

Post-Gold King  
Mine Release  
Incident:  
Conceptual  
Monitoring Plan  
for Surface  
Water,  
Sediments, and  
Biology

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EPA

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## **I. Executive Summary**

On August 5, 2015, EPA was conducting an investigation of the Gold King Mine (GKM) near Silverton, Colorado to assess the on-going water releases from the mine, treat mine water, and assess the feasibility of further mine remediation. While excavating above an old adit, pressurized water began leaking above the mine tunnel, spilling about three million gallons of water stored behind the collapsed material into Cement Creek, a tributary of the Animas River (<http://www2.epa.gov/goldkingmine>). This Conceptual Monitoring plan (CMP) was developed to guide follow-up data collection after the GKM Release Incident. This CMP describes surface water, sediment and biological monitoring efforts to be undertaken by EPA in the Animas and San Juan River watersheds from fall 2015 to fall 2016 in Colorado, the Southern Ute Indian Reservation, New Mexico, the Navajo Nation, the Ute Mountain Ute Reservation and Utah. It incorporates input received from State, Tribal and local stakeholders (Appendix A). The primary objective of this effort is to provide data that span the watershed that can be used to compare current conditions to conditions that existed in the watershed prior to the GKM Release Incident. These data may also be used by EPA, States, Tribes, and local entities to supplement a general assessment of water quality, sediment quality, and biological conditions in the watershed.

Sampling will be carried out beginning in the fall 2015 and cover all flow conditions through the fall 2016. Monitoring will focus on the heavy metal contaminants associated with the Gold King Mine and include collection of macroinvertebrates and fish community metrics. As data become available, they will be posted for public access and undergo a screening assessment. After completion of the fall 2016 sampling event, the entire dataset along with data collected by our State, Tribal, and local partners will be more thoroughly assessed to identify water quality, sediment quality, and biological trends over the year after the GKM Release Incident in order to determine if additional monitoring is necessary. Assessment results will be communicated per our Communication Strategy (Appendix E).

The EPA appreciates the review, input, and participation by State, Tribal, and local stakeholders throughout development of this monitoring plan. Comments and Agency responses are in Appendix A. Updates since the Draft CMP based upon feedback received are described in Section III below.

## **II. Background – Gold King Mine Release Incident and Animas River Watershed Historic Conditions**

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On August 5, 2015, EPA was conducting an investigation of the Gold King Mine (GKM) near Silverton, Colorado to assess the on-going water releases from the mine, treat mine water, and assess the feasibility of further mine remediation. While excavating above an old adit, pressurized water began leaking above the mine tunnel, spilling about three million gallons of water stored behind the collapsed material into Cement Creek, a tributary of the Animas River (<http://www2.epa.gov/goldkingmine>). The Animas River originates in the mountain peaks northeast of Silverton, in San Juan County, Colorado. It ends in Farmington, New Mexico, where it flows into the San Juan River, which terminates in Lake Powell in Utah. The conceptual monitoring plan outlined in this document will guide data collection activities in these surface waterbodies potentially impacted by the GKM Release Incident. Because this watershed has been historically impacted by mining releases and natural mineralization and these

releases continue today, difficulties exist in identifying and distinguishing potential impacts of the GKM Release Incident from the many other ongoing sources of impacts described in this section.

The upper reaches of the Animas watershed are heavily impacted by historic mining activities and natural mineralization. Hundreds of abandoned mines, each potentially contributing drainage, exist within the Animas River watershed. Many abandoned mines exist within two miles of Gold King in the Cement Creek drainage, including: American Tunnel, Grand Mogul, Mogul, Red and Bonita, Eveline, Henrietta, Joe and John, and Lark mines. Some of these mines have acid mine drainages that produce flows of between 30 and 400 gallons per minute that directly or indirectly enter Cement Creek and eventually reach the Animas River. These flows were occurring prior to the GKM Release Incident and are ongoing. As a result, numerous remediation activities have been initiated in the watershed. The Animas River Stakeholder Group, the Bureau of Land Management, the Colorado Division of Reclamation/Mining and Safety, and EPA Region 8 have completed remediation projects in the watershed (*EPA Region 8, Upper Animas Mining District: Draft Baseline Ecological Risk Assessment*, <http://www2.epa.gov/region8/upper-animas-mining-district-draft-baseline-ecological-risk-assessment>). The Colorado Department of Public Health and the Environment has developed more than twenty-five Total Maximum Daily Loads (restoration plans required for waterbody segments considered impaired under the Clean Water Act) to help guide restoration activities towards meeting water quality standards. However, for some waters, including Cement Creek, the State has followed procedures under the Clean Water Act to remove aquatic life support as a designated use for the waterbody because it is not an attainable goal (*Colorado Department of Public Health & Environment*, <https://www.colorado.gov/pacific/cdphe/tmdl-san-juan-and-dolores-river-basins>).

Though restoration activities and plans have been underway in the watershed, aquatic life uses in numerous segments of the watershed remain impaired by heavy metals (*Colorado Department of Public Health & Environment*, <https://www.colorado.gov/pacific/sites/default/files/Regulation-93.pdf>). The Animas River Stakeholders Group (ARSG), which updated a watershed plan for remediating historical mining sites in the Upper Animas River Basin in 2013, estimates that in recent years untreated acid mine drainage from Cement Creek alone has been in the range of 600-800 gallons per minute or about 314-420 million gallons per year, with increases in metals loadings observed 40 miles downstream in the Animas River ([http://ofmpub.epa.gov/apex/grts/f?p=110:700:13401198170892::NO:RP,700:P700\\_PRJ\\_SEQ:62860](http://ofmpub.epa.gov/apex/grts/f?p=110:700:13401198170892::NO:RP,700:P700_PRJ_SEQ:62860)).

This document describes post-GKM release surface water quality, sediment quality, and biological community monitoring that began in the fall of 2015 and will occur, over the course of the year following the GKM Release Incident. This monitoring will be extended beyond fall 2016 if necessary based upon the results. A decision regarding monitoring continuation will be made once the data have been evaluated after fall 2016. Data collected from fall 2015 through fall 2016 will support an assessment of the changes in surface water and sediment quality since the GKM Release Incident across the full range of seasonal flow conditions. While this plan focuses on surface water and sediment quality, EPA is exploring the need for further sampling of private drinking water wells and groundwater. EPA's Office of Research and Development (ORD) has undertaken a fate and transport model to identify potential groundwater impacts and vulnerable alluvial wells that may require

additional follow-up. This model is undergoing an external peer review and EPA intends to address groundwater and well water sampling under separate cover.

### III. Updates Since the Draft CMP Released September 2015

This Final Conceptual Monitoring Plan (CMP) reflects changes since the September 2015 draft version of the plan. These changes will be implemented in the sampling and monitoring that will occur in 2016. The EPA made changes to this plan based upon the comments we received from our local, State and Tribal stakeholders; knowledge gained during our first round of sampling in fall 2015; and increased familiarity with available historic data.

The EPA had an initial call with States, Tribes and locals on September 2, 2015, in which we discussed potential approaches for the CMP. That call was followed by development of the draft CMP and release of the draft plan with a three-week review and comment period from September 17 to October 8, 2015. During the comment period, a call was held on September 22, 2015 for questions and discussion. After receipt and review of comments, we then had a call on October 21, 2015 and a meeting on February 5, 2016 to share the feedback we received and seek input on our direction based upon that feedback.

Table 1 provides an overview of the comment types received.

Table 1. Types of Comments Received on September 17, 2015 Draft CMP

<b>Comment Type</b>	<b>Percentage of Total Commenters with This Comment Type (each line would have a max of 100%)</b>
Stakeholder plan development or leadership requested	18%
Scope expansion options suggested for Objective B	64%
Groundwater/well water sampling requested	45%
Sampling and assessment collaboration with States/Tribes/Locals requested	27%
Plan duration extension beyond 1 year requested	55% (2 to 10 years suggested)
General edits, clarifications, details requested	64%
Technical suggestions including:	
1. Additional analytes suggested	1. 64%
2. Benchmark details needed	2. 36%
3. Biological data use suggestions	3. 64%
4. Data management details needed	4. 27%
5. Historic data availability notification provided	5. 45%
6. Sampling frequency changes requested	6. 55%
7. Sampling methods identified for consideration	7. 45%
8. Site selection/substitutions suggested	8. 82%

The following sections describe how the broader comments were addressed in this final CMP. Appendix A provides responses to each individual comment received. Table 2 provides an overview and summary of these responses.

### ***Funding for State and Tribal Monitoring***

The Draft CMP included two study questions, Objectives A and B. Objective A focused on identifying changes in water quality, sediment quality, and biological metrics since the GKM release in order to understand the potential impacts of this event. Data assessment under Objective A relies on pre-release data availability which determines which sites should be resampled and the analytes that should be monitored again so that pre- and post-GKM release data can be compared. The EPA committed contract resources to ensure that at least one year of follow-up monitoring would begin in fall 2015 and continue through fall of 2016. Objective B focused on determining the current condition of sites downstream of the GKM release as compared to water quality standards and sediment risk benchmarks. This objective is not dependent on the availability of historic data so the scope of this objective and sampling locations that can be monitored are more flexible and open for modification.

We received comments that recommended a wide variety of additions that would expand the scope of the plan, with particular focus on Objective B monitoring efforts. In addition, we received requests for monitoring efforts to be developed and led by our State and Tribal partners to better focus on concerns of local stakeholders in their jurisdictions. The EPA is currently in communication with the States and Tribes regarding this process, its timing and how States and Tribes can work with local partners to support or conduct monitoring on their behalf. In response, the EPA will distribute two million dollars to state and tribal jurisdictions under Clean Water Act authorities for Objective B monitoring efforts.

In addition, the Agency will proceed with the Objective A monitoring while engaging with states and tribes about the scope and implementation of their Objective B priorities. Accordingly, instead of focusing this CMP on the two originally drafted study objectives (A&B), the EPA will focus this plan on implementation of Objective A and support State and Tribal plans for completion of Objective B monitoring. This approach to addressing scope expansion comments was first proposed to stakeholders in a conference call on October 21, 2015 and was further explored in the February 5, 2016 face-to-face meeting held with stakeholders in the EPA Region 8 Denver Office.

### ***EPA's Fall 2015 Monitoring Event***

EPA sampled 27 sites throughout the Animas and San Juan Rivers in fall 2015 for surface water, sediment and macroinvertebrates. This sampling occurred throughout late October and early November 2016. Consistent with the data management plan, the surface water and sediment data from this sampling are available on EPA's WQX/STORET database. The taxonomy for the macroinvertebrate data is underway and the results are forthcoming.

### ***Sampling and Monitoring Changes – Frequency, Analytes, Sites***

Based upon comments received on the Draft CMP, the EPA made a number of updates to its sampling and monitoring framework associated with Objective A. The following analytes were added: chromium VI, chromium III, strontium, alkalinity, total suspended solids (TSS). The following sampling events were added: sediment during runoff (if flow conditions allow), sediment during storm events (if flow conditions allow). The following sites were added for a total of 30 sites to be monitored under this CMP: M34, Oxbow Park, ADW-021, FW-012, SJAR, LVW-020 and SJMH. The site identified as NAR6 in the Draft

CMP has been renamed to AR 2-7. The site identified as GKM01 in the Draft CMP has been renamed to AR19-3. SJME has been replaced by SJMC and SJIN has been replaced by SJCH.

