One Year After the Gold King Mine Incident

A Retrospective of EPA's Efforts To Restore and Protect Impacted Communities

August 1, 2016

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EXECUTIVE SUMMARY

Beginning in the 1880s, the Silverton, Colorado area was home to many mines extracting gold, silver, lead and copper until operations ceased in the early 1990s. Following inadequate and incomplete closures of mines by various mine owners and operators, EPA and Colorado began assessing the area to reduce metals loadings associated with acid drainage into the Animas Watershed. The Upper Animas Watershed has historically received high concentrations from mining and highly mineralized formations, and mines in the area discharge an average of 5.4 million gallons per day. On August 5, 2015, an EPA team investigating the Gold King Mine as a source of metals inadvertently triggered a release of 3 million gallons of acidic, mine-influenced waters. These waters had been trapped by the collapsed mine structure and rock blocking the opening (or adit) of the mine, damming the water behind the collapse and causing the waters to become pressurized. Over an eight-day period, the plume from the release flowed down the Animas River to the San Juan River.

Following the release, notification was provided to four states (Colorado, New Mexico, Arizona and Utah) and three tribes (Navajo Nation, Southern Ute, and Ute Mountain Ute). While the volume of the release was later determined to be equivalent to four days of current acid mine drainage from this historical mining area, EPA took precautions to ensure that all affected localities had sufficient data to inform decisions regarding drinking water as well as ongoing agricultural and recreational use of these waters. Except for the Navajo Nation, all areas lifted limitations on river use before the end of August. The total metal mass in the GKM release was later determined to be comparable to the mass of metals carried in one day of high spring runoff.

EPA has dedicated more than $29 million to date to respond to the release and to provide for continued monitoring in the area. The majority of the funds are being used to stabilize the mine adit and mitigate ongoing acid mine drainage. Reimbursement of state, local and tribal response costs from the incident is also in process, with nearly $1.6 million provided to our partners to date. EPA is evaluating additional incident-related expenses requested and will expedite distributing these funds. EPA is also providing more than $2 million to empower states and tribes to conduct monitoring of water resources and to improve the notification process for any future incidents.

Contamination from more than 160,000 abandoned mines in the West poses costly and complex environmental and public health challenges. EPA will continue to collaborate with our partners on the best practices and lessons learned from this event to address the legacy of abandoned mines. For communities impacted by the decades of contaminated mine drainage into the Animas and San Juan Rivers, EPA has proposed a Superfund National Priorities Listing for the Bonita Peak Mining District (which includes Gold King Mine) and is committed to pursue collaborative approaches to improve water quality impacted by contaminants that cross state and tribal borders. One year after the Gold King Mine incident, we continue to work together to achieve long-term solutions to prevent future releases and protect our vital water resources.

One Year After the Gold King Mine Incident

A Retrospective of EPA's Efforts To Restore and Protect Impacted Communities

INTRODUCTION

This report provides an overview of the Environmental Protection Agency's (EPA) response to the unexpected release on August 5, 2015, of acidic, metal-laden water from the Gold King Mine (GKM) as a result of EPA's investigation to reduce metals loadings into the Animas Watershed. The report includes information on the environmental conditions of the watershed prior to and after the incident. Water in the West is a scarce and precious natural resource. EPA recognizes the impact that the GKM release had on the people of the Four Corners Region. The Agency has worked with affected residents, small businesses, universities, local governments, states and tribes in an extensive effort to assess and address the immediate and potential long-term impacts of the release on water quality in a region adversely impacted by a legacy of contaminated mine-influenced waters from abandoned and unstable hardrock mines. In responding to this incident, which resulted in the release of approximately three million gallons of contaminated water, EPA has dedicated more than $29 million for a wide range of federal, state, tribal and local response and monitoring actions. EPA's actions include efforts to address the immediate impacts, and to engage stakeholders in the process of seeking longer-term solutions and improving EPA's notification and response systems.

BACKGROUND

Mining in the Western United States began at a time when there was little understanding of the environmental impacts of mining. During the late 1800's through the early 1900's, mine waste was often directly discharged into rivers and streams. Today, abandoned and inactive hardrock mines pose a serious safety and environmental problem. While there is no current and comprehensive inventory of abandoned hardrock mines in the United States, a 2011 Government Accountability Office (GAO) report estimates at least 161,000 such mines exist in the 12 western states and Alaska, and at least 33,000 of these mines have degraded the environment by contaminating surface water and groundwater.

Long-term environmental impacts of hardrock mining result from mine-influenced waters, including water reacting with iron disulfide (pyrite) and oxygen to form sulfuric acid or acid mine drainage (AMD). The resulting acidic water dissolves naturally occurring heavy metals such as zinc, lead, cadmium, copper and aluminum. Metals are also released as a result of neutral and alkaline drainage. Water containing these metals flows out of mine adits (openings used for access or drainage) and through waste rock piles and tailings. When this water drains into river systems and is diluted, the dissolved metals precipitate out of solution and are deposited in river sediments that can be disturbed and resuspended during seasonal runoff and extreme weather conditions. In addition, soil erosion and other materials carrying metals in particulate form contribute to sediment contamination. As the majority of these abandoned mine sites have not been operated or maintained in many decades, they may also pose significant structural stability challenges including collapsed underground mine adits and failing impoundments or tailings dams.

Water contamination resulting from historic mining in the west is extensive and ongoing.

