected 10 or 20 years ago.
5. Quality of life questions should be addressed through monitoring.

Monitoring efforts provide the basis for decision making efforts and action regarding the river. As such, monitoring data will be used to identify stressors and sources of impact to the system.

Communication Priorities:

1. Data Sharing: Cooperative data sharing should occur. For example, pH and metals loading at multiple locations should be available from a single web portal. This would involve efforts from groups reporting data in similar forms from multiple sites in the watershed.
2. Transparency: of monitoring methods, from multiple sources, providing reliable data, and communicated in easy to understand language, with feedback or question availability.
3. Accessibility: data should be accessible online and through the newspaper, and in language that is understandable regardless of level of expertise.
4. Usefulness: what do the data mean in terms of people's use and enjoyment of the river? This 'implementation' factor is a critical piece of monitoring efforts.

Specifically, communication should use language that is understandable to the lay public, and that focuses on the river as a system. This eventually places the human population within the context of protection and responsible action and decisions. Messages issued by stakeholder and public health groups should address the five points of monitoring priorities, namely timely data, short-term, long-term, trends, and quality of life issues.

Responses requested weekly reports on metals and biologicals during the summer high-use season. There were requests for specific recommendations based on these reports as to how to wash children, dogs, and equipment. Respondents also requested quarterly updates on sewage, well-water tests, septic violations, and other measures that reflect overall river health or human health impacts. Yearly reports were requested on river fisheries and wildlife (fish, macroinvertebrates, dippers, etc.) with short reminders of how this fits into historical trends. Several respondents requested that reports regarding fish contamination and regulations for catch and release or other fishing use be widely publicized.

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Colorado Water Conservation Board
Durango, CO

Respectfully submitted:

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July 29, 2016

APPENDIX I

Animas River Community Forum Monitoring Gaps Analysis Team

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APPENDIX II

Survey (as presented online)

Do you care about the Animas River? Want to help the river? Please take a few minutes and complete the survey https://www.surveymonkey.com/r/AnimasRiverCommunity to help us provide information that enables you to make informed, confident decisions about your use of the Animas River and its contributions to our quality of life.

Thank you for taking the time to help us help you and the Animas River!

The Animas River Community Forum, www.animasrivercommunity.org, is a diverse group of community members who recognize that there is a gap between information generated and information delivered about the health and condition of the Animas River. To better bridge the Animas River information gap, we need to understand your concerns.

All survey responses will be kept private. No identifiers linking you to this survey will be included in any information published or shared with others. A summary of the findings will be provided on the Forum's website www.animasrivercommunity.org and will be used to develop a long-term data and information dissemination plan for the public. How do you use the Animas River in your *living* and *working* life?

Your experience *living* and *working* in the watershed is valuable, and we hope you will share it with us.

1. How do you use the Animas River in your *living* and *working* life?

2. What segment of the Animas River are you most concerned about (check all that apply)?

__Above Silverton	__City of Durango to State Line
__Silverton to Bakers Bridge	__Through S. Ute Tribal Lands
__Bakers Bridge to Durango	__State Line to Aztec, NM
__Within City of Durango	__Aztec to San Juan River

3. How would you rate the health or resilience of the Animas River on a scale from 1-10 (where 10 is most healthy/resilient and 1 is least healthy/resilient)?

   Why did you rate the river in this way?

   What river qualities would indicate a rating of 10?

4. The following questions relate to your concerns about the Animas River in your *living* and *working* life:
   a) What public health concerns do you have regarding the Animas River?

      What information or data would help you to evaluate your concerns?

b) What concerns do you have about the health or resilience of the Animas River as a natural system?

What information or data would help you to evaluate your concerns?

c) What other concerns do you have about the Animas River?

What information or data would help you to evaluate your concerns?

5. How would you prefer to access information or indicators about your river concerns? Please indicate *your top 3*:

___ Radio (station _____)
___ Newspaper _____
___ Durango TV
___ Public Meeting
___ Website (_____)
___ Email
___ Friends and Peers
___Newsletter _____
___ Social Media (facebook ___ twitter___ other_____)
___ Forum/conference
___ Mail
___ Signs at River Access Points
___ Other _____

6. Who should be included in this conversation?

7. Your responses to the following questions will help us understand the community represented by this survey:
Gender: _____
Age: _____

What county do you live in? __San Juan Cty, CO __La Plata County __San Juan Cty, NM __Other

Your affiliation (check all that apply):
Community Member ___
River recreationalist ___
River-dependent business ___
Non-river-related business ___
Farmer/Rancher/Irrigator___
Natural resource manager ___
Local or state government ___
Non-governmental organization ___
Other (specify) _____

Thanks!

The results of this survey will be summarized and available at the Animas River Community Forum website www.animasrivercommunity.org.

The Animas River Community Forum is represented by all sectors in the community (health, recreation, agriculture, environmental, etc.) and was formed to:

* Promote communication, coordination and collaborative action'
* Foster public confidence
* Support resiliency in our communities; and
* Enhance planning, improved public safety and health for the future all while honoring the institutional authorities and decision making of governmental and community organizations.

For more information regarding this survey, contact Monitoring Gaps Analysis Team coordinators:

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