Table 2. Comment Themes and Responses

<b>Broad Comment Themes</b>	<b>EPA Responses to Comment Themes</b>
<b>States/Tribes/Locals Should Develop/Lead/Carry Out Monitoring Efforts</b>	<ul style="list-style-type: none"> <li>• EPA will provide two million dollars of Clean Water Act funding to Tribes/States to develop and carry out independent monitoring plans;</li> <li>• EPA is focusing this CMP on what the draft CMP described as Objective A monitoring to collect data for the Agency. These data will be made available to supplement State/Tribal datasets as well.</li> <li>• EPA, States and Tribes have joined to form two workgroups to explore options for distributing funds for State/Tribal monitoring plans and to develop adaptive response monitoring to more quickly respond to events in this watershed.</li> </ul>
<b>Scope of the plan should be expanded to alter technical approach used, duration of monitoring, and type of analytes and media sampled</b>	<ul style="list-style-type: none"> <li>• Regarding requests for scope expansion and addition of analytes, sites, and media that do not apply to Objective A, EPA will provide two million dollars of CWA funds to Tribes/States to develop their own plans to incorporate the types of scope and content expansions they are suggesting in these comments.</li> <li>• Regarding requests for addition of analytes, sites, and media that apply to Objective A, EPA has incorporated applicable changes and suggestions provided in the comments that apply to Objective A.</li> <li>• Regarding extending the Agency CMP monitoring duration beyond 1 year, the EPA CMP duration is clarified to indicate that the duration is flexible and may be extended if needed beyond 1 year.</li> </ul>
<b>Groundwater/well sampling should be addressed</b>	<ul style="list-style-type: none"> <li>• Regarding the need to address groundwater/well water, EPA has initiated fate and transport modeling to inform groundwater/well water monitoring needs that will be addressed under separate cover. In addition, States/Tribes may use the EPA Clean Water Act monitoring funds to sample groundwater/well water under their own plans.</li> </ul>
<b>Greater detail regarding data assessment, benchmarks, data management and communication planning is needed in plan</b>	<ul style="list-style-type: none"> <li>• EPA has included requested details in the CMP (see appendices to CMP).</li> </ul>



## **IV. Context for Conceptual Monitoring Plan and Data Uses**

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This monitoring plan is conceptual in that it outlines the objectives, boundaries, and guiding principles for this effort. The draft version of the CMP allowed for stakeholder review and input prior to finalization of this version and more detailed documents. It is not intended to replace a Quality Assurance Project Plan (QAPP) or Sampling and Analysis Plan; but rather, serves to direct the development of such.

The monitoring effort described in this document will support identification of changes and characterization of conditions in the watershed potentially affected by the GKM Release Incident. These data may be useful for a variety of purposes for the EPA, States, Tribes, and stakeholders and serve to increase our understanding and characterization of conditions across the watershed. A variety of media will be sampled and the objective of this study is described in Section V. This monitoring and associated assessment are not intended to supplant State and Tribal program monitoring and assessment under the Clean Water Act or site assessment/remedial investigations under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA); however, this monitoring and data collection will support such efforts. The EPA also may use a variety of regulatory and response authorities to conduct studies, initiate cleanup actions, facilitate public participation, and otherwise contribute to the cleanup of watersheds contaminated with hazardous substances and wastes. The EPA has developed guidance for federal and state program managers on integrating waste and water program to restore watersheds, which can be found here:

<http://www.epa.gov/superfund/resources/pdfs/cross-program.pdf>

Monitoring and assessment efforts occurring prior to the GKM Release Incident identified pre-existing impairments to water quality, sediment quality, and biological communities in this watershed. Numerous sources of metals contamination are present that have impacted environmental quality before the GKM Release Incident and continue to impact environmental quality post-GKM Release Incident. Therefore, our ability to determine if current environmental impacts relate to the GKM Release Incident is confounded by the presence of these other sources, and typical conditions in many areas of this watershed are neither pristine nor free of impairments. New data that are gathered can be best understood with respect to the GKM Release Incident by a comparison to previous conditions that reflect historic impairment sources. Hence, the ease of interpretation of data gathered under this plan greatly depends on the amount and quality of historic data that are available for comparison. Sites, media, and analytes for which there are robust historic datasets for pre- and post-release comparison will be the most useful in understanding whether typical conditions in this watershed are being maintained after the GKM Release Incident. A comparison of current data to data collected under pre-release/historic conditions should allow for an understanding of whether there are changes in water quality and sediment quality post-GKM Release Incident over the next year or whether typical conditions are witnessed. The assessment methodology (Appendix B) describes how these comparisons will be made.

Some sites that do not have robust datasets will be sampled because they are necessary to provide a more complete geographic distribution of data collection under this plan. Data for sites, or certain

media, or analytes, for which there is not a historic dataset for comparison, may not be useful for determining changes in environmental quality as a result of the GKM Release Incident and should not be used to this end. However, these data are important for increasing our understanding and characterization of the watershed with respect to the many complex existing contaminant sources and stressors that have been and continue to be present. These data serve to inform stakeholders of the environmental conditions across the wider watershed, begin the development of a historic data set for more locations in the watershed, and provide valuable information for decision makers.

After completing one year of monitoring under this plan, EPA may conduct additional site-specific investigations, as appropriate, and use its authorities to work with other federal agencies, States, Tribes, and local entities to address identified problems. The EPA is coordinating with its regulatory partners and affected stakeholders to understand other organizations' monitoring efforts, prevent duplication, and promote data sharing.

## **V. Objectives and Study Questions**

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This document outlines EPA's final CMP, assessment goals and general methods for evaluating surface waters, sediments, and biological communities downstream of the GKM Release Incident. This document outlines monitoring to be undertaken by the EPA that will support collaborative assessment of the pre- and post-release conditions by EPA and key stakeholders. States and Tribes may consider this a framework for additional sampling that they wish to undertake.

The objective of the monitoring plan is limited in scope by the availability of historic or pre-release data. In this document, pre-release data include results of sampling that occurred just prior to the GKM Release Incident. Historic data include longer term data sets that reflect many years of sampling and contaminant trends. Pre-release and historic data for metals in sediment, metals in water and biological assemblages are available for the Animas River in Colorado and Southern Ute Indian Reservation due to the proximity of mine locations and past and continued interest in the effects of mining run-off. However, pre-release and historic data for both metals in sediment and water as well as biological information are less abundant further downstream on the Animas and San Juan River in New Mexico, Ute Mountain Ute Reservation, the Navajo Nation, and Utah. Sites both with and without robust historic datasets will be sampled. It is important to note that EPA's ability to assess these data with respect to its objective will vary due to the discrepancy of available pre-release and historic data

- **Study Objective (formerly Objective A):** Identify changes in surface water quality, sediment quality, biological tissue contaminants, and biological community metrics since the GKM Release Incident in Cement Creek, Animas River, and the San Juan River by comparing post-release data against pre-release or historic trends.

For this effort, it is necessary that data be collected at sites for which historic and/or pre-release data are available so that historic and/or pre-release data may be compared to the data collected through this monitoring effort. However, we note that sampling locations are identified in this document that include those both with and without historic data. All of these sites will be sampled either to meet the study objective of this CMP or to ensure geographic coverage of monitoring across this watershed to

support a greater understanding of conditions and further modeling efforts that may be undertaken by EPA ORD. Current modeling efforts are providing key information regarding fate and transport of sediments in this watershed, areas in which sediment may have been deposited after the release, and areas in which metal loading may be influenced by sources other than the Gold King Mine in the San Juan River. More information regarding EPA ORD's fate and transport modeling may be found at <https://www.epa.gov/goldkingmine/epas-draft-analysis-fate-and-transport-metals-animas-and-san-juan-rivers>.

Table 5 of this document identifies our current understanding of the type of historic data available for each sampling site of the CMP that was collected after 2009 (the period of record for the CMP assessment is 2009 to the present, which will be discussed further in Section VII).

### **Assessment Objective**

Compare pre-release/historic and post-release surface water data, sediment data and biological data of Cement Creek, the Animas River, and the San Juan River.

### **Study Questions**

1. - Have water and sediment quality trends in Cement Creek, the Animas River, and the San Juan River changed since the GKM Release Incident?
  - a. - What are the water column and sediment metals concentrations/loadings and how do they compare to pre-release or historic trends?
  - b. - What are the conditions of the biological communities, macroinvertebrates and fish, and how do the indices used to assess them compare to pre-release or historic conditions?
2. - If post-release conditions are of lower quality than pre-release/historic conditions, are water quality standards or screening levels exceeded for human health (including recreation and fish consumption), agriculture, and aquatic life in the watershed?
  - a. - If metals concentrations in sampled media are higher than pre-release/historic trends, are they meeting screening levels identified as acceptable for recreation, agriculture, and aquatic life? Screening levels that may be used by EPA include those benchmarks identified as part of the GKM Release Incident emergency response and other applicable water quality standards or benchmarks.

## **VI. Monitoring Frequency and Analytes of Interest**

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The EPA anticipates that the sampling under this plan will occur during the first year after completion of the GKM Release Incident response monitoring activities conclude (fall 2015 to fall 2016). This duration will ensure that data are collected across the full range of seasonal flow conditions after the GKM Release Incident. At that time, the need for additional monitoring and assessment and the entities best suited to undertake further monitoring will be determined.

Table 3 summarizes the frequency of monitoring under this plan as well as the type of data to be collected. The full suite of metals that were monitored during the emergency response will be monitored under this plan for consistency. However, not all of the metals monitored during the emergency response (and through this effort) are expected to be present in the GKM discharge. The primary metals of interest associated with the GKM include: aluminum, cadmium, copper, iron, lead, manganese, and zinc. Some additional metals, beyond those monitored during the emergency response, have been added in response to comments received on the Draft CMP.

<b>Table 3. Sampling and Monitoring Schedule For Sampling Sites Listed in Table 5</b>					
<b>SAMPLING AND MONITORING SCHEDULE:</b>	<b>FALL 2015 (COMPLETED)</b>	<b>SPRING 2016</b>	<b>MAY/ JUNE 2016</b>	<b>SUMMER 2016 STORM EVENTS</b>	<b>FALL 2016</b>
<b>WATER COLUMN</b> - dissolved and total metals <sup>1</sup> , dissolved organic carbon (DOC), total organic carbon (TOC), alkalinity, total suspended solids (TSS), total and dissolved hardness	1 event	1 event: pre-snow melt	1 event: snowmelt runoff	1-2 storm events	1 event: low flow
<b>SEDIMENT</b> – total metals <sup>1</sup>	1 event	1 event: pre-snow melt	1 event if flow conditions allow	1-2 storm events if flow conditions allow	1 event: low flow
<b>BENTHOS AND FISH TISSUE</b> <sup>1</sup> – metals					1 event: low flow
<b>BIOLOGICAL COMMUNITY</b> – benthic macroinvertebrate and fish populations	1 event				1 event
<b>PHYSICAL HABITAT</b>	Collected once at each site sampled for macroinvertebrates and fish – likely at fall event				
<b>FIELD PARAMETERS</b> –	All sampling events will include field parameters (pH, temperature, dissolved oxygen (DO), conductivity and turbidity) measured with a probe/sonde.				
<b>FLOW</b> –	Flow data will be measured via stream gage or by flow meter				
<sup>1</sup> Aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, chromium III, chromium VI, cobalt, copper, iron, lead, magnesium, manganese, mercury, molybdenum, nickel, potassium, selenium, silver, sodium, strontium, thallium, uranium, vanadium, and zinc					

## VII. Site Selection and Assessment Approach

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The following summarizes the site selection and general assessment approach for the watershed.