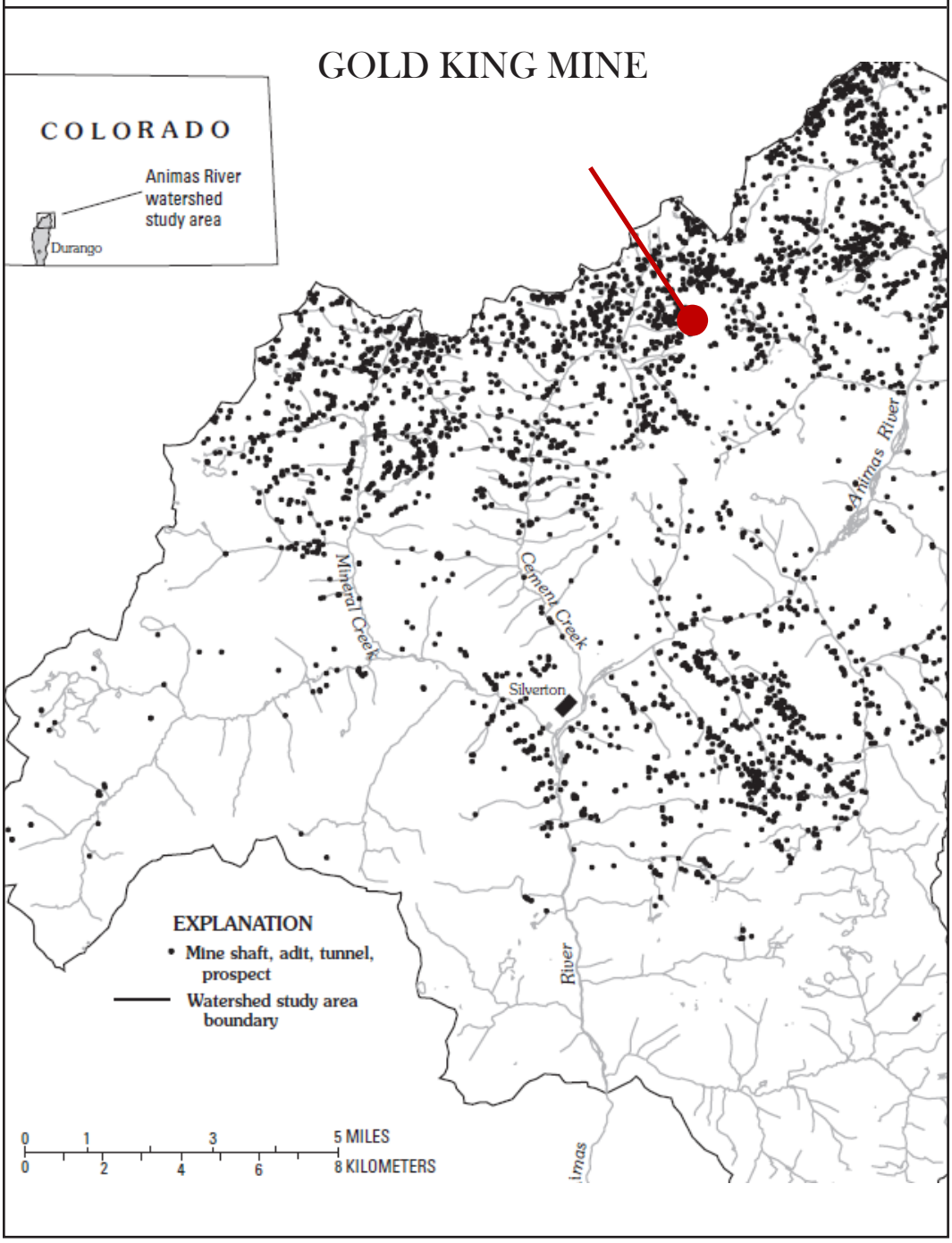
There are no overarching federal statutes or regulations for addressing the environmental contamination from abandoned hardrock mines. When requested by state or tribal partners, EPA's Superfund program has been used to investigate, take removal actions, and remediate abandoned mines and mineral processing sites that present a high risk to human and environmental health. Adding a site to the Superfund National Priorities List (NPL) allows access to the Superfund, the EPA-administered public fund for remediating contaminated sites. There are more than 500 such mining sites identified in the EPA's Superfund database and more than 130 considered for listing on the NPL. Hardrock mining and mineral processing sites are technically complex, costly to clean up, and tend to be large sites ranging from hundreds of acres to hundreds of square miles. The metal-laden waters released from these sites often require long-term water treatment, which further impacts the cost of cleanup.

A 2015 GAO report estimates that EPA spends anywhere from 7 to 52 times more at mining sites than at other types of Superfund sites. EPA spent almost $1.1 billion in Superfund removal and remedial response costs at 137 mining sites during fiscal years 2010-2014. Of the $1.1 billion, EPA spent nearly $585 million in congressionally appropriated funds and more than $470 million in funds obtained from potentially responsible parties through settlements. These totals do not include any funds spent by potentially responsible parties, states, tribes, local governments or other federal agencies to conduct response work.

The significant impacts on water quality and the environment from AMD associated with abandoned hardrock mines have been recognized for many years. Beginning in fiscal year 2012 and continuing through the fiscal year 2017 budget request, President Obama requested that Congress take action to enact legislation to provide funding for cleaning up the many thousands of abandoned hardrock mines that are contaminating American waterways. The President's proposal would levy a cleanup fee on the hardrock mining industry for public minerals similar to the royalties paid by the oil and gas industry and the abandoned mine reclamation fee paid by the coal industry. To date, Congress has not acted on the President's request.

In Colorado alone, there are an estimated 23,000 former mines and the Colorado Division of Reclamation, Mining and Safety has sought to assess 6,127 of those mines. The watersheds of the San Juan Mountains in southwestern Colorado contain approximately 400 abandoned and inactive mines, which operated between 1871 and 1991.

Historic mining presence in Animas River Watershed with over 400 Abandoned Mines contributing approximately 5.4 million gallons of acid mine drainage per day.



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The GKM, located in the Upper Animas Watershed, discharges an estimated 690,000 gallons per day. Combined with 32 other mines which discharge an average of 5.4 million gallons per day, the Upper Animas Watershed has historically received high concentrations of heavy metals (such as zinc, lead, cadmium, copper and aluminum) from acid mine drainage from mining operations and from highly mineralized rock formations. Historical practices of discharging mine waste directly into the creeks, combined with natural loadings, prompted the City of Durango to seek an alternative to the Animas River as a water supply in 1902. The U.S. Department of the Interior estimates that over the period of active mining within the Watershed, mines have created more than 8 million tons of mine tailings. Although GKM ceased operations in 1922, the mine adits and waste materials from mining operations have continued to discharge waste water into the watershed, comingling with other discharges from surrounding mines.

CDRMS took action to address mine drainage into the Upper Animas by issuing a permit in 1986 for work on the GKM site adits. In 1991, the last commercial mine in the region, the Sunnyside Mine, stopped operating and the Sunnyside mine owner entered into a 2002 consent agreement with Colorado. The agreement provides for installation of three mine bulkheads (plugs) in the American Tunnel, which served to drain GKM, and installation of a water treatment plant. After the plugging, the water flow out of the Gold King, Red and Bonita and other mines increased substantially. Subsequently, the Gold King Corporation, which took over the water treatment operations, experienced financial issues, and the treatment plant stopped operating in mid-2004. CDRMS developed a GKM Reclamation Plan in 2009 to address the increased water level in the mine. Based upon 2009-2014 flow data, the average annual water discharge from GKM and three nearby mines reached approximately 330 million gallons per year.

Since 1998, Colorado has designated portions of the Animas River downstream from Cement Creek as impaired for certain heavy metals, including lead, iron and aluminum. Colorado had developed numerous water quality cleanup plans under the federal Clean Water Act (CWA) to address mining contaminants. Numerous projects had been implemented to control “nonpoint sources” of mining waste with funding provided under EPA’s nonpoint source control grant program under CWA Section 319. New Mexico has historically designated portions of the San Juan River as impaired for one or more pollutants. Similarly, the Navajo Nation has identified portions of the Lower and Middle San Juan River Watershed as not supporting the uses designated in their EPA-approved water quality standards based on data collected in 2012-2013 for a variety of pollutants, including arsenic, lead, and zinc.

In the 1990s, EPA and Colorado jointly conducted a Site Assessment of mines within the Cement Creek watershed for possible designation on the NPL. Sampling showed that until approximately 2005, water quality in the Animas River was improving. In 2004-2005, however, water quality began to decline. This time period coincided with the cessation of operations at the water treatment plant treating the discharge from the American Tunnel. Impacts to aquatic life were demonstrated through fish population surveys, which found no fish in a two-mile stretch of Cement Creek south of Gladstone and significant declines as far as 20 miles downstream.

EPA continued working with Colorado and the Animas River Stakeholder Group (ARSG) to broaden its investigations of conditions in the area in order to understand the major sources of heavy metal contamination in the Upper Animas Watershed. As part of this process, EPA and CDRMS investigated and assessed the discharges contributed by GKM and other nearby mines. By 2014, EPA was working with CDRMS to investigate GKM to assess both the potential for a catastrophic release and the ongoing adverse water quality impacts caused by mine discharges. EPA and CDRMS sought input throughout their investigation from local governments and community members, coordinated through the ARSG.

