

## **SB 89-181 Annual Report FY 2017-2018**

This annual report to the Water Quality Control Commission (WQCC) is required under the provisions of SB 89-181 and the Memorandum of Understanding (MOU) adopted by the Mined Land Reclamation Board (MLRB) and the WQCC. The Division of Reclamation, Mining and Safety (DRMS) is an implementing agency under the provisions of SB 89-181. As such, DRMS is responsible for ensuring that mine operators comply with state ground water quality standards. It is the responsibility of the WQCC to classify waters of the state and set standards for those classified waters.

If the WQCC has not set site specific ground water standards, DRMS uses the numeric protection levels, referenced in the WQCC adopted narrative ground water standards, to set appropriate permit conditions to protect ground water.

### **Minerals Program**

DRMS analyzes all operations that have the potential to be classified as Designated Mining Operations (DMO) to ensure that their operations are protective of ground waters. Under HB 08-1161, all conventional and in situ uranium mines have DMO status. DRMS also requires non-DMO mining operations, including some aggregate operations, to initiate ground water sampling where there is a potential for impacts to ground water quality.

As of this reporting period, the Minerals Program requires approximately 34 mine sites to conduct some type of ground water quality monitoring. Of these sites, 29 are hard rock mining operations, and 5 are construction material extraction operations.

Please see the attached activity status, summaries and table for specific information about these sites for both the 2016-2017 and 2017-2018 reporting periods.

### **Coal Program**

The Colorado Coal Program currently regulates a total of 23 coal mines, of which six were actively producing in FY16-17 and FY17-18. The producing mines are both surface and underground operations. The remaining 17 mines are in various phases of reclamation or temporary cessation. Approximately 70 percent of Colorado's coal production comes from underground mining operations. The predominant method of underground mining is longwall mining.

During the 2016-2017 and 2017-2018 reporting periods, the Coal Program accomplished the following functions:

- The Coal Program effectively implemented various rules pertaining to ground water protection at Colorado coal mines. The Coal Program's current requirements for ongoing monitoring and detailed pre-disturbance permitting will continue to provide proper ground water quality protection.

- The Coal Program conducted reviews of Annual Hydrologic Reports submitted by operators. This allows for timely identification of hydrology sampling anomalies and deficiencies, in addition to water quantity and quality trends.
- The Coal Program continued to focus coal mine permitting activities regarding minimization of impacts to the hydrologic balance and prevention of material damage. These activities included the ongoing review and update of Cumulative Hydrologic Impact Analyses (CHIAs).
- The Coal Program continued to conduct regular coal mine field inspections and monitoring activities regarding minimization of impacts to the hydrologic balance and prevention of material damage. During FY16-17 the Coal Program conducted 343 inspections. During FY17-18, the Coal Program conducted 320 inspections.
- The Coal Program and WQCD communicated regularly during the last two years to discuss specific issues of mutual concern.

Please see the attached table for specific information about these sites.

## **Abandoned Mine Land Program**

### **Nonpoint Source and Water Quality Improvement Projects**

Since October 2017, final reclamation construction work was completed on 4 legacy mining-related water quality improvement projects, and investigations and design is ongoing at 6 other sites. Mine sites that underwent reclamation construction in 2017 were:

- Mountain Pride Mine, Summit County
- Mt. Emmons, Gunnison County
- Standard Mine Level 5 and 98, Gunnison County
- Lower North Empire Creek Restoration, Clear Creek County

The six mine site projects currently underway to investigate, characterize, and develop final reclamation designs are:

- Roy Pray Mine Pool Investigation, Hinsdale County
- Daisy Mine waste rock reclamation, Gunnison County
- Buckskin Joe/Phillips Mine, Park County
- Nelson Tunnel Remedial Investigation, Mineral County
- Bonita Peaks Mining District, San Juan County
- Pennsylvania Mine Pool Investigation, Summit County

In addition to these on-ground projects, DRMS continues to provide technical assistance to watershed groups and federal agency partners, and provides matching funds for additional projects sponsored by those groups. DRMS is actively engaged in the Mining Impacted Stream Task Force and Colorado Mixed Ownership Group, providing unique perspectives on legacy

mine related issues. DRMS is also actively engaged with CDPHE-WQCD to evaluate the feasibility of developing a statewide inventory of non-point source related legacy mining issues.

In FY 17-18, DRMS expended \$775,482 on legacy mining-related water quality improvement projects and investigations. This total encompasses funding from all sources, including CDPHE NPS grants, grants and contributions from BLM, USFS, EPA, private contributions, as well as state severance tax matching funds and local watershed grants.

The AML Program table includes details of each of these projects.

**Hard Rock Mining Operations**  
December 2018

Company-Mine Name- Permit #	Site Conditions	FY17-18 Activity
<p><b>AGC RESOURCES LLC CASH AND WHO DO MINES (Permit No. M-1983-141) Boulder County  (HR01)</b></p>	<p>The Operator began a groundwater characterization program in 2007. This included sampling of two surface water stations and the Cash Mine water pool, and installation and sampling of monitoring wells above and below the mine. A comprehensive report of these activities was submitted in March 2009.</p>	<p>No mining has occurred since the end of 2008</p> <p>The Division approved the Operator's request to place the site into Temporary Cessation. The period of Temporary Cessation will last from June 13, 2013 until June 13, 2018, or until the Operator notifies the Division that active mining operations have resumed. Groundwater monitoring will continue on a quarterly basis.</p> <p>In October 2013, DRMS approved Technical Revision No. 7 (TR-7). TR-7 revised the monitoring plan to address the following:</p> <ol style="list-style-type: none"> <li>1) Eliminate the following parameters from the sampling suite: aluminum, chromium, cobalt, copper, fluoride, iron, lead, lithium, mercury, nickel, selenium, and vanadium.</li> </ol> <p>The Cash Well monitoring location was eliminated and replaced with the Cash Mine Pool from the 3rd Level Adit.</p>
<p><b>AGC RESOURCES LLC GOLD HILL MILL (Permit No. M-1994-117) Boulder County (HR02)</b></p>	<p>The mill is inactive. The permit requires monitoring of the four monitoring wells located below the mill tailings impoundment on a quarterly basis for verifying the integrity of the geo-membrane liner. Although not required by the permit, the Operator has previously sampled the pond in the tailings impoundment, the Times/Wynona Mine located above the</p>	<p>No milling has occurred since the end of 2008.</p> <p>The Division approved the Operator's request to place the site into Temporary Cessation. The period of Temporary Cessation will last from June 13, 2013 until</p>