### ***Sampling and monitoring location selection***

The EPA has identified 30 monitoring locations along Cement Creek, Mineral Creek, the Animas River, the San Juan River, and Lake Powell based upon State, Tribal or local interest; locations used in the emergency response; and long-term data availability. Reference/background sites necessary for state or tribal assessments are included. The detailed list of sampling locations is provided in Section VIII, Table 4.

### ***Assessment Summary***

For data interpretation, post-release monitoring surface water, sediment, and biological data will be compared against historic data, pre-release metals levels, risk-based screening levels and/or applicable water quality standards. See Appendix B for more details regarding the CMP assessment methods. We have selected a period of record from June 1, 2009 to a date shortly before the release (August 2015) to represent the pre-release/historic conditions. If necessary and appropriate, we may extend the period of record further back to 2005. We are unlikely to go further back than 2005 because of changes in the Cement Creek watershed that affected water quality.<sup>1</sup> We anticipate 1) rapidly screening data against observed historical maxima as it becomes available throughout the fall 2015 to Fall 2016 period, and also 2) conducting a more thorough comparison of the full dataset based upon the historic data and applicable benchmarks after the fall 2016 sampling event. The results from both rapid screening and complete assessment will be made available consistent with our communication strategy (Appendix E). Appendix B contains a more detailed version of our anticipated assessment methodology. The assessment approach and methods used will depend upon the abundance of the historic data, which varies across sites and analytes.

Biological community information will be compared against pre-release/historic data using State/Tribal assessment methods. Data assessment methods for each site are based upon the quantity and quality of the historic data. For sites with more abundant historic data, a statistical analysis of pre- and post-release conditions may be possible. Sites with limited historic data may not be suitable for a statistical comparison of pre- and post-release conditions and may provide only a qualitative understanding of changes in water and sediment quality. For these sites, although we will not make impairment determinations, exceedances of water quality criteria under the Clean Water Act pre- and post-release may serve to inform whether further study is warranted for confirmation. It is anticipated that the following decision rules will apply:

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<sup>1</sup> <http://animasriverstakeholdersgroup.org/blog/index.php/2015/10/23/gold-king-timeline/>

General Decision Rules:

- **If the one-year monitoring study indicates that pre-release water quality and sediment trends are similar to trends observed prior to the GKM release:**
  - The EPA will evaluate whether or not there is the need for additional EPA monitoring under this plan; and
  - Work with our State and Tribal partners to communicate waterbody condition in comparison to water quality standards and/or screening level benchmarks to stakeholders.
- **If the one-year monitoring study indicates that pre-release water quality, sediment quality, or biological community tissue values or community metrics have declined since the GKM release AND sediment screening levels or water quality standards are exceeded:**
  - The EPA will conduct additional site-specific investigations and monitoring as appropriate and use its authorities to work with other federal agencies, States, Tribes, and local entities to address these problems; and
  - Work with our State and Tribal partners to communicate waterbody condition in comparison to water quality standards and/or screening level benchmarks to stakeholders.
- **If the monitoring data for any site cannot be compared to pre-release conditions/historic data:**

The EPA will work with our State and Tribal partners to communicate waterbody condition in comparison to water quality standards and/or screening level benchmarks to stakeholders. Conditions will not be attributable to GKM Release Incident using these data alone.

***Screening Levels, Standards, and Benchmarks***

As described above, screening levels, standards, and benchmarks will be used to assess data collected through this CMP if changes from historic conditions are identified. Appendix B describes this step-wise assessment process.

Sediment screening levels that were used for the GKM Release Incident response decisions will be used in data assessment under this plan as well. See Appendix C for a list of these screening levels.

Water Quality Standards:

Acute and chronic water quality standards/criteria for the watershed are complex and best referenced through each jurisdictional authority as these water quality criteria are segment- and analyte-specific and are hardness-dependent in many cases. A summary of the benchmarks used for this plan is provided in Appendix C. Applicable State, Tribal, and EPA water quality standards can be found at:

- State of Colorado

<https://www.colorado.gov/pacific/cdphe/water-quality-standards>

[ftp://ft.dphe.state.co.us/wqc/wqcc/Current%20Water%20Quality%20Standards/Currently%20Effective%20Standards/34\\_SanJuan\\_Effective\\_03-01-2016/](ftp://ft.dphe.state.co.us/wqc/wqcc/Current%20Water%20Quality%20Standards/Currently%20Effective%20Standards/34_SanJuan_Effective_03-01-2016/)

[ftp://ft.dphe.state.co.us/wqc/wqcc/Current%20Water%20Quality%20Standards/Currently%20Effective%20Standards/31\\_SurfaceWaterBasicStandards\\_Effective\\_1-31-2013/31\\_2013\(01\).pdf](ftp://ft.dphe.state.co.us/wqc/wqcc/Current%20Water%20Quality%20Standards/Currently%20Effective%20Standards/31_SurfaceWaterBasicStandards_Effective_1-31-2013/31_2013(01).pdf)

- Navajo Nation

<http://www.navajonationepa.org/Pdf%20files/Navajo%20Nation%20Surface%20Water%20Quality%20Standards%202007.pdf>

- Southern Ute Tribe – Contact the tribe or EPA Region 8, 303-312-6947

<https://www.southernute-nsn.gov/environmental-programs/water-quality/>

- State of New Mexico

<http://164.64.110.239/nmac/parts/title20/20.006.0004.pdf>

- State of Utah

<http://www.rules.utah.gov/publicat/code/r317/r317-002.htm>

- Ute Mountain Ute Tribe

[http://www.utemountainuteenvironmental.org/umep/assets/File/Water/Surface%20Water%20Standards/UMU\\_WQS\\_2011Revision\\_042011\\_supplimental.pdf](http://www.utemountainuteenvironmental.org/umep/assets/File/Water/Surface%20Water%20Standards/UMU_WQS_2011Revision_042011_supplimental.pdf)

- US EPA Fish Tissue Human Health Criteria

<https://www.epa.gov/wqc/human-health-criteria-methylmercury>

<https://www.epa.gov/wqc/aquatic-life-criterion-selenium-documents>

Biological Community Indices: -

State, Tribal, and national Multimetric Indices (MMIs) will be applied to assess biological data. -  
Indices include metric such as diversity, richness, relative abundance, percent EPT, and others. -  
Jurisdictionally specific MMIs will be applied as available. EPA/State National Aquatic Resource -  
survey indices may be used to enable longitudinal, cross-comparison of biological conditions. -

Biological Tissue Benchmarks:

There are no benchmarks for macroinvertebrate tissue concentrations. Therefore, the change in concentration of metal tissues values for historic/pre- and post-GKM Release Incident will be used to inform the need for further study. For fish tissue metals concentrations, EPA's Clean Water Act Section 304(a)(1) recommendations will be used in assessment.

## VIII. Sampling Locations

Table 4 provides sampling locations for the monitoring described in this plan. Section XI provides associated maps for these locations.

<b>Table 4. Sampling Sites: description and location. Asterisks (*) identify sites that act as background/reference for the release.</b>						
<b>Location</b>	<b>Associated Location(s)</b>	<b>Site Organization</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Description/Location</b>	<b>USGS gage available?</b>
CC48	CC48	EPA	37.819984	-107.663275	Cement Creek upstream from Animas	Y
	09358550	USGS				
	323	CORW				
A68*	A68	EPA	37.811202	-107.659167	14th Street Gauge @ 13th Street Bridge	Y
	09358000	USGS				
	103	CORW				
M34*	M34	EPA	37.8028	-107.6722	Mineral Creek just upstream of the Animas River	Y
	09359010	USGS				
A72	A72	EPA	37.79027	-107.667578	Animas Gauge below Silverton	Y
	09359020	USGS				
	82	WQCD				
	3611	CORW				
	3517	CPW				
A73	A73	EPA	37.72215833	-107.65482778	Animas upstream of Elk Creek	N
	3442	CORW				
	3516	CPW	37.72643	-107.65517	Animas at Elk Park, approximately 200 m upstream of Elk Creek	N
A75D	A75D	EPA	37.59793424	-107.77532681	Animas upstream of Cascade Creek	Y
	3438	CORW			Animas upstream of Cascade Creek	
	09359500	USGS			Animas River at Tall Timbers	
	3515	CPW	37.59996	-107.77032	Animas River, below Crazy Women Gulch	
Bakers Bridge	Bakers Bridge	EPA	37.454134	-107.801601	Baker Bridge 20 miles south of Silverton	N
	GKM02	EPA				
	88	CORW				
9426	9426	WQCD	37.38506	-107.83686	Animas near Trimble Bridge downstream of Hermosa Creek	N
	89	CORW				
Oxbow Park	Oxbow Park <i>sediment only</i>	EPA	37.309037	-107.855714	Animas River at Oxbow Park	N
32nd St Bridge	32nd St Bridge	EPA	37.299991	-107.868199	Bridge at 32nd Street in Durango	N
	371759107520601	USGS				
	3577	CORW				
	Animas-Rotary Park	EPA	37.280718	-107.876927	Animas at Rotary Park	Y



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Animas-Rotary Park	09361500	USGS	37.274429	-107.88454	Animas at DHS pedestrian bridge to 9 <sup>th</sup> Street, approximately 350 m downstream of Rotary Park (this could go with GKM05)	
	91	CORW				
	3576	CORW				
	12150	CPW				
GKM05	GKM05	EPA	37.268704	-107.885857	Animas upstream of Lightner Creek (Hwy 160 Bridge)	Y
	09361500	USGS				
	9418	WQCD				
AR19-3	AR19-3	SUIT	37.2213842	-107.854161	Animas River at the Southern Ute Boundary	Y
	Purple Cliffs	EPA			Animas upstream of the Southern Ute Boundary	
	09363500	USGS			Animas River at Cedar Hill	
	GKM01	EPA	37.221542	-107.859455	Animas upstream of the Southern Ute Boundary	
	371319107515001	USGS			Animas upstream of the Southern Ute Boundary	
	3590	CORW			Animas upstream of the Southern Ute Boundary	
	92	WQCD			Animas upstream of the Southern Ute Boundary	
	NAR1	SUIT			Animas River at the Southern Ute Boundary	
	10245	CPW			Animas at Purple Cliffs	
AR7-2	AR7-2	SUIT	37.084992	-107.878383	Animas River upstream of Florida River	N
	NAR4	SUIT				
AR2-7	AR2-7	SUIT	37.04431	-107.872392	Animas downstream of Florida River confluence	N
	NAR6	SUIT	37.024806	-107.8738		
ADW-022	ADW-022	EPA	36.920559	-107.909909	Animas River at the Aztec Domestic Water System Intake	N
ADW-021	ADW-021	EPA	36.872838	-107.960741	Animas River at Intake Sampling Location	N
ADW-010	ADW-010	EPA	36.837463	-107.991684	Animas River at Hwy 550 Bridge below Aztec	Y
	09364010	USGS				
	66Animas028.1	NM				
	66NM078.1 (NM0020168)	NM				
FW-012	FW-012	EPA	36.783635	-108.102111	Animas River at Intake Sampling Location	N
	66Animas017.4	NM				
	4136	CORW				
FW-040	FW-040	EPA	36.783635	-108.102111	Animas River upstream of the San Juan River	Y
	09364500	USGS				
	66Animas001.7	NM				
SIAR*	SIAR	EPA	36.706709	-108.19835	San Juan River just upstream of the Animas River	N
	66SanJua101.6	NM				