Throughout the winter and spring of 2015, EPA and CDRMS developed plans which were then presented to ARSG. During the 2014-2015 investigatory process with CDRMS, the EPA team concluded the GKM adit was likely only partially full of water, based on analysis of available information such as flow rate data and information from nearby mines as well as visual observations of seepage believed to be six feet above the adit floor. Based on this conclusion, the EPA team took preliminary actions similar to those implemented successfully at the nearby Red and Bonita Mine prior to reopening its adits. At the Red and Bonita Mine, however, a drill rig was able to bore into the mine from directly above to determine the water level and pressure of the mine pool behind the collapsed adit. While this approach was an option for Gold King, drilling a hole from above raised safety concerns and would have been significantly more difficult due to the steep terrain and the uncertainty of how stable the ground above the adit would be for drilling operations. In consideration of the safety, technical complexity and costs associated with drilling, the EPA team decided to proceed with their investigation during the 2015 construction season, taking planning precautions as if it were pressurized.

(Left) Working area of the Gold King Mine adit. (Right) From another perspective, an elevated view of the North Fork of Cement Creek from the ledge.

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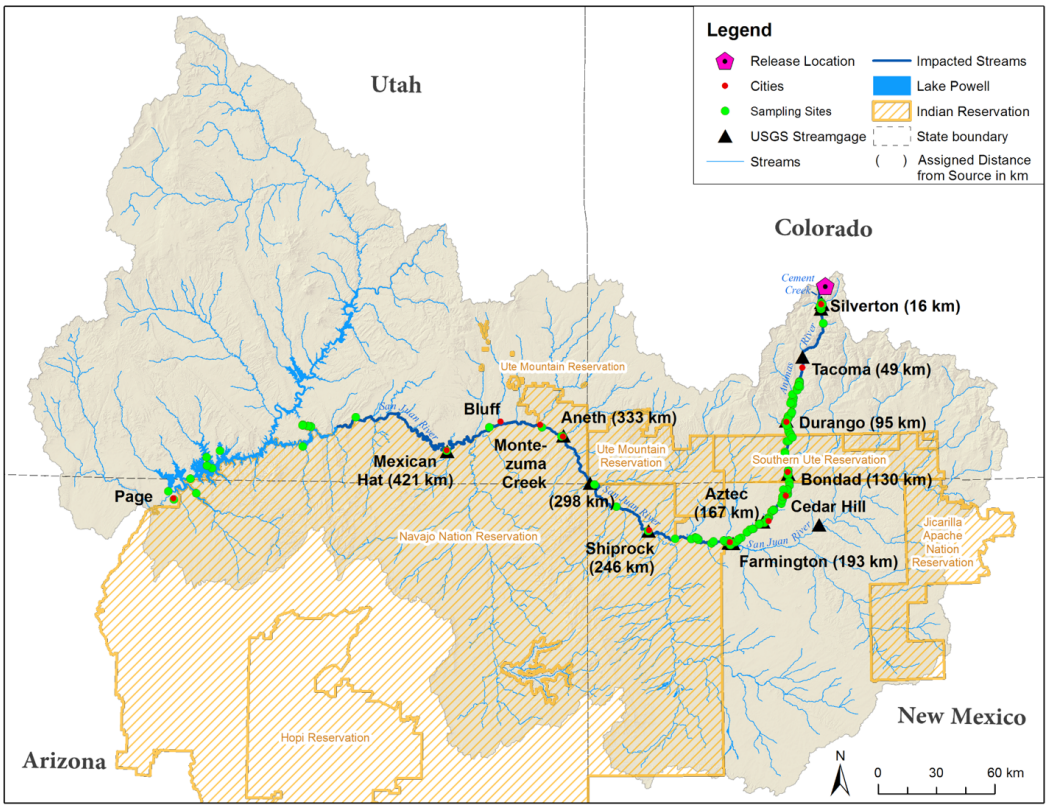
INCIDENT AND RESPONSE

During the limited 2015 construction season, EPA and CDRMS were completing work at the nearby Red and Bonita Mine, with contractor crews and equipment available. In preparation for an August 14, 2015 meeting between EPA, CDRMS and the Department of the Interior's Bureau of Reclamation (BOR) to discuss GKM, EPA sought to determine the exact location and condition of the GKM blockage, and the exact location of the bedrock above and around the adit. While the EPA team was excavating above the main GKM adit on August 5, 2015, water began leaking from the mine adit. The small leak quickly turned into a significant breach, releasing approximately three million gallons of mine water into the North Fork of Cement Creek, a tributary of the Animas River. The mine water flooded the North Fork of Cement Creek, ultimately reaching the Animas and San Juan Rivers.

Following the release, an EPA on-scene staffer contacted CDRMS staff, who then reported the release to the National Response Center. Colorado officials notified downstream jurisdictions and Ute tribes within Colorado to enable local officials to take appropriate action regarding public drinking water intakes and other possible restrictions until the contaminated plume passed. Downstream jurisdictions in New Mexico, Navajo Nation, Utah and Arizona were notified by EPA, allowing localities to make decisions on closure of drinking water intakes and management of irrigation diversions in those areas before the plume arrived. Valid concerns regarding the timeliness of these notifications were raised and EPA is instituting improvements in this area as noted later in this report (see page 19).

The release ultimately crossed three states (Colorado, New Mexico and Utah) and three reservations (Southern Ute Indian Tribe, Ute Mountain Ute Tribe and Navajo Nation). EPA deployed federal On-Scene Coordinators and other technical staff to Silverton

Map of sampling site locations along the Animas River from Silverton, Colorado to Page, Arizona.



EPA worked closely with federal, tribal, state, and local officials to provide up-to-date information so that local authorities could make decisions on restrictions to be imposed on the uses of the rivers and how to advise the public. As seen at left, EPA tours GKM with Regional tribal representatives.

and Durango, CO as well as Aztec and Farmington, NM, to assist with preparations and first response activities. EPA also activated its Emergency Operations Center in Washington, D.C. and established a Unified Command Center in Durango, CO, to help ensure coordination among its three regions, laboratories, and national program offices as well as state, tribal and local partners.

EPA worked closely with federal, tribal, state, and local officials to provide up-to-date information so that local authorities could make decisions on restrictions to be imposed on the uses of the rivers and how to advise the public. While Silverton's public drinking water supply was not affected, waters in nearby Durango were impacted and operators of the Durango Water Treatment Plant closed intakes along the Animas River in advance of the plume. EPA provided alternative drinking water, as well as irrigation water, to users in San Juan and La Plata Counties, Colorado. Before the plume reached the confluence of the Animas and San Juan Rivers on Saturday, August 8, New Mexico recommended all public water systems shut off intakes and the Navajo Nation issued a Precautionary Notice advising the public to prevent livestock from drinking from the San Juan River and diverting water from or entering the river. EPA supplied water for irrigation and livestock and delivered hay to Navajo and New Mexico farmers and ranchers.

Working in conjunction with the Colorado Department of Public Health and the Environment (CDPHE), the New Mexico Environmental Department, and the Utah Department of Environmental Quality (UDEQ), EPA deployed teams to collect water samples as the plume moved through the Animas and San Juan Rivers. Teams sampled surface wa-

ters in the Animas and San Juan Rivers as well as groundwater in private wells in Colorado and New Mexico. Working with the Navajo Nation, EPA coordinated sampling activities on the San Juan River, and worked with Utah and Arizona to sample Lake Powell. EPA also collected sediment samples from several points along and in the waterways. The initial results following the release showed spikes in metals including arsenic, lead, copper, and aluminum. In addition, low pH levels were found indicating elevated levels of acidity in the water coming from the mine.