	<p>tailings impoundment, the Hazel A Adit located below the tailings impoundment, and Left Hand Creek.</p>	<p>June 13, 2018, or until the Operator notifies the Division that active milling operations have resumed. Groundwater monitoring will continue on a quarterly basis.</p> <p>In October 2013, DRMS approved Technical Revision No. 9 (TR-9). TR-9 revised the monitoring plan to address the following:</p> <ol style="list-style-type: none"> <li>1) Eliminate the following parameters from the sampling suite: aluminum, chromium, cobalt, copper, fluoride, iron, lead, lithium, mercury, nickel, selenium, and vanadium.</li> <li>2) Remove Left Hand Creek water sampling location.</li> <li>3) Remove Hazel A water sampling location.</li> <li>4) Cease collection of samples from Wynona Mine until such time as the mine is used for water storage.</li> </ol> <p>MW1 (mill well) was established as the compliance point for Gold Hill Mill.</p> <p>Per the October 30, 2017 Board Order, the operator must submit a conversion or amendment application. At such time, the approved groundwater monitoring plan will be re-evaluated.</p>
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<p><b>CLIMAX MOLYBDENUM COMPANY HENDERSON MINE AND MILL (Permit No. M-1977-342) Clear Creek and Grand Counties (HR03)</b></p>	<p>Permit conditions protective of groundwater at the Henderson Mine and Mill include groundwater interception wells and seepage collection canals located at the toe of the tailings dams to pump potentially contaminated groundwater back into the mill water circuit for reuse. The seepage pipelines are tested for integrity at least once per year and a description of the testing and results are provided in the annual reclamation report.</p> <p>The groundwater monitoring plan includes three times per year monitoring of the one point of compliance well at the mine and four point of compliance wells at the mill.</p>	<p>An Environmental Protection Plan (EPP) and Groundwater Monitoring Plan (GMP) were approved by the Division in 2012 and implementation of the plans by Climax Molybdenum Company at the Henderson Mine and Mill facilities started in 2012.</p> <p>Monitoring activities at the site have continued in 2017. The Groundwater Monitoring Plan is evaluated for the mill and mine facilities based on the results of the groundwater monitoring results.</p>
<p><b>BATTLE MOUNTAIN RESOURCES INC. SAN LUIS PROJECT (Permit No. M-1988-112) Costilla County (HR04)</b></p>	<p>The San Luis Project is currently in reclamation mode and cyanide processing has not occurred since 1996. The permit requires groundwater monitoring at twenty-one wells, including several water wells located outside the permit area (Shalom Ranch and the San Luis Town Well).</p> <p>Groundwater monitoring is conducted at this site to verify containment of cyanide solution at the lined mill tailings facility and to assess the progress of groundwater management in the West Pit. West Pit groundwater quality is managed by pumping to prevent contact with polluting strata. The pumped water is then treated and discharged as regulated by the WQCD.</p>	<p>Monitoring activities at the site have continued unchanged during the past year. A new M-14 was installed and the Division is monitoring the new data. At this time, the monitoring data indicate compliance and successful containment of cyanide solutions.</p>
<p><b>CATALIX INTERNATIONAL, LLC PRECIOUS MINE (Permit No. M-2013-008) Crowley County (HR05)</b></p>	<p>This 110d permit was approved in 2013 and includes an Environmental Protection Plan. Shale will be mined in open pits and processed using acids in aqua regia treatments for leaching out gold and platinum. Piezometers will be installed around the pits. Groundwater quality will be monitored in a down gradient groundwater point of compliance well.</p>	<p>Permit was issued 10/30/2014 after required Financial Warranty was submitted. Mining activities have not yet commenced at this site. Operator submitted full release request for permit. Site was inspected on 10/4/2017. DRMS observed</p>

		that no groundwater monitoring wells had been installed and the operation never commenced. Therefore, full release was approved on 10/16/2017. Accordingly, this permit will be excluded from further reports.
<b>EXXONMOBIL COLONY OIL SHALE PROJECT (Permit No. M-1980-047) Garfield County (HR06)</b>	In the past, ExxonMobil has conducted ground and surface water monitoring programs of varying scopes with various objectives. However, the only reporting requirements were for surface discharge at Pond 5 as specified by the NPDES program. In June 2007 ExxonMobil implemented a water monitoring program taking monthly water levels and quarterly samples for chemical analysis in three wells (one up-gradient and two down-gradient). In January 2008 a fourth well was installed down-gradient of an electrofrac experiment location to provide rapid detection of any groundwater impact from the experiment. Drilling and fracturing tests were conducted in 2008.	No mining activity is currently being conducted at the site.
<b>OCCIDENTAL OIL SHALE, INC. LOGAN WASH (Permit No. M-1977-424) Garfield County (HR07)</b>	Final reclamation of the main facilities began during summer 2003 and continued through 2008. Maintenance of reclamation and remaining facilities continues. Discharge of water from within the sealed mine consists of mine water and retort water. Mine water from the lower portal and from the research portal are monitored for flow rate and sampled on a weekly, monthly and quarterly schedule (depending on analyte) when the site is accessible and flow is present at the outfall. NPDES monitoring is reported to the WQCD.	Mine water and retort water are monitored monthly at the portal locations for flow rate. The retort water discharges to an evaporation pond.
<b>LKA INTERNATIONAL, INC. GOLDEN WONDER MINE (Permit No. M-1978-091 UG) Hinsdale County (HR08)</b>	LKA International, Inc., (LKA) collects water from a shallow off-site sampling well on Deadman Gulch and from the Lake Fork above and below the confluence with Deadman Gulch. During 2006 and 2007 LKA collected surface water from several points	Lined diversion structures appear to be functioning effectively, as no seeps were noted at the toe of the waste dump in 2017. Diversion structure consists of welded

	<p>along Deadman Gulch and ground water from the underground mine workings. Except during seasonal runoff periods, Deadman Gulch is dry.</p> <p>Adit discharge was not observed or reported for several years, since the operator has impounded water in an underground sump in the workings. Operator neutralizes underground impounded water with sodium bicarbonate. Ground water monitoring locations are shallow sumps on and below the waste rock dump, acting as wells.</p> <p>During 2007 through 2009 a series of small seeps were observed issuing from the waste rock dump, and additional sampling ensued to determine sources of the water. The operator installed lined diversion structures to isolate the waste dump from surface runoff, and installed two piezometers to monitor for possible connection of underground mine water and seep flow. Piezometer sampling was approved to be discontinued when the piezometers were found to be dry.</p> <p>Mine discharge was observed during an October 2016 site inspection. The operator was ordered to address the issue with a water treatment system. The majority of the treatment system was installed and observed by DRMS staff September 2017. DRMS was provided as-built certifications for the treatment system October 2017 and is waiting for water quality sampling results to determine if the system is effective.</p>	<p>polyethylene pipe and limestone-lined open ditch.</p>
<p><b>COTTER CORPORATION SCHWARTZWALDER MINE (Permit No. M-1977-300) Jefferson County (HR09)</b></p>	<p>This underground uranium mine operated from 1953 to 2000, and is now in reclamation. The mine is a Designated Mining Operation. Mine pool water and groundwater in alluvial fill are contaminated with uranium, sulfate, and other constituents.</p> <p>The operator treats mine pool water using an in-situ biological process. The site also has a reverse osmosis system for treating pumped</p>	<p>Cotter Corporation completed construction of a new water treatment facility adjacent to the Steve Level adit. The RO system and IX system have both been transferred to the new facility and are operational. The mine pool was at an elevation of 6,472 ft. (130 ft.</p>



	<p>mine pool water and an ion exchange system for treating alluvial ground water that is captured in underground sumps.</p> <p>The operator monitors groundwater quality in 11 alluvial wells, 8 bedrock wells, and in the mine pool. Concentrations of selected analytes in mine pool water sampled on August 16, 2017 were: :</p> <table border="0" data-bbox="613 485 1073 911"> <thead> <tr> <th style="text-align: center;"><u>Analyte Standard</u></th> <th style="text-align: center;"><u>Concentration</u></th> </tr> </thead> <tbody> <tr> <td>Manganese 0.05 mg/L</td> <td>2.37 mg/L</td> </tr> <tr> <td>Molybdenum 0.035 mg/L</td> <td>4.13 mg/L</td> </tr> <tr> <td>Radium 226 5 pCi/L</td> <td>21.8 pCi/L</td> </tr> <tr> <td>Sulfate 250 mg/L</td> <td>3600 mg/L</td> </tr> <tr> <td>Uranium 0.03 mg/L</td> <td>27.6 mg/L</td> </tr> </tbody> </table>	<u>Analyte Standard</u>	<u>Concentration</u>	Manganese 0.05 mg/L	2.37 mg/L	Molybdenum 0.035 mg/L	4.13 mg/L	Radium 226 5 pCi/L	21.8 pCi/L	Sulfate 250 mg/L	3600 mg/L	Uranium 0.03 mg/L	27.6 mg/L	<p>below Steve Level) on October 20, 2017. The target elevation for the mine pool is 150 ft. below Steve Level.</p>
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<p><b>DEADWOOD GULCH MINING CO. INCAS MINE (Permit No. M-1986-076) La Plata County (HR10)</b></p>	<p>The facility is permitted for a cyanide vat leach system to leach gold and silver, and previously produced small (~10 tons per year) quantities of tailings. The site is permitted as a DMO, and is required to sample surface and groundwater during the seasons that its mill and leaching facility is active. The site is monitored for pH, EC, TDS, sulfate and WAD cyanide. The site has an NPDES permit for historic adit discharge.</p>	<p>This site is in Temporary Cessation. There was no mining or milling activity during 2016-17, and no water quality samples were taken. The operation was put into temporary cessation in June of 2014 after verification that all hazardous materials had been removed from the site.</p>												
<p><b>SUNRISE MINING LLC MAY DAY IDAHO MINE COMPLEX (Permit No. M-1981-185) La Plata County (HR11)</b></p>	<p>The permit was converted to a 112d in 2011 through approval of CN-01, which included the old permit area under M-2006-069 and M-2010-003. The operator has installed groundwater monitoring wells at the site, and surface water sample locations have been established in order to provide baseline conditions for 5 quarters. Mining and milling are not yet approved at this site.</p>	<p>In January of 2016 the MLRB ordered the new Operator, Sunrise Mining LLC, to undergo a complete permit amendment. The Division is currently engaged in the permit review process, and water quality monitoring is ongoing to establish the 5 quarters of data required to characterize the baseline conditions.</p>												