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LVW-020	Animas River at Intake Sampling Location	EPA	36.730556	-108.251046	Animas River upstream of the San Juan River	N
	09365000	USGS	36.73588701	-108.2539868		
	66SanJua100.2	NM	36.7217	-108.224		
SJLP	SJLP	EPA	36.73588701	-108.2539868	San Juan River downstream of the confluence with the Animas	Y
	09365000	USGS			San Juan River in Farmington, NM	
	67SanJua096.3	NM				
SJFP	SJFP	EPA	36.74815602	-108.4120157	San Juan River near Farmington, NM	N
	NMRM-1005	EPA				
	09367540	USGS				
	67SanJuan082.6	NM				
SJSR	SJSR	EPA	36.78162422	-108.6927838	San Juan River near Shiprock, NM	Y
	09368000	USGS				
SJ4C	SJ4C	EPA	37.002775	-109.03177	San Juan River near Four Corners (CO/NM border)	Y
	4954000	Utah			San Juan River near Four Corners (near Hwy 161 in CO/UteMtnUte)	
	09371010	USGS			San Juan River near Four Corners	
SJMC	SJMC	EPA	37.258226	-109.310604	San Juan River upstream of Montezuma Creek	N
	4953990	Utah				
SJBB	SJBB	EPA	37.257527	-109.618941	San Juan River near Bluff	N
	4953250	Utah	37.260279	-109.613734	San Juan River near Bluff - San Island	
	UTRM-1009	EPA			San Juan River near Bluff	
SJMh	SJMh	EPA	37.146948	-109.853672	San Juan River in Mexican Hat	Y
	4953000	Utah				
	09379500	USGS				
SJCH	SJCH	EPA	37.293008	-110.399621	San Juan River / Lake Powell at Clay Hills boat ramp	N
	4952942	Utah				
	371248110395301	USGS				

\*Background/reference sites – data to be used to characterize background loading to Animas and San Juan unrelated to Gold King Mine Influence.

Table 5 identifies historic data availability by site and media type.

Table 5. Summary of historic (i.e. 2009 or later) data availability by site. Asterisks (*) indicate immediately pre-release data are available. "Limited" indicates that data are available but are very limited. There may be sites in addition to those already identified for which data are extremely limited.						
Site	Water column - metals	Sediment - metals	Fish tissue - metals	Benthic tissue - metals	Macro-invertebrate population	Fish population
CC48	Yes	Yes	No	No	No	No (fishless)
A68	Yes	Yes	No	Yes	Yes	No
M34	Yes	Yes	No	Yes	Yes	No
A72	Yes	Yes	No	Yes	Yes	No (fishless)
A73	Yes	Yes	No	Yes	No	Yes
A75D	Yes	Yes	No	Yes	Yes	Yes
Bakers Bridge	Yes*	Yes	No	Yes	Yes	No
9426	Yes	No	No	No	Yes	No
Oxbow Park	No	No	No	No	No	No
32nd St. Bridge	Yes*	Limited	No	No	Yes	No
Animas – Rotary Park	Yes	No	No	No	Yes	Yes
GKM05	Yes	No	No	No	No	No
AR19-3	Yes*	No	Yes	No	Yes*	Yes
AR7-2	Yes	Yes	No	No	Yes*	No
AR2-7	Yes*	No	Yes	No	No	No
ADW-022	Limited*	No	No	No	No	No
ADW-021	Limited*	No	No	No	No	No
ADW-010	Limited*	No	No	No	No	No
FW-012	Limited	No	No	No	No	No
FW-040	No	No	No	No	No	No
SJAR	Limited	No	No	No	No	No
LVW-020	Limited	No	No	No	No	No
SJLP	Limited*	No	No	No	No	No
SJFP	Limited*	No	No	No	Yes	Yes
SJSR	Limited*	No	No	No	No	No
SJ4C	Limited*	Limited	No	No	No	No
SJMC	Limited*	Limited	No	No	Yes	Yes
SJBB	Yes*	Limited	Yes	No	Yes	Yes
SJMH	Yes*	Limited	No	No	No	No
SJCH	Yes	No	No	No	No	No

## IX. Methods

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The following analytical and field methods will be used for sample collection and analysis under this monitoring plan:

1. - Dissolved metals in water:
  - ICP-MS Dissolved Metals in Water (EPA 200.8); ICP Dissolved Metals in Water (EPA 200.7); IC Hexavalent Chromium in Water (EPA 218.7)
2. - Total metals in water:
  - ICP-MS Total Metals in Water (EPA 200.8) and ICP Total Metals in Water (EPA 200.7); IC Hexavalent Chromium in Water (EPA 218.7)
3. - Mercury:
  - EPA 1631
4. Methylmercury:
  - EPA 1630
  - EPA 1630 as modified for tissue in USGS Water-Resources Investigations Report 03-4183
5. - Dissolved organic carbon (DOC):
  - EPA 415.2
6. - Total organic carbon (TOC):
  - EPA 415.1
7. - Hardness:
  - SM 2340B
  - Calculated from dissolved metals samples
8. - Total metals in sediment:
  - ICP-MS Total Metals in Soil (EPA 200.8) and ICP Total Metals in Soil (EPA 200.7)
9. - Field methods:
  - EPA Sampling Standard Operating Procedures: Emergency Response Team (ERT) Standard Operating Procedures (SOPs) for surface water and sediment.
  - EPA Region 8 Water Sampling Standard Operating Procedure (SOP) and Sediment Sampling SOP.
  - NMED SOP Chemical Sampling in Lotic Environments, available at - <https://www.env.nm.gov/swqb/SOP/> -
  - EPA ERT SOPs general website: [http://www.epaosc.org/site/site\\_profile.aspx?site\\_id=2107](http://www.epaosc.org/site/site_profile.aspx?site_id=2107)
  - Surface water sampling SOP: <http://www.epaosc.org/sites/2107/files/2013-R00.pdf>
  - Sediment sampling SOP: <http://www.epaosc.org/sites/2107/files/2016-R00.pdf>
  - Macroinvertebrate sampling options – methods may vary by location
    - Use method used for historical data collection for historical comparability
    - These may be a state or tribal method, an EPA Remedial Program method, or the EPA's National Rivers and Streams Survey Method<sup>2</sup>
  - Fish community sampling options – methods may vary by location
    - Use method used for historic/pre-release data collection for pre-release/historic comparability
    - These may be a state or tribal method, an EPA Remedial Program method, or the EPA's National Rivers and Streams Survey Method<sup>1</sup>

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<sup>2</sup> [www2.epa.gov/sites/production/files/2013-11/documents/nrsa\\_field\\_manual\\_4\\_21\\_09.pdf](http://www2.epa.gov/sites/production/files/2013-11/documents/nrsa_field_manual_4_21_09.pdf)

- Habitat Assessment options – methods may vary by location
  - Use method used for historical data collection for historic comparability
  - These may be a state or tribal method, an EPA Remedial Program method, or the EPA's National Rivers and Streams Survey Method<sup>1</sup>
- Fish tissue sampling – methods may vary by location
  - Use method used for historical data collection for historic comparability

## **X. Quality Assurance/Quality Control**

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A QAPP has been developed to describe the data quality objectives, the detailed sampling and analysis plan, field and laboratory quality control requirements, data handling and storage, standard operating procedures for field and laboratory activities, and other quality assurance for this monitoring plan. This QAPP will be updated to reflect changes in this CMP since the September 17, 2015 draft and will conform to *QA/R-5 EPA Requirements for Quality Assurance Project Plans*.

The EPA plans to use a single, National Environmental Laboratory Accreditation Conference (NELAC)-accredited lab that conforms to American National Standard ASQ/ANSI E4 quality assurance systems. Split samples may be provided to a second accredited laboratory for analytical verification.

## **XI. Data Management**

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The EPA anticipates using a single lab for metals analysis in order to facilitate data delivery and sharing. We also anticipate using an online SCRIBE database to share data and uploading the data to the EPA's WQX/STORET data warehouse for long-term storage. WQX/STORET is publicly available. Appendix D is the Data Management Plan for this effort.

## **XII. Data Assessment**

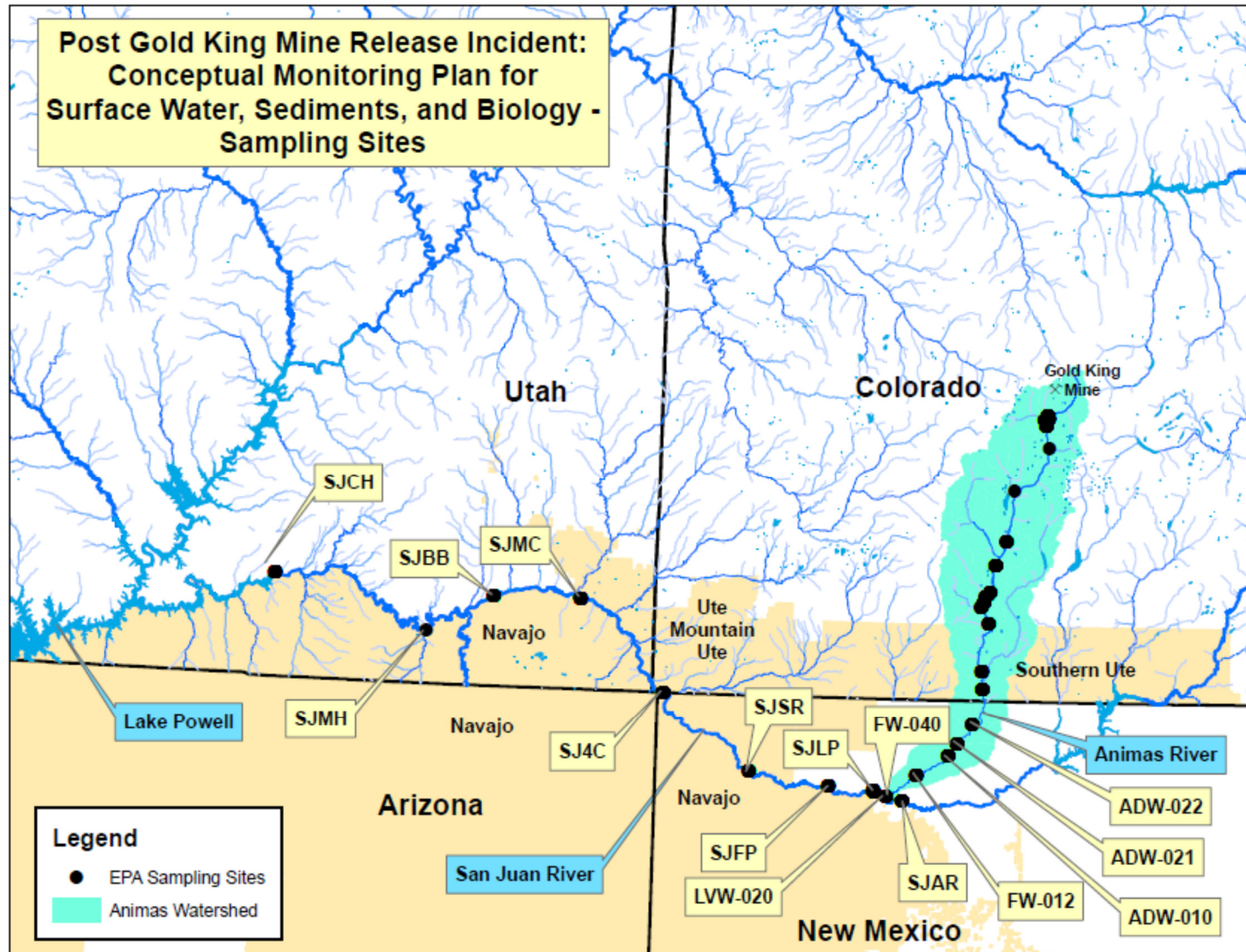
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The objective of this monitoring effort is to identify changes in metals concentrations in surface water, sediment, and biological conditions since the GKM Release Incident in Cement Creek, Animas River, and San Juan River for at least one year after the end of the emergency response. Data assessment is described generally in Section VII. Additional detail regarding data assessment approaches are included in Appendix B. For sites with more abundant historic data, a statistical analysis of pre- and post-release conditions may be possible. Sites with limited historic data may not be suitable for a statistical comparison of pre- and post-release conditions and may provide only a qualitative understanding of changes in water, sediment, and biological integrity. For these sites, although we will not make impairment determinations, exceedances of water quality criteria under the Clean Water Act pre- and post-release may serve to inform whether further study is warranted.