In the first several days after the incident, EPA deployed more than 210 employees and contract personnel. EPA worked with the Ute Mountain Ute (UMU) and Southern Ute Indian Tribes (SUIT) holding two tribal public meetings and conducting a tribal GKM and Red and Bonita Mine tour. An EPA Tribal Liaison was added to the Incident Command to further facilitate information sharing. Both UMU and SUIT representatives participated in the Incident Command, managing all aspects of the response. In addition to daily calls with elected officials and the media, within the first four days EPA attended or held four public meetings in Silverton and Durango, attended by a total of approximately 2,000 people. EPA also deployed 30 personnel to deal specifically with impacts to the Navajo Nation, and held public meetings to inform Navajo communities of the release. Over the course of ten days, 1,100 community members were reached at nine public meetings throughout affected Navajo communities.

EPA continued to collect samples over varying intervals, beginning at six-hour intervals early in the response and continuing weekly during later phases of the response. The majority of samples taken in the days and months following the release indicated water quality trended to pre-incident conditions, and most localities decided to reopen water intakes and resume recreational and agricultural use of the Animas and San Juan Rivers by August 16, 2015. The Navajo Nation lifted irrigation restrictions for three Navajo Nation chapters on August 28, 2015, and lifted agricultural restrictions on the rest of the San Juan River on October 15, 2015. On an ongoing basis during response efforts, EPA provided validated sediment and water sampling data to the public via EPA's GKM Response web page (www.epa.gov/goldkingmine) and the Agency continues to post sampling data and other updates to this site on a regular basis.

By August 10, 2015, EPA finished the construction of a series of settling ponds to treat the metal-laden water discharging from the mine. Lime was added to the ponds to raise the pH of the acidic water so that the metals of concern became insoluble and formed a sludge which settled in the ponds. To enhance treatment of the routine discharge from the mine, in November 2015, EPA completed installation of a $1.5 million portable interim water treatment plant in Gladstone, CO, approximately 10 miles north of Silverton. The interim treatment plant is designed to manage up to 1,200 gallons per minute of mine discharge and treat it by removing solids and metals. EPA has sampled and analyzed the untreated (influent) and treated (effluent) mine water monthly since the plant was installed to ensure the plant is performing properly. Data indicate that the plant is meeting EPA performance expectations for removing 95% of metals from the discharge and has lessened the risk of downstream impacts from GKM.

After soliciting and incorporating feedback from stakeholders, including state, tribal and local partners, in March 2016 EPA released the Post-Gold King Mine Release Incident: Conceptual Monitoring Plan for Surface Water, Sediments, and Biology, a final monitoring plan for the Animas and San Juan Rivers. This monitoring plan is designed to gather scientific data to evaluate river conditions over the course of the year and to identify any potential impacts

to public health and the environment from the release. Under this plan, EPA is examining water quality, sediment quality, biological indicators and fish tissue at 30 locations under a variety of flow and seasonal river conditions. EPA continues to work with state, tribal and local partners on additional monitoring, data management and analyses, and states and tribes are also designing and implementing their own jurisdiction-specific monitoring and preparedness plans. EPA has made over $2 million available in funding to states and tribes for these monitoring efforts, in addition to the annual grants states and tribes receive from EPA to support water quality management programs. EPA will also be contributing more than $600,000 toward a real-time, water-quality monitoring alert system established by states, tribes and local communities.

From left to right: the retired Goldfields, Inc. treatment facility, the Gold King settling ponds, and the Gladstone Water Treatment Plant.

ENVIRONMENTAL CONDITIONS POST-INCIDENT

To estimate the fate and transport of the GKM plume (where it went and what happened to it along the way), EPA scientists analyzed more than 1,000 water quality and hydrologic samples collected during and after the GKM release to estimate metal concentrations and loadings as the plume flowed from Cement Creek to the Animas and San Juan Rivers. To allow for a robust comparison to historic conditions, they also reviewed U.S. Geological Survey (USGS) historic studies of acid mine drainage under similar high flow scenarios. EPA's analysis finds that the release of three million gallons of acid mine drainage was equivalent to four days of current acid mine drainage. The total metal mass in the GKM plume was comparable to the mass of metals carried in one day of high spring runoff. Overall nearly 500,000 kg of metals were released into the Animas River from GKM. The results indicate that the load of metals released from GKM increased significantly as the mine water traveled between the mine entrance and the Animas River due to the rate and volume of the flow scouring additional metal load from the hillslope and streambed.

The total metal mass in the GKM plume was comparable to the mass of metals carried in one day of high spring runoff.

Most of the metal mass was carried in the plume of mine water as it traveled over a period of 8 days from the mine entrance through Cement Creek and into the Animas River and to a lesser extent, the San Juan River. As the plume traveled downstream, the maximum metal concentrations decreased due to dilution and neutralization of the acidic mine water. As the acids neutralize, the dissolved metals transform to solid form. The solids in the GKM plume—specifically the iron and aluminum ions—oxidized and created the deep yellow color. Approximately 15,000 kg, or 3% of the total metal mass, was dissolved metals and the rest was in particulate form. Within 100 kilometers of the release, dissolved and particulate concentrations rapidly decreased. Generally, dissolved metals are considered more toxic, more reactive, and more mobile than particulate metals. While dissolved metals initially increased in Cement Creek, they decreased to nearly pre-event conditions by the time the plume flowed from the Animas and had minimal impact on the San Juan River. While there may have been some water quality criteria exceedances within 100 kilometers of the release, data indicate that water quality returned to pre-event conditions shortly after the plume passed. Data also indicate that the particulate loads from the waste pile erosion on the mine hillslope substantially increased in Cement Creek but declined moving downriver as material deposited along the Animas, principally between Silverton and Durango. EPA scientists estimate that approximately 90% of the particulate load was deposited in the Animas River. On average, it was difficult to statistically detect the GKM deposits in the streambed compared to historical deposits from legacy mining in the region.

The GKM plume continued to flow from the Animas into the sediment-rich San Juan River at Farmington, New Mexico, where the small remaining particulate load mixed with the large existing sediment load in the San Juan River. Although the San Juan River background metal concentrations are generally low, the river carries so much sediment during storms and high flow events that water quality appears to be strongly related to sediment concentrations and can exceed GKM plume concentrations, with the exception of lead and selenium. Overall metal concentrations in the streambed of the San Juan River are lower than they are in the Animas River and increase proportionately with flow during storms as the sediments in the San Juan River are mobile in high flows. Analysis to date suggests that

the GKM metals probably did not settle in the San Juan until they reached Lake Powell. As additional data become available, especially from spring runoff, EPA scientists will continue to analyze and update the fate and transport of metals from GKM.