<p><b>RESURRECTION MINING CO.</b>  <b>BLACK CLOUD MINE</b>  <b>(Being Reclaimed under a Consent Decree File No. M-2008-083)</b>  <b>Lake County</b>  <b>(HR12)</b></p>	<p>The approved groundwater monitoring plan specifies quarterly monitoring of six wells and one surface water sampling station cross gradient and downgradient from the tailing impoundment. A point of compliance is established down gradient of the impoundment and numeric protection levels are established. The Black Cloud Mine pool is pumped and piped to the Yak Tunnel Water Treatment Plant.</p>	<p>Site under reclamation.</p>
<p><b>ENERGY FUELS RESOURCES CORPORATION, INC.</b>  <b>WHIRLWIND MINE</b>  <b>(Permit No. M-2007-044)</b>  <b>Mesa County</b>  <b>(HR13)</b></p>	<p>The mine was on standby status as of October 2008. The Division placed the mine into temporary cessation on May 6, 2013. The operator installed a monitor well below proposed mine dump areas in October of 2008 as part of the requirements for a DMO EPP. An existing upgradient well is utilized for sampling to establish baseline data. Sampling was conducted from October 2008 through April 2010 on a bimonthly schedule. Groundwater sampling is, as of June 2010, required to be conducted and submitted to DRMS on an annual basis. The mine has a water treatment and discharge permit through WQCD. No treatment or discharge occurred in 2017-2018. A mine pool developed in historic workings over several decades. It is anticipated that the pool will reform over an extended period of time. The operator is monitoring pool levels and can turn on pumps if they reach undesirable levels prior to reactivation of the mine.</p>	<p>Quarterly well sampling and annual reporting continues.</p> <p>Second period of temporary cessation granted on November 8, 2017.</p>
<p><b>RIO GRANDE SILVER, INC. BULLDOG MINE</b>  <b>(Permit No. M-1977-215)</b>  <b>Mineral County</b>  <b>(HR14)</b></p>	<p>Water monitoring was terminated by the former operator. Rio Grande Silver (RGS) has applied for a permit amendment consisting of an Environmental Protection Plan (EPP) which includes a water sampling and monitoring program. The EPP amendment must be approved and a WQ baseline established before the mine can be reactivated or possible mill constructed,. There is currently no observed discharge to the surface. RGS has been voluntarily sampling surface water throughout their unpatented claim area.</p>	<p>The mine is in Temporary Cessation (TC) status, and no construction, mining, or processing is occurring. Water sampling will occur on an annual basis while permit is in TC.</p>

<p><b>COTTER CORPORATION JD-7 PIT (Permit No. M-1979-094HR) Montrose County (HR15)</b></p>	<p>Due to HB-1161 this mine is a Designated Mining Operation (DMO) and the Division required the operator to submit an Environmental Protection Plan (EPP). The EPP was approved on February 21, 2014. The site is currently in temporary cessation. During mining, water accumulated in the underground mine is treated and discharged in accordance with an NPDES permit.</p>	<p>The site is in temporary cessation. There was no activity during the fiscal year.</p>
<p><b>COTTER CORPORATION JD-9 MINE (Permit No. M-1977-306) Montrose County (HR16)</b></p>	<p>Due to HB-1161 this mine is a Designated Mining Operation (DMO) and the Division required the operator to submit an Environmental Protection Plan (EPP). The EPP was approved on February 11, 2014. The site is currently in temporary cessation. During mining, water accumulated in the underground mine is treated and discharged in accordance with an NPDES permit.</p>	<p>The site is in temporary cessation. There was no activity during the fiscal year.</p>
<p><b>CAMP BIRD COLORADO, INC. CAMP BIRD MINE (Permit No. M-1982-090) Ouray County (HR17)</b></p>	<p>After several years of reclamation activity, the operator began new surface activity in the fall of 2012 including reconstruction of a sedimentation pond and a pipeline conveying portal discharge to the pond. The operator has applied for a new or renewed discharge permit from WQCD. Upstream and downstream surface water sampling has begun on a quarterly basis.</p>	<p>The EPA is currently conducting reclamation of “pre-law” waste dump piles outside of the permit area. The EPA has plans to begin slope reduction of waste dump piles adjacent to Sneffels Creek within the permit area spring of 2018.</p>
<p><b>FORTUNE REVENUE SILVER MINES, INC. REVENUE MINE (Permit No. M-2013-032) Ouray County (HR18)</b></p>	<p>Operation was approved as a 112d-1 permit in 2013, and included an EPP. The main portal discharges water that is piped to lined settling pond, to reduce suspended zinc before it is piped to a passive bioreactive treatment system which then infiltrates to groundwater which was approved July 2016 under Technical Revision 8. Operator is required to monitor surface and groundwater and implement mine water handling plan. Sampling plan includes five</p>	<p>Operator began quarterly surface and groundwater sampling in 2012. The Division approved a mine water handling plan to involve on site treatment. The operator is currently developing a new water treatment plan and will submit a new technical revision early 2018. Water sampling, treatment and</p>

	<p>locations for groundwater and four locations for surface water.</p> <p>A permit transfer from Fortune Revenue Silver Mines to Ouray Silver Mines was completed in November 2015.</p>	<p>monitoring will continue as required.</p>
<p><b>AMERICAN SODA, LLC YANKEE GULCH PROJECT (Permit No. M-1999-002) Rio Blanco County (HR19)</b></p>	<p>American Soda ceased production in 2004 and started reclamation of the site.</p>	<p>Groundwater quality monitoring is continuing at a reduced rate for both the interim status period and for the possibility that commercial production may once again resume.</p>
<p><b>NATURAL SODA, INC. NAHCOLITE PROJECT (Permit No. M-1983-194) Rio Blanco County (HR20)</b></p>	<p>Thirty two active monitoring wells are located at the mine with water quality samples obtained from discrete zones. A total of seventeen wells are equipped with continuous water level measurement transducers and data acquisition and storage systems. Groundwater monitoring includes water levels and over 50 water quality parameters. An annual monitoring report is submitted to DRMS, the BLM and the EPA.</p>	<p>Monitoring activities at the site have continued unchanged during the past year.</p>
<p><b>COLORADO GOLDFIELDS, INC. PRIDE OF THE WEST MILL (Permit No. M-1984-049) San Juan County (HR21)</b></p>	<p>Operations at the Pride of the West Mill (previously named Howardsville Mill) site were both historic and modern. In December of 2016 the MLRB revoked the permit and secured the forfeited Financial Warranties in the amount of \$515,130.00.</p>	<p>In August of 2017 the surface reclamation of Cell 1A was completed by the Division's Inactive Mines Program.</p>
<p><b>SUNNYSIDE GOLD CORPORATION SUNNYSIDE MINE (Permit No. M-1977-378) San Juan County (HR22)</b></p>	<p>Approximately 36 spring and seep locations were monitored semi-annually in accordance with the DRMS/WQCD Consent Decree for drainage associated with the mine pools of the American and Terry Tunnels. The Consent Decree was subsequently terminated by the parties. Terry Tunnel bulkhead final closure occurred on October 5, 2000. American Tunnel Bulkhead No. 1 was closed May 14, 2001; Bulkhead No. 2 was closed August 31, 2001; and Bulkhead No. 3 was closed on December 3, 2002. Sunnyside Gold Corporation also removed the water treatment plant pursuant to a court order. Water monitoring continues twice per</p>	<p>Sunnyside Gold Corporation continues towards completion of final reclamation, release of warranties, and termination of its reclamation permit.</p>