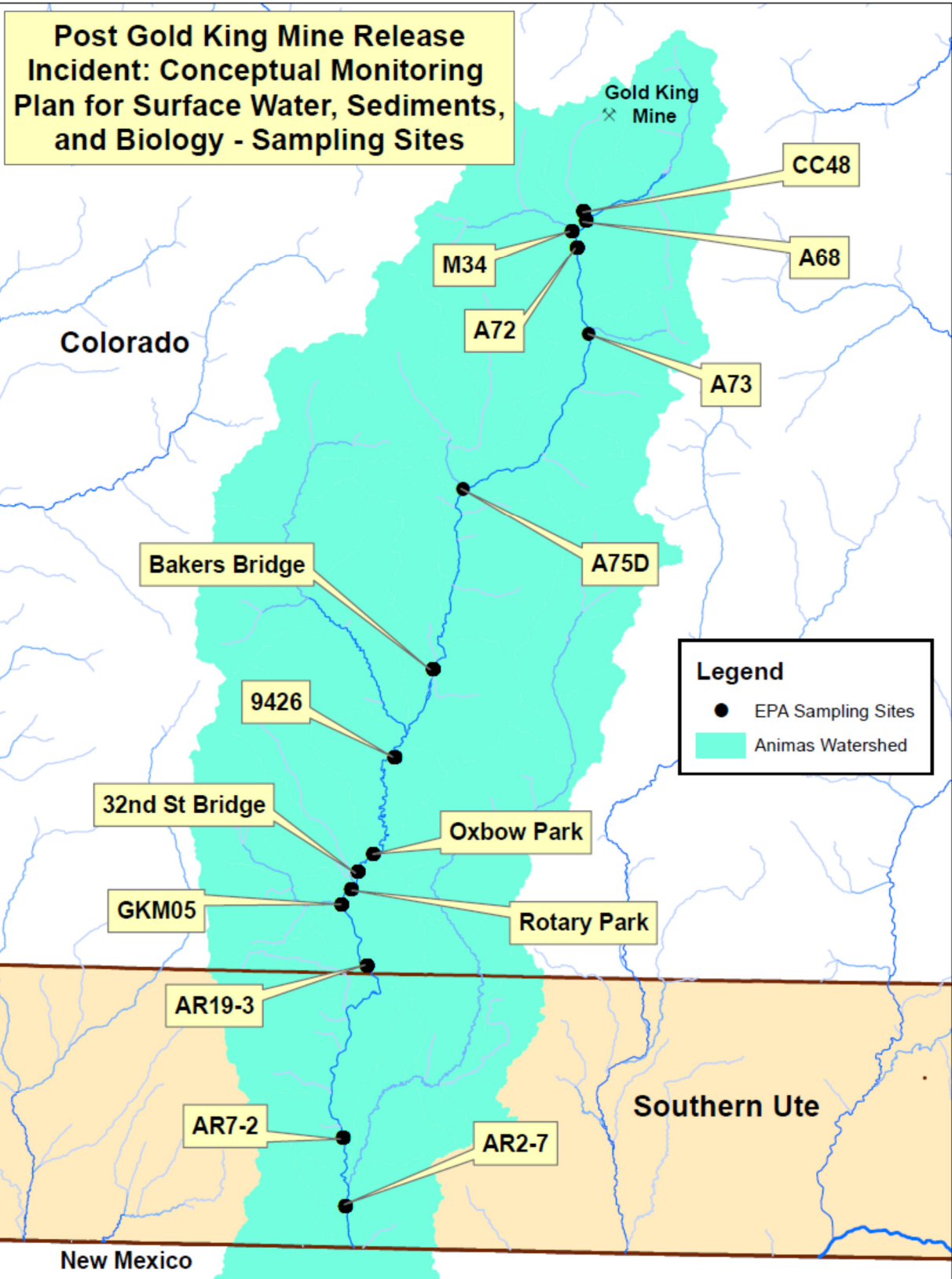
When completing condition assessments, State and tribal assessment methods will be considered in assessing data against water quality standards. Available assessment methods include the following:

- State of Colorado –  
<https://www.colorado.gov/pacific/sites/default/files/303dLM2016.pdf>
- State of New Mexico –  
[https://www.env.nm.gov/swqb/protocols/documents/2016\\_FINAL\\_AP\\_062215.pdf](https://www.env.nm.gov/swqb/protocols/documents/2016_FINAL_AP_062215.pdf)
- State of Utah –  
[http://www.deq.utah.gov/ProgramsServices/programs/water/wqmanagement/assessment/docs/2015/03Mar/303d\\_AssessmentMethodology.pdf](http://www.deq.utah.gov/ProgramsServices/programs/water/wqmanagement/assessment/docs/2015/03Mar/303d_AssessmentMethodology.pdf)

XI. Figures -









## **Appendix A: Responses to Comments on Draft Conceptual Monitoring Plan**

See response to comment document under separate cover. -

## Appendix B: Assessment Methods

Appendix B. Post-GKM release monitoring data assessment methods. The primary metals associated with the GKM discharge include: zinc, aluminum, cadmium, copper, lead, manganese and iron. Assessment will focus on these metals.	
<b>Initial Screening (upon receipt of data):</b> As surface water and sediment metals data are received, they will be assessed on a rolling basis against maxima of historic data. Results will be communicated per the Communication Strategy described in Appendix E.	
<b>Water Column</b>	
1 – Characterize pre-release/historic data	<p>Evaluate water column data availability at each site or cluster of sites, per Conceptual Monitoring Plan (CMP) Table 4, from June 1, 2009 to before the plume (this will vary by site, but is generally early August 2015).</p> <ul style="list-style-type: none"> <li>• Identify and flag any snowmelt run-off or storm-event associated data. <ul style="list-style-type: none"> <li>○ Use meteorological, gage, and flow data to graphically analyze and confirm suspected storm events.</li> </ul> </li> <li>• If fewer than 10 data points are available for a particular parameter, consider pooling data from contiguous sites either by water quality standards-based segment or other appropriate, ecologically relevant factors (e.g. discharger locations, tributaries, geomorphology).</li> <li>• After pooling, if fewer than 10 data points are available for a particular parameter or flow condition, a comparison between the new and historic data may not be possible.</li> <li>• Develop summary statistics by constituent: n, minimum, maximum, median, 90<sup>th</sup> percentile.</li> </ul>
2 – Screen post-GKM release data against historic data	<p>Compare post-GKM release monitoring plan data to comparable historic dataset based on flow and/or season (e.g., if historic dataset does not include snowmelt runoff or storm data, it may be necessary to exclude these data for comparability)</p> <ul style="list-style-type: none"> <li>• Identify if/where each post-GKM release monitoring data point falls within the distribution of historic data.</li> <li>• Plot data to visually analyze or identify trends.</li> <li>• If a value exceeds the 90<sup>th</sup> percentile of historic data, then examine dataset more closely to better understand and interpret these results.</li> <li>• Statistical analysis may be undertaken in addition to percentile-based analysis to compare "historic" and "post-release" groups or improve understanding and data interpretation.</li> <li>• If no values exceed the 90<sup>th</sup> percentile of the historic data, then communicate comparison to WQS (described in General Decision Rules of CMP) and discontinue monitoring under this plan.</li> </ul> <p>For fall 2016 report, investigate statistically significant differences between historic and post-GKM datasets by pooling data across broader areas to increase the number of data points within each group.</p>
3 – Assess relevant benchmarks	<p>Where post-GKM data exceed the 90<sup>th</sup> percentile, compare post-GKM release data to applicable water quality standards or other relevant risk-based screening thresholds (for water, these include recreation and agriculture).</p> <ul style="list-style-type: none"> <li>• Comparisons to applicable water quality standards will be based on the jurisdictional state or tribal method.</li> <li>• Recreational and agricultural threshold comparisons will be on point-by-point basis.</li> </ul>