Gold King Mine sampling efforts continued to follow the San Juan River into Utah. UDEQ collected water samples weekly at seven different locations along the San Juan River as well as two tributaries during the months of February, March and April 2016. The data were screened against recreational, drinking water, agricultural, and aquatic life criteria. Aluminum exceeded Utah's criteria for aquatic life and total dissolved solids for agriculture but no other exceedances of criteria were identified. USGS collected sediment samples in August and October 2015 from the San Juan River and compared this data to USGS sediment cores taken in 2010 and 2011 in the San Juan and Escalante River deltas of Lake Powell. They found that concentrations of metals in the older USGS cores were generally higher than the 2015 surficial sediment samples but still within the same order of magnitude. The older cores revealed extensive layering, which could signal different storm events in the watershed. UDEQ water samples also indicated that total metal concentrations in the San Juan River were elevated during storms in late fall 2015. None of the data, however, exceeded health screening values for recreational exposures, as developed by the Utah Department of Health (UDOH). Utah's Long-term Monitoring and Assessment Plan for the San Juan River and Lake Powell will continue to evaluate how high flow events affect sediment, groundwater, and surface water quality as well as whether observed metal loads pose a risk to plants, livestock, aquatic life, and/or humans.

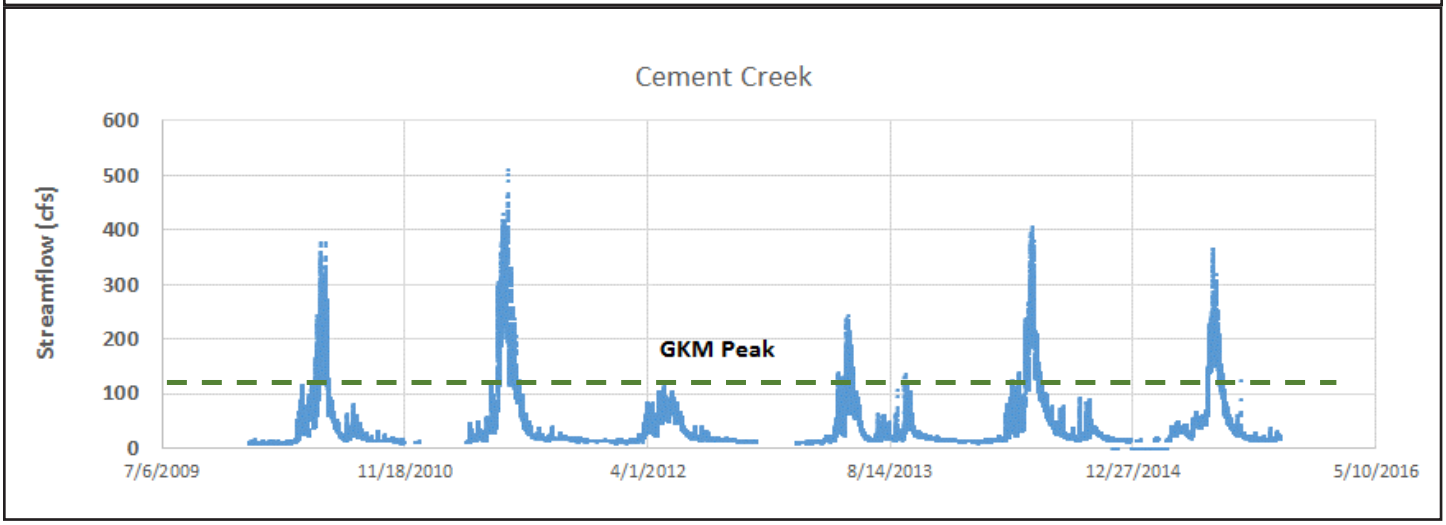
Data indicate the plume dispersed down the Animas River to the San Juan River over a period of 8 days, with dissolved metals levels in all areas returning to pre-incident conditions shortly after passage of the plume.

Water quality in the San Juan Mountain Range has been and will continue to be comprehensively studied by federal agencies and stakeholders moving forward. For example, the Mountain Studies Institute (MSI), an independent research center, connects scientists and stakeholders across the San Juan Mountain region, with a focus on human-caused change in water quality in the San Juan Mountains. Recognizing that metal contamination from natural sources and mine-related sources have affected water quality of the Animas River for over a hundred years, MSI has compiled water quality data from 2002 to 2016. MSI collected 130 water samples from the Animas River from August-October 2015, and analyzed the samples for 24 different metals and minerals. The MSI data were consistent with EPA data and showed a spike in total and dissolved concentrations of metals and minerals immediately following the GKM release.

MSI, in partnership with the City of Durango, continued to collect water quality samples from February, 2016 through early April, 2016, during spring melt to assess possible re-suspension of sediment deposited along the margins of the Animas River banks. They found that metals of concern for human health (arsenic, lead, and mercury) were at levels considered "safe" for human, recreational and agricultural use based on Colorado water quality standards. In addition, MSI found that metals most harmful to aquatic life (copper, zinc, and selenium) were at levels considered

"safe" based on Colorado water quality standards. Concentrations of aluminum and iron surpassed Colorado water quality standards to protect aquatic life from persistent, long-term exposure, but similarly high levels of these metals have occurred in the Animas River during spring runoff in previous years as well. MSI's recent findings from studies of Animas River aquatic life do not indicate that there were substantial impacts to aquatic communities that signal degrading water quality. They stress that these findings should be viewed in the historical context of metal contamination that has already led to the elimination of species most sensitive to metal contamination. While EPA, states and tribes will continue to assess the potential longer-term impacts of the release, including any metals that may have been deposited in the sediment and may be re-mobilized during heavy rains and spring runoff, the August 5 release may be difficult to statistically detect from historic and ongoing contamination.

Comparison of Gold King Mine release peak streamflow to historic streamflow on Cement Creek.
Gold King Mine Release - Analysis of Fate and Transport in the Animas and San Juan Rivers. Session 1 (webinar). Gold King Mine Team, National Exposure Research Lab, Office of Research and Development, U.S. EPA, June 21, 2016.



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EPA FINANCIAL COMMITMENTS

As of July 15, 2016, EPA has dedicated more than $29 million in response to the GKM release, including 1) actions taken by EPA, state, tribes and localities to respond to the release and 2) grants provided to states and tribes to support continued monitoring.

As part of responding to the release, the Agency is stabilizing the mine, treating the acid mine drainage, and providing sampling, data management, and analysis. EPA also ensured access to alternate water supplies for drinking, livestock, and irrigation, and provided hay for animal feed for the Navajo Nation. EPA has reimbursed approximately $1.6 million in allowable expenses incurred by states, tribes, and local governments.

EPA has dedicated more than $29 million in responding to the release with nearly $4 million of this funding provided to our state, tribal, and local partners.

Pursuant to Superfund and Federal grant regulations, EPA is authorized to enter into cooperative agreements to reimburse allowable removal-related activities such as personnel staff time and travel expenses related to responding to the emergency, and contract support for field work including water and soil testing and sample and data analysis. However, some requests cannot appropriately be funded within EPA's Superfund program, such as requests to construct new infrastructure, purchase of new emergency response vehicles not used during the response, hiring new staff, or payment for outside counsel who may have been used to explore pursuing legal action against EPA. Costs for activities which occurred after the conclusion of emergency response or shutdown and demobilization are not allowable, and expenditures not associated with the emergency response are not allowable. EPA continues to evaluate additional incident-related expenses requested and will expedite distributing these funds as allowed.