	year in the Animas River above and below the Mayflower Mill site and in Cement Creek above and below the American Tunnel complex.	
<b>PINON RIDGE MINING, LLC SUNDAY MINE (Permit No. M-1977-285) San Miguel County (HR23)</b>	<p>Lower portions of the underground workings accumulate groundwater, which was managed during periods of active mining by using it for drill water, underground dust control and by pumping it elsewhere in the extensive workings. No pumping or other water management is currently occurring. Accumulation of mine pool water has apparently equilibrated, during several years of temporary cessation, and the flooded portion of the workings is not expanding.</p> <p>Due to HB-1161 this mine is now a DMO and the Division required the former operator to submit an EPP. A permit transfer from Energy Fuels Resources to Pinon Ridge Mining was completed in October 2014.</p>	<p>The Environmental Protection Plan (EPP) that was approved in 2012 includes a groundwater monitoring plan. Up-gradient and down-gradient monitoring well locations were determined, as well as compliance well locations farther down-gradient near the permit boundary. The wells will be located on the adjacent permit area for the Topaz Mine (M-1980-055HR). Well installation approved under the EPP was completed in 2013. Five quarters of data were collected. The mine is in temporary cessation and no additional sampling has occurred.</p>
<b>PINON RIDGE MINING, LLC WEST SUNDAY MINE (Permit No. M-1981-021) San Miguel County (HR24)</b>	<p>Lower portions of the underground workings accumulate groundwater, which was managed during periods of active mining by using it for drill water, underground dust control and by pumping it elsewhere in the extensive workings. No pumping or other water management is currently occurring. Accumulation of mine pool water has apparently equilibrated during several years of temporary cessation, and the flooded portion of the workings is not expanding.</p> <p>Due to HB-1161 this mine is now a DMO and the Division required the former operator to submit an EPP.</p>	<p>The Environmental Protection Plan (EPP) that was approved in 2012 includes a groundwater monitoring plan. Up-gradient and down-gradient monitoring well locations were determined, as well as compliance well locations farther down-gradient near the permit boundary. These wells will be located on the adjacent permit area of the Topaz Mine (M-1980-055HR).  Well installation approved under the EPP was completed in 2013. Five quarters of data were</p>

	<p>A permit transfer from Energy Fuels Resources to Pinon Ridge Mining was completed in October 2014.</p>	<p>collected. The mine is in temporary cessation and no additional sampling has occurred.</p>
<p><b>PINON RIDGE MINING, LLC TOPAZ MINE (Permit No. M-1980-055 HR) San Miguel County (HR26)</b></p>	<p>Lower portions of the underground workings accumulated groundwater, which was managed during periods of active mining by using it for drill water, dust control, and by pumping it elsewhere in the extensive workings. No pumping or other water management is currently occurring. Accumulations of mine pool water has apparently equilibrated during several years of temporary cessation, and the flooded portion of the workings is not expanding.</p> <p>Due to HB-1161 this mine is now a DMO and the Division required the former operator to submit an EPP.</p> <p>A permit transfer from Energy Fuels Resources to Pinon Ridge Mining was completed in October 2014.</p>	<p>The operator Environmental Protection Plan (EPP) that was approved in 2012 includes a groundwater monitoring plan. Up-gradient and down-gradient monitoring well locations were determined, as well as compliance well locations farther down-gradient near the permit boundary.</p> <p>Well installation approved under the EPP was completed in 2013. Five quarters of data were collected. The mine is in temporary cessation and no additional sampling has occurred.</p>
<p><b>CLIMAX MOLYBDENUM COMPANY CLIMAX MINE (Permit No. M-1977-493) Summit, Lake, and Eagle Counties (HR27)</b></p>	<p>Groundwater monitoring has continued as approved in the EPP for the site. This includes increased monitoring frequency (monthly) for pH in the GW#2 well located in the Tenmile drainage.</p> <p>All engineering measures to protect groundwater, including groundwater cutoff walls and pump-back systems, the 5-Shaft dewatering pumps, the sludge densification plant (SDP), and the new discharge water treatment plant are still in place and operational.</p> <p>A possible groundwater to surface water seep(s) has been recently identified near the Storke yard collection area and characterization/monitoring is ongoing by Climax. DRMS directed Climax to contact CDPHE regarding this feature in Oct. 2013.</p>	<p>DRMS, Climax, and WQCD have met several times to discuss if INS table value standards are appropriate for analytes of concern (primarily Mn) when establishing site NPLs. Based on these discussions and site data provided by Climax, DRMS will provide direction to Climax regarding this issue in late 2017.</p>

	To-date Climax is still monitoring these seeps while awaiting further direction from CDPHE.	
<b>CRIPPLE CREEK &amp; VICTOR GOLD MINING COMPANY CRESSON PROJECT (Permit No. M-1980-244) Teller County (HR28)</b>	CC&V continues to monitor groundwater at the Cresson Project. The monitoring plan was most recently reviewed in permit amendment No. 11 (AM-11), approved February 8, 2017. The plan requires quarterly monitoring of 17 compliance wells. The Division is currently re-evaluating the groundwater monitoring plan to determine whether it complies with Regulation No. 41 requirements pertaining to NPLs. Any required changes to the approved plan will require submittal of a permit revision or amendment.	The operator reported no exceedances for this reporting year. However, the Division is currently re-evaluating the monitoring plan, including NPLs set for each of the 6 drainages monitored. The mine added new compliance wells downgradient in Arequa Gulch in 2013, and new Grassy Valley and Squaw Gulch wells were sampled beginning the 2nd Qtr of 2014.
<b>VENTURE RESOURCES, INC. HUKILL GULCH MILLSITE (PERMIT NO. M-2009-076) Clear Creek County (HR29)</b>	Venture Resources monitors groundwater in upgradient and downgradient monitoring wells to ensure there is no release of process water from the lined tailings impoundment. The wells are monitored and reported on a monthly basis.	Following a violation issued in 2016, a Cease and Desist Order was placed on the operation and remains in effect. Venture Resources, Inc. has removed all material from within the tailings impoundment and made the necessary repairs to the Environmental Protection Facility (EPF). The Division is currently assessing the remediation work and recertification of the EPF will occur following a site inspection. Monthly monitoring of upgradient and downgradient wells has shown no loss of process solution from the EPF.