	<ul style="list-style-type: none"> <li>If any exceedances occur, additional study or continued monitoring will be evaluated.</li> </ul>
4 -- Assess changes in impairment status	If historic data prevent comparison with post-GKM release monitoring data, incorporate the new data into an assessment of water quality standards consistent with state or tribal methods. Then compare the new impairment status based upon this comparison to the previous impairment status.
<b>Sediment</b>	
1 – Characterize pre-release/historic data	<p>Evaluate sediment data availability at each site (or cluster of sites per CMP Table 4) from June 1, 2009 to before the plume (this will vary by site, but is generally early August 2015).</p> <ul style="list-style-type: none"> <li>If fewer than 10 data points are available for a particular parameter, consider data from pooling contiguous sites either by water quality standards-based segment or other appropriate, ecologically relevant factors (e.g. dischargers, tributaries, and geomorphology).</li> <li>After pooling, if fewer than 10 data points are available for a particular parameter or flow condition, a comparison between the new and historic data may not be possible.</li> <li>Develop summary statistics by constituent: n, minimum, maximum, median. <ul style="list-style-type: none"> <li>Statistical methods, such as those through Pro-UCL, may be used to help estimate maxima.</li> </ul> </li> </ul>
2 – Assess post-GKM release data against historic data	<p>Compare post-GKM release monitoring plan data to historic data.</p> <ul style="list-style-type: none"> <li>Because sediment data is anticipated to be less abundant than water column data, we do not anticipate being able to perform percentile-based analysis at many locations.</li> <li>Compare post-GKM release data to historic data, using the maximum for comparison where possible.</li> <li>If too few data exist for development of a maximum, statistical analysis may be undertaken to compare "historic" and "post-release" groups and improve understanding and results interpretation.</li> </ul> <p>For fall 2016 report, investigate statistically significant differences between historic and post-GKM datasets by pooling data across broader areas to increase the number of data points within each group.</p>
3 – Assess relevant benchmarks	Where post-GKM release data exceed maxima, compare post-GKM release data to recreational and aquatic life screening values for sediment.
<b>Metals in tissue (fish and macroinvertebrates)</b>	
1 – Characterize pre-release/historic data	<p>Evaluate data availability at each site (or cluster of sites per CMP Table 4) from June 1, 2009 to before the plume (this date will vary by site, but is generally early August 2015).</p> <ul style="list-style-type: none"> <li>For fish, focus assessment on an indicator species that is anticipated to be a naturally reproducing population (i.e., not stocked) based upon consultation with stocking authority (likely the State fish and game organization).</li> <li>If necessary, convert data to wet or dry weight for comparability. <ul style="list-style-type: none"> <li>Use dry weight for all constituents except mercury.</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>○ Dry weight for selenium enables comparability with 2015 draft Clean Water Act (CWA) Section 304(a) criteria.</li> <li>○ Wet weight for mercury enables comparability with CWA Section 304(a) criterion.</li> <li>● Investigate any available species or size information to identify differences among species or size classes.</li> <li>● If fewer than 10 data points are available for a particular parameter (and species and/or size class, if differences are identified), consider data from pooling contiguous sites either by water quality standards-based segment or other appropriate segmentation factors (e.g. dischargers, tributaries, and geomorphology).</li> <li>● After pooling, if fewer than 10 data points are available for a particular parameter or flow condition, comparison between the new and historic data may not be possible.</li> </ul> <p>Develop summary statistics by constituent: n, minimum, maximum, median.</p> <ul style="list-style-type: none"> <li>● Statistical methods, such as those through Pro-UCL, may be used to help estimate maxima.</li> </ul>
2 – Assess post-GKM release data against historic data	<p>Compare post-GKM release monitoring plan data to comparable historic data. If a difference among species and/or size distribution is observed in the historic data</p> <ul style="list-style-type: none"> <li>● Identify if/where each post-GKM release monitoring data point falls within the distribution of historic data.</li> <li>● Plot data to visually analyze or identify trends.</li> <li>● If a value exceeds the maximum of historic data, then compare against relevant benchmarks such as water quality standards and screening values used during response.</li> <li>● If no values exceed the maximum percentile of the historic data, then communicate comparison to WQS (described in General Decision Rules of CMP) and discontinue monitoring under this plan.</li> <li>● Statistical analysis may be undertaken to compare "historic" and "post-release" groups or increase understanding and improve data interpretation.</li> </ul> <p>For fall 2016 report, investigate statistically significant differences between historic and post-GKM datasets by pooling data across broader areas.</p>
2 – Assess water quality standards or risk-based thresholds	<p>Where post-GKM data exceed historic conditions, assess against applicable (tissue-based) CWA benchmarks. Please note that only CWA thresholds for fish tissue are available. Conversion into whole fish numbers for methylmercury may be necessary. Possible benchmarks include:</p> <ul style="list-style-type: none"> <li>● State or tribal-adopted methylmercury criteria for human health, and</li> <li>● EPA’s draft 2015 selenium criteria for aquatic life.</li> </ul>
4 -- Assess changes in impairment status	<p>If historic data prevent comparison with post-GKM release monitoring data, assess water quality standards consistent with state or tribal method and then compare the new status to the pre-release status.</p>
<b>Biological communities and physical habitat</b>	

<p>1 – Characterize pre-release/historic data</p>	<p>Evaluate macroinvertebrate, physical habitat, and fish data availability at each site (or cluster of sites per CMP Table 4) from June 1, 2009 to before the plume (this will vary by site, but is generally early August 2015).</p> <ul style="list-style-type: none"> <li>• If fewer than two data points are available for a particular parameter, consider data from pooling contiguous sites containing the same multi-metric indices or sampling protocol.</li> <li>• As datasets allow, different metrics can be developed from macroinvertebrate data, e.g. percent Ephemeroptera, Plecoptera and Trichoptera (% EPT). These metrics may help to better characterize pre-release/historic condition.</li> </ul> <p>Where possible, develop trend analyses and/or summary statistics by constituent: n, minimum, maximum, median, 90<sup>th</sup> percentile.</p>
<p>2 – Assess post-GKM release data against historic data</p>	<p>Compare post-GKM release monitoring plan data to historic data.</p> <ul style="list-style-type: none"> <li>• Because biological and habitat data availability is anticipated to be low, we do not anticipate being able to perform percentile-based analysis at the majority of locations.</li> <li>• Compare post-GKM release data to historic data, using the 90<sup>th</sup> percentile for comparison where possible.</li> <li>• If too few data points exist for development of a 90<sup>th</sup> percentile, compare post-GKM data to historic data.</li> <li>• The use of the same operational taxonomic unit (OTU) list and autecology will be used to ensure the development of metrics and (macroinvertebrate multimetric indices) MMIs are the same as what was done for the historical data.</li> </ul> <p>Comparisons will be made across the same season to ensure appropriate comparisons.</p>
<p>3 -- Assess changes in impairment status</p>	<p>Where post-GKM data exceed the 90<sup>th</sup> percentile or indicate a significant change from historical condition, compare post-GKM release data to applicable benchmarks for biological criteria.</p>

## Appendix C: Benchmarks for Surface Water and Sediment

Per the assessment methods described in Appendix B, data will be compared to applicable and relevant benchmarks **when post-GKM data exceed historic values** to determine if further study is required.

Table 1 of this appendix provides a summary of the benchmarks that will be used when post-GKM data exceed historic values.

Appendix C Table 1. Benchmark Types to Be Used for Assessment When Post GKM Data Exceed Historic Conditions

Matrix Type	Endpoints Considered in Assessment*			
	Aquatic Life/Wildlife Uses	Recreational Use	Water Supply and Fish Consumption Uses	Agricultural Use – including livestock watering and crop use
Water	State or Tribal Water Quality Standards	GKM Risk Based Screening Levels	State or Tribal Water Quality Standards	State or Tribal Water Quality Standards
Sediment	MacDonald consensus screening values	GKM Risk Based Screening Levels	NA	NA
Biological Communities	State or Tribal Water Quality Standards or multimetric assessment tools where available	NA	NA	NA
Fish Tissue	State or Tribal Water Quality Standards where available and EPA's draft 2015 selenium criteria		State or Tribal Water Quality Standards where available or EPA's recommended criteria for methyl mercury	NA

\*Not all uses are designated to all segments of the Animas or San Juan Rivers. Water quality standards are developed by States and Tribes to protect specific uses in these waters on a segment by segment basis. Additionally, a number of site-specific criteria apply to segments of the Animas and San Juan that will be considered.

### **Water Quality Standards for Water, Biological Metrics, and Fish Tissue Values**

Generally, States and Tribes divide waterbodies into segments and assign appropriate designated uses to the segment and adopt water quality criteria (pollutant thresholds) that protect those uses. Hence, not all segments have the same designated uses and the same water quality criteria. Designated uses that may be assigned to segments by State and Tribes include aquatic life/wildlife, recreation, fish consumption/human health, water supply, agriculture/livestock watering, cultural uses, and others. For the Animas and San Juan Rivers, the segmentation, designated uses, and water quality criteria are highly

complex as multiple jurisdictions are involved. The reader may visit the water quality standards on-line resources of the States and Tribes to identify applicable water quality standards for each segment as they are too voluminous to include here. Links to EPA's fish tissue recommended criteria for methyl mercury and draft 2015 selenium criteria are provided below as well.

- State of Colorado

<https://www.colorado.gov/pacific/cdphe/water-quality-standards>

[ftp://ft.dphe.state.co.us/wqc/wqcc/Current%20Water%20Quality%20Standards/Currently%20Effective%20Standards/34\\_SanJuan\\_Effective\\_03-01-2016/](ftp://ft.dphe.state.co.us/wqc/wqcc/Current%20Water%20Quality%20Standards/Currently%20Effective%20Standards/34_SanJuan_Effective_03-01-2016/)

[ftp://ft.dphe.state.co.us/wqc/wqcc/Current%20Water%20Quality%20Standards/Currently%20Effective%20Standards/31\\_SurfaceWaterBasicStandards\\_Effective\\_1-31-2013/31\\_2013\(01\).pdf](ftp://ft.dphe.state.co.us/wqc/wqcc/Current%20Water%20Quality%20Standards/Currently%20Effective%20Standards/31_SurfaceWaterBasicStandards_Effective_1-31-2013/31_2013(01).pdf)

- Navajo Nation

<http://www.navajonationepa.org/Pdf%20files/Navajo%20Nation%20Surface%20Water%20Quality%20Standards%202007.pdf>

- Southern Ute Tribe – Contact the tribe or EPA Region 8, 303-312-6947

<https://www.southernute-nsn.gov/environmental-programs/water-quality/>

- State of New Mexico

<http://164.64.110.239/nmac/parts/title20/20.006.0004.pdf>

- State of Utah

<http://www.rules.utah.gov/publicat/code/r317/r317-002.htm>

- Ute Mountain Ute Tribe

[http://www.utemountainuteenvironmental.org/umep/assets/File/Water/Surface%20Water%20Standards/UMU\\_WQS\\_2011Revision\\_042011\\_supplimental.pdf](http://www.utemountainuteenvironmental.org/umep/assets/File/Water/Surface%20Water%20Standards/UMU_WQS_2011Revision_042011_supplimental.pdf)

- US EPA Fish Tissue Human Health Criteria

<https://www.epa.gov/wqc/human-health-criteria-methylmercury> -

<https://www.epa.gov/wqc/aquatic-life-criterion-selenium-documents> -

### **GKM Risk-Based Screening Levels**

States and Tribes do not have water quality criteria applicable for assessment of metals impacts on recreational uses in water and sediment. Hence, as part of the GKM Release Incident, EPA identified risk-based screening levels against which water and sediment data were compared. These screening levels are provided below in Table 2 of this Appendix.

**Appendix C Table 2: GKM Recreation Risk-Based Screening Levels**

<b>Chemical</b>	<b>Surface Water Recreational Use (ug/L)</b>	<b>Sediment Recreational Use (mg/kg)</b>
Aluminum	170,000	3,300,000
Antimony	67	1,300
Arsenic, Inorganic	50	4,200
Barium	33,000	670,000
Beryllium and compounds	330	6,700
Cadmium	83	1,00
Calcium		
Chromium, Total	220,000	4,300,000
Cobalt	50	1,000
Copper	6,700	130,000
Iron	120,000	2,300,000
Lead and Compounds	200	20,000
Magnesium		
Manganese	7,800	160,000
Mercury	50	1,000
Molybdenum	830	17,000
Nickel Sol Salts	3,300	67,000
Potassium		
Selenium	830	17,000
Silver	837	17,000
Sodium		
Thallium (Sol Salts)	2	33
Vanadium	830	17,000
Zinc	50,000	1,000,000

**MacDonald Consensus Sediment Screening Levels for Aquatic Life (2000)<sup>2</sup>**

Generally, States and Tribes do not have water quality criteria applicable for assessment of sediment metals impacts on aquatic life. Hence, EPA will consider the use of the MacDonald consensus screening levels or other appropriate benchmarks as shown below.