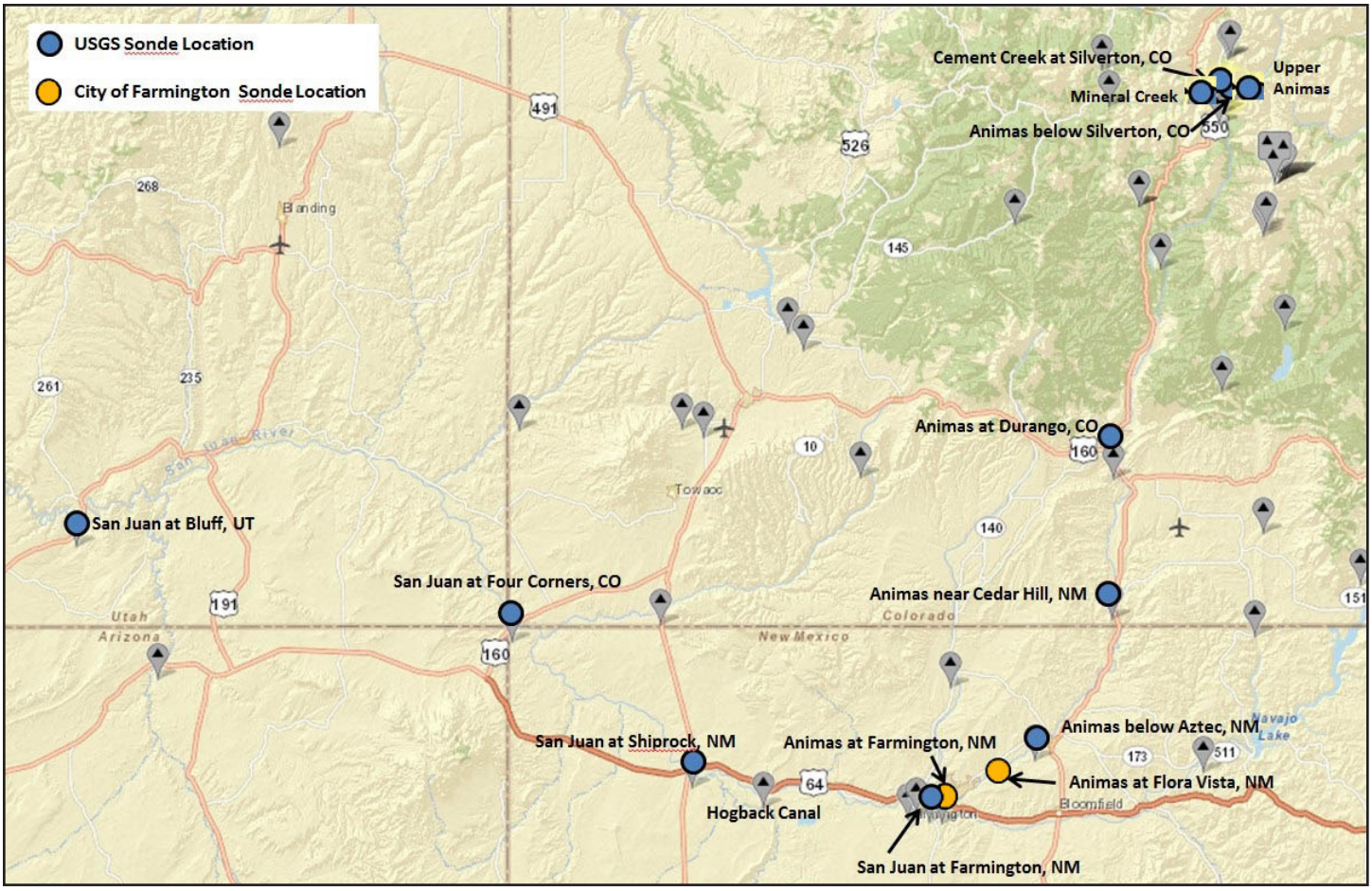
Costs of Responding to Incident (as of July 15, 2016)	
Mine Stabilization and Mitigation of Mine Drainage	*$7,312,175*
Sampling, Data Management and Analysis	*$7,573,594*
Agency Personnel	*$4,958,735*
Interim Water Treatment Plant	*$2,675,162*
Alternative Water and Animal Feed	*$1,698,553*
Reimbursement of State, Tribal and Local Response Costs	*$1,622,224*
Other (e.g., Protective Clothing, Supplies and Materials)	*$757,771*

Funds Provided for State and Tribal Water Quality Information	
State and Tribal Monitoring Grants	*$2,270,900*
Real Time Monitoring	*$600,000*
Public Education and Outreach	*$100,000*

EPA is currently in the process of awarding over $2 million in Clean Water Act grant money to states and tribes to support their ongoing water quality monitoring of the Animas and San Juan Rivers. Additionally the agency is spending $600,000 specifically to support spring runoff and continuous real-time monitoring efforts. EPA has entered into a cooperative agreement with Colorado to install continuous monitoring equipment (sondes) and conduct sampling at four stations in the Upper Animas. EPA is also working to fund installation of similar sondes and sampling in the Lower Animas and San Juan Rivers. This real-time monitoring will serve to ensure coordination and implementation of notification and preparedness activities for communities downstream.

EPA is providing $100,000 to support projects that provide public education and outreach directly to residents, operators of recreational facilities, and visitors in and around Gladstone and Durango, Colorado, to build awareness and understanding of the environment and public health conditions associated with the long-term impacts of mining on the Animas River. There will be special emphasis on 1) ensuring that residents and visitors understand the water quality conditions in the Animas River including safe recreational river use and 2) providing assistance and technical support to public and private recreational facilities to reduce environmental risks to residents and visitors.

To help evaluate emergency contingency water supplies for Navajo farms in northern New Mexico, DOI is providing funding for a study to identify alternative contingency water supplies and operations plans in case the San Juan is temporarily deemed unfit for irrigation in the future.



Sondes provide real time monitoring of parameters such as acidity and turbidity that can be correlated with metals sampling, in order to provide early warning of elevated metals of concern during snow melt runoff and storm events.

Map of Sonde locations (adapted from the Animas San Juan Preparedness Plan. March 17, 2016 Version 6 and Final, developed by a consortium of state, tribal, county, municipal and federal agencies)

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MOVING FORWARD

Internal and external reviews of this incident have identified many insights regarding necessary improvements to the practices used in assessing mine contamination and improvements to emergency response actions. EPA has implemented many improvements and will continue to take action to improve overall response and timeliness, including better notifications and communications regarding environmental incidents that may affect multiple jurisdictions. With respect to the GKM release itself, as detailed in this report, EPA has maintained accountability for the event and continues on a path of long-term commitment to addressing the environmental impacts of the decades of hardrock mining and mineral processing sites in the area.

EPA maintains accountability for the incident and has identified important lessons for improved notification of incidents and assessment processes for similarly-situated mines.

Over the course of the past year, EPA, in collaboration with other federal agencies and, state, tribal, and local governments, has engaged directly with residents and other stakeholders affected by the release to minimize the impacts associated not only with this release but with the historical and continuing contributions from legacy mines. There are additional reviews related to the GKM release underway by the U.S. Government Accountability Office and EPA's Inspector General. The Agency intends to review the results of these reports closely to ensure that additional appropriate recommendations are addressed. The Agency is also working closely with the Department of Justice regarding the Federal Tort Claims Act claims that have been filed related to this matter and hopes to respond in the coming weeks.