**Construction Materials Operations**  
December 2018

<b>Company-Mine Name-Permit #</b>	<b>Site Conditions</b>	<b>FY17-18 Activity</b>
<p><b>CEMEX, INC.</b> <b>LYONS QUARRY</b> <b>(Permit No. M-1977-208)</b> <b>Boulder County</b> <b>(CM01)</b></p>	<p>Groundwater monitoring is required at the Lyons Quarry to verify that the disposal of cement kiln dust (CKD) into the mined out limestone quarry (C-Pit) does not cause groundwater degradation. Groundwater protection requirements include: backfilling the pit with overburden and shale from ongoing quarry operations for reducing ponded water in C Pit to less than one-half acre, and lining portions of the Boulder Feeder Canal near C-Pit to reduce seepage into the pit.</p> <p>The monitoring program requires continuous monitoring of water elevation in the C-pit and in an up gradient well, and quarterly monitoring of water elevation in a deep down gradient well. Water quality samples are collected quarterly from the C-Pit and from down gradient alluvial and bedrock wells.</p> <p>DRMS approved Technical Revision No. 12 (TR-12). TR-12 revised the numeric standards for chloride and sulfate. The previous numeric standards for chloride and sulfate were based on drinking water standards. The drinking water standards were not appropriate as the groundwater down-gradient from the operation is not used for drinking. A chemical analysis of chloride and sulfate was performed on the water in C-Pit using a stiff diagram. The average concentrations of chloride and sulfate in C-Pit were used to establish the revised numeric standards.</p>	<p>In March 2014, the Operator requested a revision to the monitoring plan (TR-12) that DRMS approved, which demonstrated the exceedances of chloride and sulfate in CEM-004 could not be attributed to migration of water from C-Pit. The revised numeric standards for chloride and sulfate are:</p> <p>1) Chloride (mg/L): 1,053 Sulfate (mg/L): 2,641</p>
<p><b>HOLCIM US, INC.</b> <b>PORTLAND LIMESTONE</b> <b>(Permit No. M-1977-344)</b> <b>Fremont County</b> <b>(CM02)</b></p>	<p>Holcim monitors groundwater to evaluate potential release of contaminants from cement kiln dust (CKD) stored on site. Holcim completed the collection of five quarters of baseline data and submitted their report on June 7, 2004. Three wells are designated as compliance and monitoring wells to be monitored for TDS, sulfate (SO<sub>4</sub>), potassium (K), sodium (Na), iron (Fe) and manganese (Mn). In February 2015 the</p>	<p>Data are collected and submitted to DRMS annually. The required parameters and numeric protection levels for MW-7 and MW-13, respectively are:</p> <p>1) TDS (mg/L): 3918, 4026</p>



	DRMS approved a technical revision requested by Holcim to replace the Na standard with K: Na ratio using 0.5 as a numeric protection limit.	<p>2) SO<sub>4</sub> (mg/L): 2080, 2200</p> <p>3) K (mg/L): 17, 13</p> <p>4) Na: K ratio: 0.5</p> <p>5) Fe (mg/L): 4.5, 0.13</p> <p>6) Mn (mg/L): 0.88, 0.30</p>
<b>HOLCIM, INC. BOETTCHER QUARRY (Permit No. M-1977-348) Larimer County (CM03)</b>	The Boettcher Quarry and cement plant were permanently closed in 2002 and the cement plant was demolished in 2004. The site has been largely reclaimed, and the Cement Kiln Dust (CKD) disposal area has been capped and revegetated. Groundwater monitoring to date indicates a very tight formation with deep groundwater and little groundwater movement. Additional groundwater monitoring is being conducted at this time to determine if the site can be considered for final closure. Three additional monitoring wells were installed in 2013 to help characterize current conditions. Additional monitoring data and site characterization information continue to be collected.	<p>DRMS is evaluating the ongoing monitoring results and will determine if additional enhanced groundwater monitoring will be required, or if the site is eligible for final closure.</p> <p>Barium levels in several monitoring wells continue to exceed the MCL of 2mg/l, however this may be due to naturally elevated background levels of this element.</p>
<b>GCC RIO GRANDE, INC. PUEBLO CEMENT PLANT AND LIMESTONE QUARRY (Permit No. M-2002-004) Pueblo County (CM04)</b>	GCC conducts semi-annual monitoring of a down gradient well. DRMS approved a permit revision in March 2013 that eliminated monitoring of four alluvial wells, based on a lack of hydrologic connection between them and the facility. DRMS approved a permit revision in August 2015 to allow the beneficial re-use of a portion of kiln feed material from the main kiln baghouse in the quarry area for reclamation backfill purposes.	DRMS approved a permit revision in July 2017 to construct an additional groundwater monitoring well immediately down gradient of the area associated with backfilling kiln feed material. The new well will be monitored quarterly for the first 18 months (sampling will be reduced to semi-annual if no groundwater is encountered).
<b>AGGREGATE INDUSTRIES - WCR, INC. PLATTE VALLEY OPERATION (PERMIT NO. M-1989-120) Weld County (CM05)</b>	This sand and gravel mining operation has three open water basins. The Operator allows importation of inert material to backfill into the pit excavations. CDPHE inspected the site and found Broda Inert Fill (Broda) had possibly imported unauthorized waste to the site without obtaining a Certificate of Designation. CDPHE	On September 5, 2017, Aggregate Industries submitted the quarterly groundwater measurement data collected by Aggregate Industries as well as

	<p>required Broda to install three groundwater monitoring wells at the site to test groundwater quality. These wells and a monitoring plan were incorporated into the DRMS mining and reclamation plans. These wells are monitored on a quarterly basis and the results sent to CDPHE and also reported to DRMS annually.</p>	<p>groundwater quality monitoring and measurement data collected at the site. This data was also submitted to the Colorado Department of Public Health and Environment as required under the recycling license held by Broda Inert Fill and in accordance with Technical Revision No. 03.</p>
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## Colorado Coal Mines – Activity Status

December 2017

### Colowyo Mine (Producing) – C-1981-019

Moffat and Rio Blanco Counties

Company Name: Colowyo Coal Company L.P.  
Mine Name: Colowyo Coal Mine  
Mine Type/Status: Surface/Federal/ Active  
FY 17-18 Production: 1,997,411 tons (July 2017-June 2018)  
No. Miners: 190  
Permit Acres: 27,529.24 (3,573.07 federal surface and 22,910.97 federal coal)  
Affected Acres: 5,812.10  
Disturbed Acres: 5,802.10  
Bond Amount: Required - \$146,219,785; Actual Held - \$108,025,721\*

Mining operations began in 1976 with the East Pit, a multi-seam coal operation with eight coal seams. Extraction of coal from the East Pit was terminated in 2006, and currently the only ongoing operation in the East Pit is reclamation of the final cut, including backfilling and grading of the pit and highwall reduction. Coal extraction from the multi-seam West Pit, including highwall mining, concluded in 2015. In 2006, Colowyo expanded the permit boundary by approximately 6,000 acres to the west and south into the South Taylor/Lower Wilson area. Mining, including highwall mining, in the South Taylor Pit will continue until 2019, with reclamation continuing until 2025. Permit Revision PR-04, which changes the mine plan for the Collom Area, originally approved with Permit Revision PR-03, was approved in September 2016. Colowyo completed the infrastructure for Collom (haul rods, ponds, facilities area, etc.) over the summer of 2018 and anticipates starting the box-cut in the fall of 2018.

\*The difference between the amount of bond required and the amount of bond held is due the Division's approval of Permit Revision PR-04. Colowyo currently has an incremental bond schedule in place. Prior to disturbing any surface, Colowyo will be required to submit the appropriate reclamation bond.

### Deserado Mine (Producing) – C-1981-018

Moffat and Rio Blanco Counties

Company Name: Blue Mountain Energy, Inc.  
Mine Name: Deserado Mine  
Mine Type/Status: Underground/Federal/ Active  
FY 17-18 Production: 2,231,324 tons (July 2017-June 2018)  
No. Miners: 154  
Permit Acres: 13,645.01 (13,325.01 federal surface and 13,645.01 federal coal)  
Affected Acres: 8,215.75  
Disturbed Acres: 513.46  
Bond Amount: Required - \$5,719,215; Actual Held - \$5,808,383.

The Deserado Mine is an underground longwall mine that is currently mining in the B-Seam. All coal mined from Deserado Mine is shipped by train directly to the Bonanza Power Plant located near Bonanza, Utah. The Deserado Mine continually drills into their current longwall workings to allow nitrogen to be pumped into the mine as a fire preventative measure.