**Appendix C Table 3: MacDonald Consensus Screening Levels (2000) – Sediment quality guidelines for metals in freshwater ecosystems that reflect TECs for aquatic life (below which harmful effects are unlikely to be observed).**

Metal	Threshold Effects Concentrations
	Consensus Based TEC mg/kg dry weight
Arsenic	9.97
Cadmium	0.99
Chromium	43.4
Copper	31.6
Lead	35.8
Mercury	0.18
Nickel	22.7
Zinc	121

**Appendix C Table 4: MacDonald Consensus Screening Levels (2000) – Sediment quality guidelines for metals in freshwater ecosystems that reflect PECs (above which harmful effects are likely to be observed).**

Metal	Probable Effects Concentrations
	Consensus Based PEC mg/kg dry weight
Arsenic	33.0
Cadmium	4.98
Chromium	111
Copper	149
Lead	128
Mercury	1.06
Nickel	48.6
Zinc	459

<sup>2</sup> MacDonald DD et al., 2000, *Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems*, Environmental Contamination and Toxicology, 39, 20-21.

## **Appendix D: Data Management Strategy**

The Post Gold King Mine Response Conceptual Monitoring Plan’s data management strategy is a component of the following broader data management strategy for the mining-related activities for the Animas Watershed and the Animas River impacted portion of the San Juan River.



# U.S. EPA Region 8 Upper Animas Data Management Strategy

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*Region 8 Ecosystems Protection and Remediation*

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## Introduction

This data management strategy outlines the approach for managing and sharing all historic and future analytic data collected for the site currently known as the Upper Animas Mining District. Due to the geographically large and temporally diverse nature of this site, data pertaining to but not limited to other sites such as Upper Cement Creek, Mogul/Grand Mogul Mine(s), Red and Bonita Mine, and Gold King Mine are included under the larger site umbrella of the Upper Animas Mining District (at this time the site has not been listed on the National Priorities List (NPL), but should it be listed in the future, the site will be renamed Bonita Peak Mining District). This strategy also covers all data collected or compiled as part of the Gold King Mine Release response effort and subsequent monitoring effort. This document is not intended to address the management of spatial data, photographs, documents, or other data that do not fall into the category of analytic data. U.S. EPA Region 8 already has processes and procedures in place to address these types of data.

The objective of this plan is to provide a pathway for ensuring the analytic data which have been and will be collected by the various organizations across this site are interoperable and discoverable via a common interface. At present these organizations include U.S. EPA Regions 6, 8, and 9; the states of Colorado, New Mexico, and Utah; the Navajo, Southern

Ute, and Ute Mountain Ute tribes; non-governmental organizations; and various federal agencies. Multiple datasets originating from these different organizations may also exist and will be included as part of this strategy.

This strategy addresses several aspects of the data management process, including: 1) compiling all relevant datasets, 2) managing and archiving those data, and 3) publishing and making accessible the standardized data. A diagram summarizing this process can be found in Appendix D Figure 1.

## Data Compilation

A data inventory was conducted by both the U.S. EPA Region 8 Remedial and Removal programs to identify all relevant U.S. EPA Region 8 Scribe datasets for the Upper Animas Mining District. This included all existing Scribe projects that contain data collected for the Remedial, Removal, Emergency Response, and Site Assessment programs. It includes all Gold King Mine Release data in Scribe, including U.S. EPA Regions 6 and 9, and to the extent possible, identifies the datasets originating from external governmental and non-governmental organizations. The elements identified for each U.S. EPA Region 8 Scribe dataset includes:

- Scribe Project ID – the unique numerical identifier for the Scribe project
- Project Name – the name used to identify the Scribe project
- Sample Matrices – the type of matrix associate with a sample (soil, surface water, etc...)
- Location Information – general geographic description of where the data were collected
- Date Range – date ranges of the data in the Scribe project
- Number of Samples – total number of samples
- Field Parameters – do field parameter data exist? (yes or no)
- Number of Lab Results – total number of lab results
- Number of Samples without Lab Results – number of samples that do not have associated lab results
- Special Events (toxicity, minisippers) – number of samples for special types of data collection events
- Data System – data management system the dataset resides in
- User Access – who has been provided access to the data at the time of the inventory
- Owner – the originator of the dataset
- Notes – additional information about the dataset

The elements identified for datasets originating from organizations other than U.S. EPA Region 8 includes:

- Organization Name – name of the organization
- Data System – data management system the dataset resides in
- Currently Submitting to WQX – is the organization submitting data to WQX already? (yes or no)
- Most recent year of data submitted – the most recent year that data were submitted to WQX
- Notes – additional information about the dataset

## Data Management

### **Centralized Data Storage**

WQX will provide the primary means of storing and managing the site wide data for the Upper Animas Mining District. The Water Quality Exchange (WQX) is the accepted national standard for data sharing and was designed to provide a common format and data exchange protocol for analytic and monitoring data. WQX is operated by the Office of Water and is already used by the three states and two of the three tribes in the Animas and San Juan Watersheds. Other stakeholders in the watershed, the Colorado River Watch organization and the National Park Service, have historical data in WQX and continue to monitor in the watershed. WQX has the ability to share water, sediment, biological, habitat, fish tissue, and even toxicological data. There is significant benefit in having data available in one location, in one format, and using common terms. It reduces the amount of rework that a data user must do in order to analyze or make use of the data, and it reduces duplication of effort for individual organizations trying to publish the data.

WQX is not a local data management system, it is instead a mechanism for sharing the data. The data collected by Organizations are stored in a wide variety of ways, including EPA developed products (e.g. SCRIBE), off-the-shelf products (e.g., AWQMS), and custom built applications. WQX is meant to be the universal communication language between these various datasets. As data get loaded to WQX it is mapped to the standard format used by WQX. EPA Office of Water will provide support to those organizations (including EPA data collectors) to make the data available via WQX. Although many of the organizations are already communicating via WQX, some organizations within the watershed will need additional support. EPA has a contract in place to provide support to organizations that are not currently sharing data with WQX.

### **Data Standardization**

Prior to being migrated to WQX, the datasets will need to undergo additional processing in preparation for loading to WQX. It is recommended that the Scribe projects for the U.S. EPA Region 8 Remedial program be combined into one Scribe project. To achieve this, a data management plan specific to all the remedial data will need to be developed, describing in detail how all Remedial data are to be loaded to Scribe in a standard way. Such a plan should indicate the Scribe tables, fields, and valid values to be used. It should also document for each Remedial Scribe project what processing steps are necessary to migrate the original data to the standardized combined Scribe project. Any future data collected by the respective programs should be loaded to the standardized combined Scribe project. Whenever possible the standards adopted for the Remedial data should conform to the established standards used by the Removal program and WQX. A similar yet less extensive data scrubbing process will occur for the U.S. EPA Region 8 Removal and Site Assessment Scribe projects.

Other considerations when migrating datasets to WQX include metadata, a common organization identifier, common project identifiers, common station identifiers, and data migration priorities. In order for the data to be valuable, all relevant metadata must be

included. WQX requires data to be fully documented in order for it to be shared. Metadata should be documented in data submissions to WQX, including: project, analytical methods, sampling equipment, collection methods, and appropriate data quality flags.

To promote data integration, any data collected by U.S. EPA Region 8 that is related to the Upper Animas Mining District or the Gold King Mine should be documented in WQX using the following common Organization ID: *USEPA\_Region8*. All data collected for these sites, regardless of organization, will be assigned a primary Project ID of *Animas\_Sanjuan\_Watershed*. This will allow data users to search and retrieve all site related data and is a convenient way to group all data collected for previous and future efforts. Secondary Project IDs will also be assigned to help identify individual datasets loaded to WQX. For data belonging to the U.S. EPA Region 8, *GKM\_Response*, *GKM\_Followup*, and *UpperAnimas\_Remedial* will be used. Should the Upper Animas Mining District site be listed on the NPL prior to the loading of Remedial data to WQX, the secondary Project ID of *BPMD\_Remedial* will be used instead of *UpperAnimas\_Remedial*. These secondary Project IDs do not preclude an organization from using their organization's existing Identifiers (WQX allows for multiple projects to be associated with an individual sample).

Organizations collecting data should reference, where appropriate, the common station identifier noted in the Gold King Mine Release follow-up monitoring plan by using the 'Alternate Monitoring Location' data element in WQX. Each organization maintains their own identifiers for monitoring locations (stations). However, many times, multiple organizations are collecting data at the same location. In order to ensure interoperability amongst the various data collectors, the organizations would continue to use their identifiers, but they would reference the common identifiers outlined in the monitoring plan (which in many cases are the organization's original identifiers). The relationship between historical sites and the current sites has already been developed, however, any new data collections should consider whether or not a new station is co-located with the stations identified in the monitoring plan.

### **Data Migration Priorities**

Due to the volume of data in the area of the Upper Animas Mining District, a prioritization list for the migration has been formed. Factors which influenced the prioritization includes; the current status and format of the data, where existing efforts are already in place, and the feasibility and cost of the migration. The prioritization of the missing datasets are as follows:

1. - Follow-up monitoring Scribe dataset
2. - U.S. EPA Emergency Response Scribe datasets (Regions 6, 8 and 9)
3. - Historic U.S. EPA Region 8 Removal Scribe datasets
4. - U.S. EPA Region 8 Remedial Scribe datasets
5. - Other U.S. EPA Region 8 Site Assessment & Removal datasets
6. - Utah Department of Environmental Quality
7. - Colorado Department of Public Health and the Environment macroinvertebrate - data -
8. - Southern Ute Indian Tribe biological data
9. - Navajo Nation water quality data
10. New Mexico Department of Game and Fish

To begin the migration of each data partner, the respective region for each organization will initiate the assistance by setting up a kick-off call consisting of the necessary partners. The partners should include the data experts in the organization, EPA headquarters, the EPA headquarters contractor, and the appropriate personnel at the EPA region. Items to be discussed at the kick-off call include:

1. The status of the dataset not currently available in WQX
2. Initial discussion of the engagement plan
3. Identifying the next steps

Following the kick-off, the contractor will work with the group to create an engagement plan to outline the execution of the migration.

### **Data Archiving**

Once data have been migrated to WQX, the original dataset should be preserved and decommissioned. For Scribe projects that will no longer be used for storing data collected in the future, this means maintaining the original database(s) on servers managed by the Emergency Response Team (ERT). However, any Scribe project that gets decommissioned should also be removed from any Scribe.NET subscriptions, as the data will be accessible from the Water Quality Portal or from the standardized combined Scribe projects.

### **Data Publishing and Accessibility**

WQX provides the backbone for the Water Quality Portal (<http://waterqualitydata.us>) which provides seamless access to all of the data that are shared via WQX as well as all of the data collected by USGS. The Portal provides public access to these data in a common format, using common terminology. The information within the Portal will be accessible via manual download and through web services. The web services of the Portal allow for the data to be integrated into other applications to analyze or share the data. If data loaded to WQX have not received authorization to be made publicly accessible, it is possible to flag the data as preliminary making it not visible to the public. Once authorization is received the preliminary flag can be removed making it visible to the public.