Improved Review, Notification and Response Systems

EPA is taking action to be prepared for any future incidents that have potential multi-state and regional impacts by improving stakeholder notifications and increasing capacity for rapid data collection and dissemination. Contingency Plans will include comprehensive notification contact information in a consistent format with well-developed protocols to provide clear direction and easy access to information in the event of an emergency. Once notified, promptly establishing a flow of information to be released to decision makers and the public is critical. EPA is expanding the use of internal tools to support the use of a consistent database to improve data management and the use of a protected and secure website to share critical information in an effort to establish a fluid process of data collection and communication.

Based on recommendations outlined in both EPA's internal review and BOR's October 2015 report, Technical Evaluation of the Gold King Mine Incident, EPA developed a draft "Best Practices and Approaches Report: Preventing Sudden, Uncontrolled Fluid Mining Waste Releases Prior to Conducting Response Actions at Mine Sites" that compiles best practices and approaches for preventing fluid mine waste releases from collapsed adits and tailings impoundments/dams. This draft report is currently undergoing external review by federal land management agencies, states and tribes.

In advance of the finalization of this "Best Practices Report," EPA Assistant Administrator Mathy Stanislaus issued an EPA-wide memorandum on March 29, 2016, emphasizing the need to exercise extreme care before conducting field work at hardrock mine sites to minimize the potential for uncontrolled fluid releases. EPA regional offices must consult with EPA Headquarters before initiating action to ensure thorough consideration of key issues outlined in the Draft Best Practices and Approaches Report. These considerations include: 1) increased oversight where there is unknown or likely potential for fluid release; 2) creation of a contingency plan for stopping work immediately if problems arise that present a near-term risk; and 3) planned actions to take if an accidental release takes place, including containing and minimizing the release as well as maintaining a notification plan identifying the local, state, and tribal authorities who should be notified as soon as possible in the event of a release. EPA's consultation process also requires written documentation of EPA's discussions with a state and/or tribe on the work the EPA is to perform. EPA's goal in establishing this consultation process is to ensure that it has the institutional capability to conduct work at mining and mineral processing sites with potential fluid hazards in a way that minimizes, to the extent possible, the risk of a release and adequately provides for contingency plans in the event of an unforeseen fluid release.

EPA has proposed a Superfund National Priorities Listing for the Bonita Peak Mining District and is commited to pursue improved water monitoring capability in the area.

View of the Gold King Mine adit from across the North Fork Cement Creek gulch, showing stabilization efforts with Shock-Crete application. *June 14, 2016.*

NPL Listing

The GKM is one of 48 mine sites included in the Bonita Peak Mining District (BPMD), which the agency proposed to be added to the NPL on April 7, 2016. NPL listing would make the BPMD eligible for additional study and cleanup resources under EPA's Superfund program. On February 29, 2016, EPA received a letter from Colorado Governor John Hickenlooper expressing support for the addition of the BPMD to the NPL. In his letter, Governor Hickenlooper noted that the Town of Silverton, San Juan County, Durango, La Plata County, local tribes and other interested stakeholders

requested that BPMD be added to the NPL. The decision to propose the site to the NPL came after extensive reengagement with local communities, local, state and tribal government officials and other key stakeholders and represents EPA's long-term commitment to further investigate remediation for the area. The comment period for the proposed listing ended June 13, 2016, and EPA will respond to comments received prior to making a final decision. Additional site characterization would then be necessary prior to considering cleanup options and associated costs.

In the meantime, EPA is taking action during the 2016 construction season to further stabilize the GKM adit and to stabilize the mine waste pile located in front of the adit. The consultation process for this work included EPA Headquarters and CDRMS review of site-specific work plans, a technical assessment of the potential for a fluid release, and verification of a carefully designed and coordinated contingency plan. Acid mine drainage will continue to be piped from the adit to the interim water treatment plant through November 2016. Given the continuing historical discharges in this area, EPA is initiating an evaluation of the options available for longer-term operation of the water treatment plant.

Using Clean Water Act Tools in Downstream Areas not Presently Proposed for Designation on the NPL
Under the federal Clean Water Act (CWA), EPA provides grant assistance to help support state and tribal water quality management programs. States and authorized tribes set water quality standards to establish goals for the protection of their waters. Every two years, states consider readily available data and information to assess their waters and prepare lists of waters that do not meet their water quality standards. States then establish "Total Maximum Daily Loads" (TMDLs) for listed waters that identify the pollution reductions needed to meet water quality standards. To implement TMDLs, states include appropriate limits in CWA discharge permits for point sources and use federal grants and state authorities and grant programs to reduce nonpoint sources of pollution.

In 2018, the states of Colorado, New Mexico and Utah will prepare their next lists of waters that do not meet standards and need a TMDL. The states will consider all readily available information, including monitoring data that has been collected since the GKM release. They will then decide which portions of their waters do not meet their standards and need to be listed as impaired. EPA will work with the states and tribes who share the Animas and San Juan Rivers to help them consider multi-jurisdictional issues, such as differences in state and tribal water quality standards and foster collaboration to address pollution that crosses state and tribal borders, including pollution from nonpoint sources that are not regulated under the federal CWA.

CONCLUSION

EPA fully recognizes the impacts that the Gold King Mine release has had on communities and residents who live along and use the Animas and San Juan Rivers. We continue to be accountable, and working with our federal, state and tribal partners, we are implementing and sharing best practices and lessons learned from this event. Countless communities and their residents throughout the country are dealing with the legacy of abandoned and inactive mines. The public should not have to bear the costs of cleaning up the contamination. We will continue to pursue parties responsible for creating these conditions and support the Obama Administration's request for an Abandoned Mine Lands fee to help cover the costs of cleanups at these sites.

EPA is strongly committed to working with states, tribes, and local stakeholders to evaluate the effects of the continuing historical mine releases on water quality in the Animas and San Juan Watersheds, and will provide recommendations and support for appropriate follow-up monitoring and actions, including taking action on the proposal for listing of the Bonita Peak Mining District on the NPL. EPA will implement a collaborative response program that serves the public interest and supports a broader, science-based understanding of water quality conditions in the Animas and San Juan River Watersheds. EPA will strengthen relationships with the states, tribes, and local governments in the affected areas in order to continue to protect human health and the environment. One year after the Gold King Mine incident, EPA and our partners are moving forward together and seeking more permanent solutions to these complex environmental problems.

REFERENCES

"Animas River." Mountain Studies Institute. Web. <http://www.mountainstudies.org/animasriver>.

Butler, Ann, and Peter Marcus. "Animas River Reopens after Gold King Mine Fiasco." The Durango Herald. The Durango Herald, 15 Aug. 2015. Web. <http://www.durangoherald.com/article/20150814/NEWS01/150819805/Animas-River-reopens-after-Gold-King-Mine-fiasco>.

Clean Air Act [As Amended Through P.L. 108–201, February 24, 2004]. February 2014. US Senate. Web. < http://www.epw.senate.gov/envlaws/cleanair.pdf >

"Emergency Response Monitoring Data from the Gold King Mine Incident." EPA. Environmental Protection Agency. Web. <https://www.epa.gov/goldkingmine/emergency-response-monitoring-data-gold-king-mine-incident>.

"Emergency Response to August 2015 Release from Gold King Mine." EPA. Environmental Protection Agency. Web. <https://www.epa.gov/goldkingmine>.