**Foidel Creek Mine (Producing) - C-1982-056****Routt County**

Company Name: Twentymile Coal, LLC  
 Mine Name: Foidel Creek Mine  
 Mine Type/Status: Underground/Federal/ Active  
 FY 17-18 Production: 3,162,667 tons (July 2017-June 2018)  
 No. Miners: 265  
 Permit Acres: 22,607 (6,070 federal surface and 8,484.8 federal coal)  
 Affected Acres: 19,961.33  
 Disturbed Acres: 773  
 Bond Amount: Required - \$9,647,442; Actual Held - \$10,267,598

The Foidel Creek Mine is an underground longwall mine located near Oak Creek, Colorado. Mining at the Foidel Creek Mine has historically occurred in the Wadge seam. In December 2014, the Division approved a revision to allow for development mining of the deeper Wolf Creek seam. During 2015 and 2016, the company ramped down to, and conducted development mining in, the Wolf Creek seam. Longwall mining in the Wadge seam ended in June 2016. Longwall mining in the Wolf Creek seam began in September 2016.

**King Coal Mine (Producing) - C-1981-035****La Plata County**

Company Name: GCC Energy, LLC  
 Mine Name: King Coal Mine  
 Mine Type/Status: Underground/Federal/ Active  
 FY 17-18 Production: 598,283 tons (July 2017-June 2018)  
 No. Miners: 90  
 Permit Acres: 2,705.40 (81.30 federal surface and 1,346.20 federal coal)  
 Affected Acres: 1,654.70  
 Disturbed Acres: 49.59  
 Bond Amount: Required - \$837,375; Actual Held - \$908,673

The King Coal Mine, permitted by GCC Energy, LLC (GCC), is an underground mine west of Durango in La Plata County. Mining at the original mine (King I) was completed in 2009 and those portals have been sealed. Expansion to the King II Mine was approved in 2006. Coal extraction from the King II mine began in 2007. The King II mine's surface facilities were constructed in 2008. Coal is mined from the "A" seam of the Menefee Formation using conventional room-and-pillar methods. The coal is hauled from the site by truck to a railhead located in Gallup, NM. Much of the King II coal is federally owned and located beneath surface lands owned by the Ute Mountain Tribe. All of the King II surface facilities fall under the jurisdiction of the Division as they are situated upon State-owned lands, but OSM is the permitting agency for the federal coal beneath the Ute lands.

**New Elk Mine (Non-Producing) - C-1981-012****Las Animas County**

Company Name: New Elk Coal Company, LLC  
 Mine Name: New Elk Mine  
 Mine Type/Status: Underground/Private/Active (Idled)  
 FY 17-18 Production: 0 (July 2017-June 2018)  
  
 No. Miners: 2

Permit Acres: 4,201.90 (0 federal surface and 0 federal coal)  
 Affected Acres: 2,900.41  
 Disturbed Acres: 223.80  
 Bond Amount: Required - \$4,044,697; Actual Held - \$4,133,137.

The New Elk Mine is an underground room and pillar mine located approximately 25 miles west of Trinidad, Colorado. The operation has an off-site loadout located on the western edge of Trinidad. In July of 2012, the mine suspended production and went into Temporary Cessation for an initial period of 60 days. In September 2012, this Temporary Cessation was extended indefinitely "pending improved market conditions". In May 2014, the permit status was returned to Active. During CY14, 14,238 tons of coal were mined and delivered to a prospective customer on a test-burn basis. No coal was mined in FY16-17.

**New Horizon North Mine (Non-Producing since March 2017) - C-2010-089 Montrose County**

Company Name: Elk Ridge Mining and Reclamation, LLC  
 Mine Name: New Horizon North Mine  
 Mine Type/Status: Surface/Private/Active  
 FY 17-18 Production: 0 tons (July 2017-June 2018)  
 No. Miners: 24  
 Permit Acres: 234.60 (0.00 federal surface and 0.00 federal coal)  
 Affected Acres: 203.0  
 Disturbed Acres: 203.0  
 Bond Amount: Required - \$4,843,021; Actual Held - \$5,254,691

The New Horizon North Mine is a surface mine located west of Nucla, Colorado and ships its coal to the Nucla Generating Station. Overburden removal is accomplished with trucks and excavators. In October 2016, Tri-State Generation and Transmission, the mine's parent company, informed the Division that the Nucla Generating Station was going to be retired by December 31, 2022, and that the station had already been shut down on a temporary basis. Coal extraction at the mine Ceased in March 2017.

**Trapper Mine (Producing) - C-1981-010 Moffat County**

Company Name: Trapper Mining, Inc.  
 Mine Name: Trapper Mine  
 Mine Type/Status: Surface/Federal/Active  
 FY 17-18 Production: 1,933,247 tons (July 2017-June 2018)  
 No. Miners: 172  
 Permit Acres: 11,156.69 (0.00 federal surface and 5,540.43 federal coal)  
 Affected Acres: 3,265.70  
 Disturbed Acres: 3,265.70  
 Bond Amount: Required - \$22,847,951; Actual Held - \$23,400,000

The Trapper Mine, permitted by Trapper Mining, Inc., is a surface mine located south of Craig. Draglines, excavators, loaders and trucks are used to mine the coal. The coal is trucked directly to the Craig Power Plant located adjacent to the mine site. In October 2016, Tri-State Generation and Transmission, the company that operates the Craig Power Plant, announced that Unit No.1, the oldest unit, would be retired by December 31, 2025.

**West Elk Mine (Producing) - C-1980-007****Delta and Gunnison Counties**

Company Name: Mountain Coal Company, LLC  
Mine Name: West Elk Mine  
Mine Type/Status: Underground/Federal/ Active  
FY 17-18 Production: 4,481,366 tons (July 2017-June 2018)  
No. Miners: 261  
Permit Acres: 19,854.90 (13,358.40 federal surface and 15,395.00 federal coal)  
Affected Acres: 15,953.10  
Disturbed Acres: 600.38  
Bond Amount: Required - \$14,428,380; Actual Held - \$15,000,000.00

The West Elk Mine is an underground longwall mine that is producing coal from the E-Seam. The operator is currently mining in the sixth longwall panel in the southern mining area. Complications with obtaining a lease to the south has led the operator to pursue new workings in the B-Seam. A project to establish access to the B-Seam from the existing workings is ongoing. The existing coal wash plant and refuse pile are expected to provide sufficient capacity for the remaining life of mine. The operator continues to construct and reclaim mine ventilation boreholes, and their associated drill pads and light-use roads. In 2018, MCC had a revision approved that allowed for the mining of four additional panels in the E-Seam south of their current workings. This revision added 2,620 acres to the permit area and 53.63 acres to the disturbed area.

**Colorado Coal Mines  
November 2017**

Permit #	Mine	Total Permitted Acreage	Inspections Required
	<b>Active</b>		
C-1980-007	West Elk Mine*	19,854.90	12
C-1981-010	Trapper Mine*	11,156.69	12
C-1981-012	New Elk Mine	4,201.90	12
C-1981-018	Deserado Mine*	13,645.01	12
C-1981-019	Colowyo Mine*	27,529.24	12
C-1981-022	Elk Creek Mine	15,676.51	12
C-1981-035	King Coal Mine*	2,705.40	12
C-1982-056	Foidel Creek*	22,607.00	12
C-1983-059	Terror Creek Load Out	20.00	12
C-2010-089	New Horizon North Mine	234.60	12
	<b>TOTAL ACTIVE</b>	<b>117,631.25</b>	<b>120</b>
	<b>Reclamation and Cessation</b>		
C-1980-004	McClane Canyon Mine (Temporary Cessation)	3,561.40	4
C-1981-008	New Horizon Mine	916.79	12
C-1981-025	North Thompson Mine (Phase II released)	411.80	4
C-1981-028	Keenesburg Mine	225.55	12
C-1981-038	Bowie No. 1	5,035.20	12
C-1981-041	Roadside Portals	548.00	12
C-1981-044	Williams Fork Mines (Temporary Cessation)	6,363.00	4
C-1982-057	Seneca IIW Mine	3,878.50	12
C-1984-065	Coal Ridge No. 1 Mine (Phase II released)	2,484.30	4
C-1992-081	H-G Loadout	391.20	12
C-1994-082	Yoast Mine	2,318.30	12
C-1996-083	Bowie No. 2 (Temporary Cessation)	10,987.40	4
C-1996-084	Lorencito Canyon Mine	384.00	12
C-2009-087	Peabody Sage Creek Mine	10,164.00	12
C-2010-088	Fruita Loadout (Temporary Cessation)	208.60	4
	<b>TOTAL RECLAMATION AND CESSATION</b>	<b>47,878.04</b>	<b>132</b>
	<b>Revoked</b>		
C-1981-015	Fruita No. 1 & 2	16.00	4
C-1981-014	Southfield Mine	1.45	2
C-1981-033	Bear Mine	1,108.40	12
C-1981-037	GEC Strip Mine	890.00	2
	<b>TOTAL REVOKED</b>	<b>2,015.85</b>	<b>20</b>
	<b>New</b>		
C-2006-085	Northfield Mine (pending bond)	1,157.00	0
	<b>TOTAL NEW</b>	<b>1,157.00</b>	<b>0</b>
	<b>Total</b>	<b>168,682.14</b>	<b>272</b>
	* Actively Producing Mines		