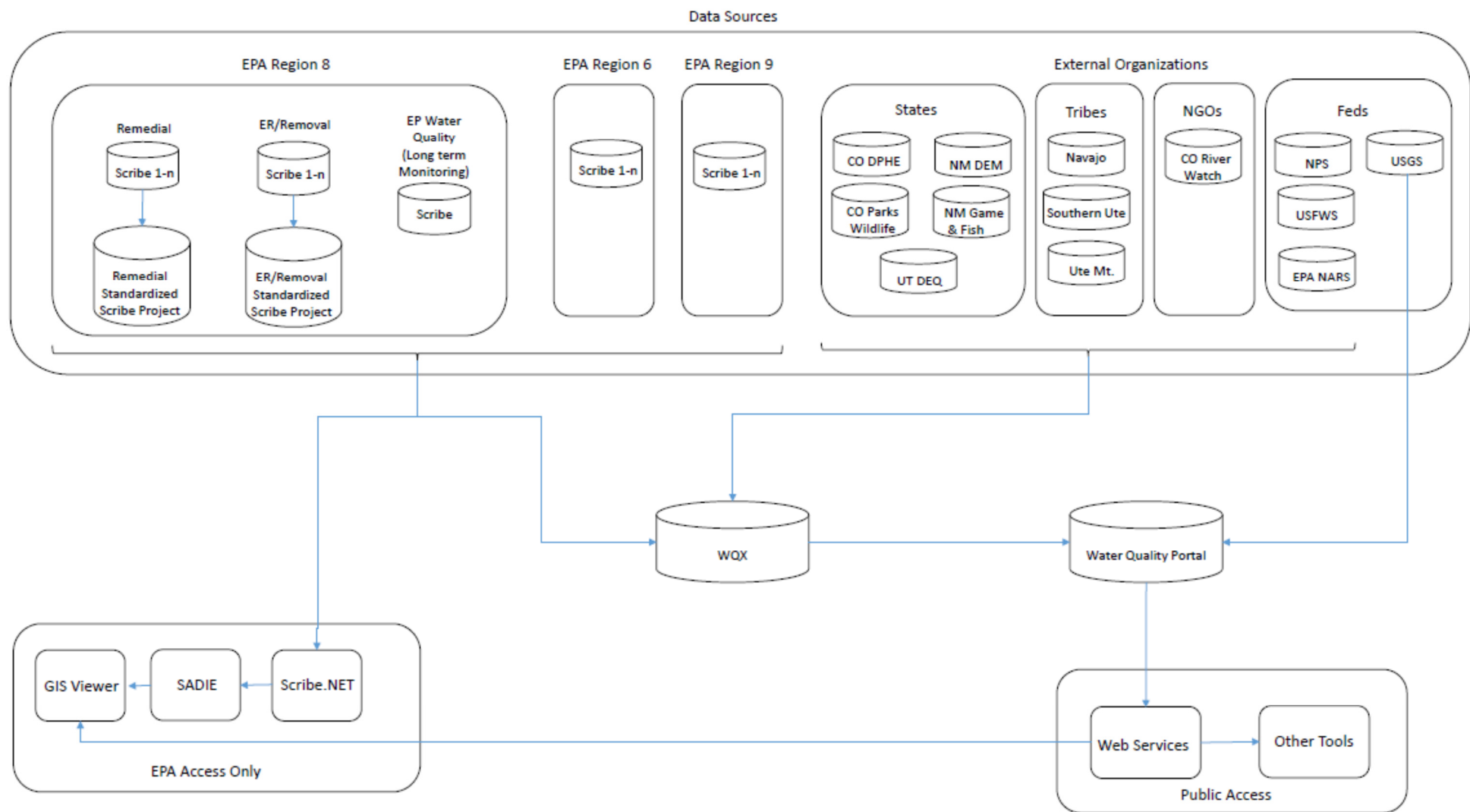
Although the Portal is an easy way to access the data, additional applications for interfacing with these site data may be necessary. These applications would be able to leverage the web services available via the Portal. One example of this might be an interactive web map application. It will also be necessary for EPA personnel who will be performing data analysis and interpretation to access the data using tools custom built for the EPA, especially if some data in WQX have not received authorization for public access. In these situations EPA personnel may use the Scribe desktop interface to access the standardized Scribe datasets, or they may choose to use a tool like SADIE, a custom web interface for Scribe datasets, that integrates the analytic data with interactive web map applications. Regardless of the tools used for interacting with the data, Upper Animas Mining District data will be publicly available through the Water Quality Portal and internally through either the Water Quality Portal or Scribe.NET.

### **Implementation**

Responsibility for implementing this data management strategy resides with the U.S. EPA Region 8 Removal and Remedial programs. Specifically, each program will produce a site-specific data management plan that encompasses all the Scribe datasets for which they or

their contractor is the owner. Such a plan will detail how existing and future Scribe datasets are to be standardized and migrated to WQX and will serve as a blueprint for contractors to perform the data migration. These data management plans will also serve to document how data were transformed within existing data systems and/or from one data system to another.





Appendix D Figure 1. GKM Data Management Flow Diagram

## Appendix E: Communication Approach & Strategy

The EPA has hosted a number of calls, meetings and meeting organization efforts with our state, tribal and local partners throughout development of the Conceptual Monitoring Plan (CMP) since August 2015. This document is not a summary of previous communication, but reflects current and future anticipated communication. Table 1 contains points of contact for the specific topics described below. Table 2 contains state, tribal and local contacts for coordination related to data collection and assessment. Please let us know if you have an alternative contact.

**Modeling and Release Characterization:** EPA undertook a modeling effort from which preliminary summary results were provided to states, tribes and locals on February 5, 2016. The information provided on February 5, 2016 is also available on-line.<sup>3</sup> The modeling effort is currently undergoing peer-review and will be made available once finalized.

**EPA Sampling and Monitoring:** Seven days prior to sampling events described in the CMP, EPA will provide notification to tribal council chairs. Additionally, notification and coordination for sampling events will occur with the environmental contacts identified in Table 2 below.

**Monitoring and Funding Workgroups:** At our February 5, 2016 meeting at EPA’s regional office in Denver, the state, tribal, local and federal representatives identified the need to break into subgroups based upon different interests and authorities among the various parties. Workgroups to evaluate emergency response and preparedness capacity development, watershed condition assessment were formed. Workgroup meetings including EPA, Tribes, and States are ongoing.

**CMP Data Management:** EPA will notify states and tribes of data availability and then make it publicly available as described in Appendix D. See Appendix D for detail.

**CMP Data Assessment:** As water and sediment metals data become available, EPA will perform an initial screen of the data against historical maxima and communicate those results to our state, tribal and local partners as we complete them. After the fall 2016 sampling event, EPA will develop an assessment report based upon collaborative assessment with our state, tribal and local partners. We will engage with states and tribes to assess the data collected through this plan.

<b>Table 1. Points of contact for specific topics</b>				
<b>Topic</b>	<b>Contact</b>	<b>Organization</b>	<b>Email</b>	<b>Phone</b>
<b>Modeling and Release Characterization</b>	Kate Sullivan, Branch Chief, Ecosystems Assessment	EPA Office of Research and Development	<a href="mailto:sullivan.kate@epa.gov">sullivan.kate@epa.gov</a>	706-355-8100
<b>EPA Sampling and Monitoring</b>	Steve Merritt, On-Scene Coordinator	EPA Region 8	<a href="mailto:merritt.steven@epa.gov">merritt.steven@epa.gov</a>	303-312-6146
<b>Monitoring and Funding Workgroups</b>	Pat Pfaltzgraff, Director, Water Quality Control Division	CDPHE	<a href="mailto:patrick.j.pfaltzgraff@state.co.us">patrick.j.pfaltzgraff@state.co.us</a>	303-692-3509
	Ryan Flynn, Secretary	NMED	<a href="mailto:ryan.flynn@state.nm.us">ryan.flynn@state.nm.us</a>	505-827-2855
	Tom Wall, Director, Assessment and Watershed Protection Division	EPA Office of Water	<a href="mailto:wall.tom@epa.gov">wall.tom@epa.gov</a>	202-564-4179
	Bill Honker, Director, Water Division	EPA Region 6	<a href="mailto:honker.william@epa.gov">honker.william@epa.gov</a>	214-665-3187

<sup>3</sup> <https://www.epa.gov/goldkingmine/epas-draft-analysis-fate-and-transport-metals-animas-and-san-juan-rivers>

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<b>Data Management</b>	John Wieber, GIS Coordinator	EPA Region 8	<a href="mailto:wieber.john@epa.gov">wieber.john@epa.gov</a>	303-312-6118
	Dwane Young	EPA Office of Water	<a href="mailto:young.dwane@epa.gov">young.dwane@epa.gov</a>	202-566-1214
	Marty McComb, On-Scene Coordinator	EPA Region 8	<a href="mailto:mccomb.martin@epa.gov">mccomb.martin@epa.gov</a>	303-312-6963
<b>CMP data assessment</b>	Tom Wall, Director, Assessment and Watershed Protection Division	EPA Office of Water	<a href="mailto:wall.tom@epa.gov">wall.tom@epa.gov</a>	202-564-4179
	Dwane Young	EPA Office of Water	<a href="mailto:young.dwane@epa.gov">young.dwane@epa.gov</a>	202-566-1214

**Table 2. State, tribal and local environmental contacts for data collection, distribution and assessment**

<b>Organization</b>	<b>Contact</b>	<b>Email</b>
Colorado Department of Public Health and Environment	Patrick Pfaltzgraff	<a href="mailto:patrick.pfaltzgraff@state.co.us">patrick.pfaltzgraff@state.co.us</a>
Town of Silverton	Bill Gardner	<a href="mailto:bgardner@silverton.co.us">bgardner@silverton.co.us</a>
San Juan Basin Health Department	Brian Devine	<a href="mailto:bdevine@sjbhd.org">bdevine@sjbhd.org</a>
San Juan Basin Health Department	Liane Jollon	<a href="mailto:ljollon@sjbhd.org">ljollon@sjbhd.org</a>
San Juan County Public Health	Becky Joyce	<a href="mailto:director@sicph.org">director@sicph.org</a>
City of Durango	Ron LeBlanc	<a href="mailto:ron.leblanc@durangogov.org">ron.leblanc@durangogov.org</a>
La Plata County	Pete Foster (Wright Water Engineers)	<a href="mailto:pfoster@wrightwater.com">pfoster@wrightwater.com</a>
Southern Ute Indian Tribe Environmental Program	Tom Johnson	<a href="mailto:tojohns@southernute-nsn.gov">tojohns@southernute-nsn.gov</a>
Southern Ute Indian Tribe Environmental Program	Curtis Hartenstine	<a href="mailto:charten@southernute-nsn.gov">charten@southernute-nsn.gov</a>
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Navajo Nation EPA	Steve Austin	<a href="mailto:nnepawq@frontiernet.net">nnepawq@frontiernet.net</a>
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Utah Department of Environmental Quality	Erica Gaddis	<a href="mailto:egaddis@utah.gov">egaddis@utah.gov</a>