Environmental Protection Agency. EPA Update on Gold King Mine Response Efforts for August 16, 2015. News Releases from Headquarters. Environmental Protection Agency. Web. <https://yosemite.epa.gov/opa/admpress.nsf/bd4379a92ceceeac8525735900400c27/55c6a01d0203e1c785257ea4004cb79b!OpenDocument>.

Environmental Protection Agency. September 23, 2015: EPA Announces Gold King Mine Water Treatment System for Winter 2015-16. Environmental Protection Agency. Web. <https://www.epa.gov/goldkingmine/september-23-2015-epa-announces-gold-king-mine-water-treatment-system-winter-2015-16>.

"EPA Superfund Program: Bonita Peak Mining District Unincorporated, CO." Environmental Protection Agency. EPA.Web. <https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0802497>.

"Frequent Questions Related to Gold King Mine Response." EPA. Environmental Protection Agency. Web. < https://www.epa.gov/goldkingmine/frequent-questions-related-gold-king-mine-response>

"Gold King Mine Emergency Response in Navajo Nation." EPA. Environmental Protection Agency. Web. <https://www.epa.gov/sites/production/files/2015-08/documents/goldkingminefactsheet15aug2015.pdf>

"Gold King Mine Watershed Fact Sheet." EPA. Environmental Protection Agency. Web. <https://www.epa.gov/sites/production/files/2015-08/documents/goldkingminewatershedfactsheetbackground.pdf>.

"Gold King Mine Water Spill Long Term Monitoring Plan." New Mexico Environmental Department. New Mexico Environment Department. Web. <http://www.env.nm.gov/riverwatersafety/documents/GKMLongTermMonitoringPlan2016.04.04.Final.pdf>.

"Gold King Mine Release – Analysis of Fate and Transport in the Animas and San Juan Rivers." EPA. Environmental Protection Agency. Web. <https://www.epa.gov/sites/production/files/2016-06/documents/epa_ord_gkm_project_review_session_1_final_june212016.pdf>

Hickenlooper, John. "Proposed Listing of the 'Bonita Peak Mining District' site on EPA's Superfund National Priorities List." Letter to Mr. Shaun McGrawth Regional Administrator EPA Region 8. 29 February 2016. Web. < https://www.epa.gov/sites/production/files/2016-02/documents/letterfromgovhickenlooperrebonitapeaksuperfunddesignation29feb2016.pdf>

McCarthy, Gina. "EPA Administrator Gina McCarthy Response to Navajo Nation President Russell Begaye March 15, 2016 Letter." Letter to Russel Begaye. 15 Mar. 2016. Web. <https://www.epa.gov/sites/production/files/2016-04/documents/ginamccarthyreplytomarch15presbegayeletter.pdf>.

Navajo Nation. Office of the President and Vice President. President Opens Irrigation to Upper Fruitland, San Juan and Nenahnezad Chapters. Official Site of the Navajo Nation. Navajo Nation, Web. <http://www.navajo-nsn.gov/News%20Releases/OPVP/2015/aug/President%20Begaye%20opens%20irrigation%20to%20Upper%20Fruitland,%20San%20Juan%20and%20Nenahnezad%20Chapters.pdf>.

"Press Releases and Updates for Gold King Mine Response." EPA. Environmental Protection Agency. Web. <https://www.epa.gov/goldkingmine/press-releases-and-updates-gold-king-mine-response>.

Stanislaus, Mathy. " EPA Work Activities at Abandoned Hardrock Mining and Miner 1-'Processing Sites in Preparation for the Fiscal Year 2016 Construction Season." Memorandum to EPA Regional Administrators. United States. Environmental Protection Agency. Office of Land and Emergency Management. Washington D.C.. March 29, 2016. Web.< https://semspub.epa.gov/work/HQ/100000037.pdf>

"Superfund: National Priorities List (NPL)." EPA. Environmental Protection Agency, n.d. Web. <https://www.epa.gov/superfund/superfund-national-priorities-list-npl>.

United States. Cong. House. Committee on Natural Resources. Abandoned Mines: Information on the Number of Hardrock Mines, Cost of Cleanup, and Value of Financial Assurances. July 14, 2011. 112th Congress. Washington: GPO, 2011. (testimony of Anu K. Mittal, Director Natural Resources and Environment Team). Web. <http://www.gao.gov/assets/130/126667.pdf>

United States. Cong. House. Science, Space and Technology Committee. Sept. 9, 2015. 114th Congress. Washington: 2015. (testimony of Mathy Stanislaus, Assistant Administrator Office of Solid Waste and Emergency Response at EPA). Web. <https://www.epa.gov/sites/production/files/2015-09/documents/mathy_testimony_09092015.pdf>

United States. Department of the Interior. Bureau of Reclamation. Technical Evaluation of the Gold King Mine Incident. Denver: 2015. Web. < http://www.usbr.gov/docs/goldkingminereport.pdf>

United States. Environmental Protection Agency. Addendum to EPA Internal Review of Gold King Mine Incident. Denver: 2015. Web. <https://www.epa.gov/sites/production/files/2015-12/documents/gkmaddendumfinal.pdf>.

United States. Environmental Protection Agency. OLEM/OSRTI. National Priorities List (NPL) ***Proposed Site*** Bonita Peak Mining District, San Juan County, Colorado. Washington: EPA Bulletin, 2016. Web. <https://semspub.epa.gov/work/08/1570785.pdf>.

United States. Environmental Protection Agency. Post-Gold King Mine Release Incident: Conceptual Monitoring Plan for Surface Water, Sediments, and Biology. Washington: 2016. Web. < https://www.epa.gov/sites/production/files/2016-03/documents/post-gkm-final-conceptual-monitoring-plan_2016_03_24_16.pdf >

United States. Forest Service. Bureau of Land Management. Abandoned Mine Lands: A Decade of Progress Reclaiming Hardrock Mines. Washington, 2007. Web. <http://www.blm.gov/style/medialib/blm/wo/MINERALS__REALTY__AND_RESOURCE_PROTECTION_/aml.Par.86533.File.dat/Final%20AML%20Report.pdf>

United States. Geological Survey. Summary and Conclusions from the Investigation of the Effects of Historical Mining in the Animas River Watershed, San Juan County, Colorado. Ed. Stanley Church, Paul von Guerard, and Susan Finger. Professional Paper 1651. Web. <http://pubs.usgs.gov/pp/1651/downloads/Vol1_combinedChapters/vol1_chapA.pdf>.

United States. Government Accountability Office. Superfund: Trends in Federal Funding and Cleanup of EPA's Nonfederal National Priorities List Site. Washington: GAO, 2015. Web. < http://www.gao.gov/assets/680/672734.pdf >

United States. Government Publishing Office. Environmental Protection Agency 40 CFR Part 300 National Priorities List Proposed Rule. 67th ed. Vo. 81. Washington: GPO, 2016. GPO. Web. <https://www.gpo.gov/fdsys/pkg/FR-2016-04-07/pdf/2016-07671.pdf>

"Upper Animas Mining District." EPA. Environmental Protection Agency. Web. <https://www.epa.gov/region8/upper-animas-mining-district>.

Utah. Department of Environmental Quality. Division of Water Quality. Evaluation of UDEQ Water Quality Data Collected during Spring Runoff following the Gold King Mine Release. 2016. DEQ. Web. <http://www.deq.utah.gov/Topics/Water/goldkingmine/docs/2016/04apr/screening-value-analysis-surfacewwater04252016.pdf>.

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