**COLORADO ABANDONED MINE LAND PROGRAM  
NONPOINT SOURCE AND WATER QUALITY IMPROVEMENT PROJECTS  
November 2018**

**SAN JUAN RIVER WATERSHED**

Project	Status	Partners
<p><b>Bonita Peaks Mining District</b></p> <p>The Bonita Peaks Mining District (BPMD) was designated as a Superfund site by EPA following the 2015 Gold King event and renewed focus on impacts by “legacy” mines to the Animas River. DRMS is currently providing technical assistance to BLM, USFS, EPA, CDPHE and other partners within the BPMD. DRMS has been given funding by BLM and USFS to provide technical assistance, reclamation project design, and potential implementation of reclamation projects on BLM and USFS managed mine sites. DRMS is involved in the Hydrogeologic Workgroup, Characterization Workgroup, coordinating cultural clearances, collecting mine map information, and utilizing the legacy site knowledge to help inform the superfund partners. DRMS is currently funded by CDPHE to inspect the bulkheads in the mining district and anticipates continued CDPHE funding to provide technical assistance, design and implementation of additional mine reclamation projects within the BPMD.</p>	Ongoing	DRMS, BLM, USFS, EPA, CDPHE, ARSG, MSI

**LOWER COLORADO RIVER WATERSHED**

Project	Status	Partners
<p><b>Uncompahgre Watershed Partnership NPS 319 grant</b></p> <p>The Uncompahgre Watershed Partnership (UWP) is a 501 c(3) organization located in Ridgway, Colorado whose mission is to focus on the Upper Uncompahgre watershed. The UWP has been in existence since 2007 and is headed by a Board of</p>	Completed	DRMS, UWP, CDPHE



Project	Status	Partners
<p>Directors with consultation from the previous watershed coordinator. The UWP was awarded a NPS 319 grant in 2014 for 3 projects located on 3 separate 303(d) listed waters. The WQCD has assisted in water quality sampling to characterize water quality.</p> <p>DRMS technical assistance and potential funding for two water quality projects in Sneffels Creek drainage. Partners Ouray Silver Mines and Trout Unlimited along with UWP using Supplemental Environmental Project funding from CDPHE to consolidate and amend the Atlas Mill tailings and provide stream bank stabilization, and runoff/runoff controls.</p> <p>DRMS staff providing additional technical assistance for a project in negotiation with CDPHE using Idarado Natural Resource Damage Funds in assistance with Ouray Silver Mines and UWP to cap and cover more acidic and oxidized waste rock with buffered non-oxidized waste rock in Governor Basin. Provide runoff/runoff controls and revegetation.</p>	<p>Ongoing with anticipated implementation in 2019</p> <p>Ongoing with anticipated implementation in 2020</p>	<p>USFS, Ouray Silver Mines, Alpine Environmental Consultants, GeoSyntec, Trout Unlimited, DRMS</p> <p>USFS, Ouray Silver Mines, Alpine Environmental Consultants, GeoSyntec, Trout Unlimited, DRMS</p>
<p><b>Carbonero Mine, Howard Fork/ San Miguel River Watershed</b></p> <p>Ongoing water quality monitoring assistance with San Miguel Watershed Coalition to determine legacy mining impacts in the Howard Fork of the San Miguel River.</p>	<p>Underway - 2017 and 2018 Sampling</p>	<p>DRMS, EPA, CDPHE, USFS, San Miguel Watershed Coalition</p>

Project	Status	Partners
<p><b>Redwell Basin/ Daisy Mine, Slate River/ Gunnison River Watershed</b></p> <p><u>Gunsight Processing Area</u>  The Gunsight Processing Area is located outside of the Town of Crested Butte on lands managed by the Bureau of Land Management. The site comprises approximately 3 acres of disturbed lands, with approximately 3,000 cubic yards of ore and waste rock, presumably transported to the site in the mid-1950's from Redwell Basin likely the Daisy Mine. This site has significant run-off and seeps and springs associated with the waste rock/ore dump. Surface waters potentially impacted are Oh Be Joyful Creek, the Slate River, and associated wetland areas. The site was funded by the BLM and the 319 Non-point source program for reclamation and included the Coal Creek Watershed Coalition and the Gunnison Field Office of the BLM as project partners. 2016 sitework included drilling groundwater monitoring wells, furnishing those wells with pressure transducers, and excavating soil pits to determine the depth of waste and potential locations for "borrow" soil.</p> <p>Project was bid and constructed in the summer/fall of 2017. Project design included consolidating and encapsulating the waste rock on-site into a waste consolidation area and applying a rock cap, treating the removal area with pulverized limestone, grading the site, covering the disturbed area with topsoil, installing run-on/run-off controls, and revegetating the site.</p>	<p>Completed 2017 with low and high flow monitoring in 2018.</p>	<p>DRMS, CDPHE, BLM, CCWC</p>

Project	Status	Partners
<p><u>Daisy Mine</u> The Daisy mine is the largest anthropogenic source of metals loading into Redwell Creek, Oh Be Joyful Creek, and the Slate River. High levels of Pb, Zn, As, Cu, and Cd run-off the waste rock area and contaminate the receiving streams. Low pH conditions within the waste rock dumps and draining adit facilitate the transport of metals from the site. 2016 site work included mapping of the site, water sampling of the draining adit, and soil sampling.</p>	Drilling planned for 2019	DRMS, CDPHE, FMI
<p><b>Standard Mine, Coal Creek/Gunnison River Watershed</b></p> <p>DRMS has been providing technical assistance to CDPHE, EPA, and their contractor with respect to implementation of the Record of Decision for the Standard Superfund site. DRMS involvement included review of design documents, quality assurance with respect to construction of various remedies, and input on O&amp;M items</p> <p>DRMS has partnered with USFS for Level 5 and Level 98 work at the Standard Mine. These levels were not included in the Standard Mine Superfund Project. Work includes diversion of Level 5 drainage, trench closure, waste consolidation, and wetland restoration at Level 98, and revegetation at both Level 5 and 98.</p>	<p>Ongoing</p> <p>Underway with portions completed. Final completion in 2019.</p>	<p>CDPHE, EPA, HDR</p> <p>DRMS USFS</p>
<p><b>Mt. Emmons Mine, Coal Creek/Gunnison River Watershed</b></p> <p>DRMS is providing reclamation design and implementation of mine waste reclamation on Freeport owned property at the Mt. Emmons site. DRMS working under an agreement with Freeport McMoran to implement reclamation activities.</p> <p>Work completed included consolidation and removal of waste rock materials, site grading, hydrologic controls, in-situ</p>	Level 1370 and 1670 reclamation completed 2018. Additional revegetation and gossan project 2019.	DRMS, FMI, TU

Project	Status	Partners
treatment of wastes at 1670 level, and revegetation.		
<b>Henson Creek/Gunnison River Watershed</b>		
<u>Hough Mine Post Reclamation water quality sampling</u> DRMS and its partners are currently sampling the Henson Creek and Palmetto Gulch watersheds to determine reclamation effectiveness at the Hough Mine. The Hough Mine reclamation was completed in 2015. Post Reclamation monitoring has been ongoing for three years. Initial results indicate that the reclamation was effective at reducing metals concentrations by more than 50% and increasing pH downstream of the Hough Mine from pH 3.5 to pH 6.5.	Ongoing	DRMS, LFVC, CDPHE
<u>Roy Pray Post Reclamation Monitoring</u> Post Reclamation Monitoring of the hydrologic bulkhead seal in the Roy Pray adit is underway. Construction of a drill hole and installation of a piezometer was completed in September 2018. Water sampling of the mine pool and the area around the Roy Pray was also completed and a report about mine pool conditions will be completed in the Spring of 2019. The work is being funded by the BLM.	Portions completed 2018	DRMS, BLM

#### UPPER COLORADO RIVER

Project	Status	Partners
<b>Snake River Watershed Pennsylvania Mine Project-</b>		
DRMS continues to provide in-kind technical assistance to the various agencies and groups investigating impacts to Peru Creek and the Snake River from the Pennsylvania Mine and other Legacy sites within the watershed.	Post construction monitoring, installation of monitoring wells in 2017 and 2018.	DRMS, EPA, CDPHE, USFS, USGS, Summit County Open Space

Project	Status	Partners
Following completion of bulkheads on both Level F and Level C of the Pennsylvania Mine, DRMS has provided monitoring of mine pool conditions and assisted with water sampling. Efforts are ongoing to determine the long term effectiveness of the installed bulkheads. In 2018, multiple monitoring wells were installed in an attempt to intercept mine pool waters for future monitoring.		
<p><b>Mountain Pride Mine, Blue River Watershed</b></p> <p>The CDPHE, EPA, USFS, USGS, USFWS, DRMS and Trout Unlimited (TU) have been investigating abandoned mine impacts to water quality in Illinois Gulch, a tributary to the Blue River, since 2012. These investigations have proceeded in consultation with local landowners, Summit County, and the Town of Breckenridge and led to the development of a reclamation project at the Mountain Pride mine in upper Illinois Gulch. The Mountain Pride mine project was managed by TU and completed in 2018. The DRMS contributed funding and conducted a site evaluation and research to provide TU a report on the relationship of surface disturbances and other surface features to the historic underground mine workings.</p>	Completed 2018	TU, DRMS, CDPHE, EPA, USGS,USFS, USFWS

### SOUTH PLATTE RIVER WATERSHED

Project	Status	Partners
<p><b>North Empire Creek, Clear Creek Watershed</b></p>		
<p><u>Lower North Empire Creek Restoration Project-</u> This project will address the <i>lower reach</i>, which encompasses about 1/3 lineal mile of the entire drainage system. The Middle and Upper North Empire Creek Restoration Projects have already addressed the upper</p>	Completed 2018	CCWF, CDPHE, DRMS, EPA

Project	Status	Partners
<p>2/3 of the drainage system. The project will entail construction of a diversion channel construction, sediment storage embankments, Texas road crossings, and removal of contaminated sediment along with placement in an onsite repository.</p>		
<p><b>Captain Jack Superfund Site, Lefthand Creek, Boulder County</b></p> <p>DRMS is providing technical assistance to EPA and CDPHE regarding underground design elements of the Record of Decision, and may provide future design and implementation of O&amp;M alternatives.</p>	<p>Ongoing</p>	<p>EPA, CDPHE</p>
<p><b>Buckskin Joe a/k/a Phillips mine, Buckskin Gulch, Park County</b></p> <p>The draining adit and waste rock dump of the Buckskin Joe (Phillips) mine are located less than two miles west from the Town of Alma immediately south of Buckskin Creek and upstream of the intake gallery for the Town of Alma water supply. Water, sediment, and soil (mine waste rock and mill tailings) sampling and characterization was conducted by EPA and project partners beginning in 2011. In 2016, EPA and DRMS installed a dedicated flume and transducers at the Buckskin Joe portal to measure adit drainage rates over time. In 2016 and 2017 DRMS with support from EPA and the Town of Alma conducted underground reconnaissance in the Buckskin Joe mine. These efforts were hampered by cave-ins, hazardous conditions, and deep water in the mine. To facilitate the reconnaissance, DRMS re-opened and installed a hatch on a previously grated shaft and EPA mobilized a Remotely Operated Vehicle in an effort to collect video beyond deep water pooled in the mine. These efforts resulted in a determination that there are at least two mine pools within the Buckskin Joe underground workings, one impounded behind a partial collapse approximately 40-feet from the portal, and one flowing over a</p>	<p>Investigations and Characterization Underway</p>	<p>EPA, CDPHE, CUSP, DRMS, USFS, Town of Alma, Park County, TU, USGS</p>

Project	Status	Partners
<p>floor to ceiling collapse approximately 100-feet from the portal.</p> <p>EPA is developing plans to drill into the flooded mine workings behind the collapse in 2019. DRMS provided technical review and comments on the drilling plan. EPA and DRMS have partnered on a rigorous program of flume monitoring and maintenance to occur every 4-weeks November 2018 through February 2019, then every 2-weeks through June 2019 in order to secure a high-quality flow data set from low flow into the high flow period.</p>		

### ARKANSAS RIVER WATERSHED

Project	Status	Partners
<p><b>Chalk Creek / Mary Murphy Mine, Golf Tunnel Hydrologic-Bulkhead, Chaffee County-CDPHE, EPA, USFS, DRMS:</b></p> <p>DRMS continues to coordinate with the USFS and EPA in addition to other stakeholders regarding ongoing monitoring and long term data collection within Chalk Creek. DRMS is also assisting in the development of a site wide O&amp;M plan to not only help establish success of the reclamation work within the watershed, but to provide a mechanism for addressing any maintenance needs that may arise. Future work within Chalk Creek may entail construction of a hydrologic bulkhead seal on the 1400 Level of the Mary Murphy to address discharge associated with the Golf Tunnel mine pool.</p>	Ongoing Monitoring	DRMS, EPA, CDPHE, USFS

### RIO GRANDE RIVER WATERSHED

Project	Status	Partners
<p><b>Nelson Tunnel Source Controls Remedial Investigation and Feasibility Study (RIFS), West Willow Creek- CDPHE, EPA, DRMS:</b></p> <p>The EPA, CDPHE and DRMS continue to investigate the feasibility of implementing</p>	Ongoing	DRMS, EPA, CDPHE

Project	Status	Partners
<p>source control measures at the Nelson Tunnel, Creede, Colorado. During this process, DRMS continues to provide technical assistance pertaining to RIFS documents and underground related information.</p> <p>Future tasks for DRMS may involve facilitation of additional underground investigations, review and analysis of existing data, development of additional cost analysis for installation of multiple bulkheads, facilitation and cooperation with potential sampling well installations, and development of potential source control remedies.</p>		

**STATEWIDE MINING NPS INITIATIVES**

Project	Status	Partners
<p><b>Mixed Ownership</b></p> <p>In 2018, DRMS received an interagency agreement from CDPHE to provide technical assistance and field work related to Legacy Mine Mixed Ownership sites throughout the State.</p> <p>Technical assistance from DRMS will include in office and onsite field assessment of various AML Mixed Ownership sites as determined by the Mixed Ownership Group. The onsite activities may include, but are not limited to, waste pile and adit discharge sampling, site mapping, discharge and flow rate measurements. DRMS staff will also attend mixed ownership meetings and phone calls to discuss results of data collection, site prioritization, reclamation alternatives, and future project planning.</p>	<p>Ongoing</p>	<p>CDPHE, EPA, USFS, TU</p>



<p><b>Mine Impacted Stream Task Force</b></p> <p>DRMS actively participates in the Task Force formed following the Gold King release in 2015. Activities associated with the Task</p>	<p>Ongoing</p>	<p>CDPHE (HMWD, WQCD), DRMS</p>
<p>Force have included the AML Data Hub and the Draining Mines Inventory. The Task Force is currently evaluating the feasibility of assessing mining related non-point source impacts from legacy sites throughout the State, and whether a statewide prioritization could be possible.</p>		
<p><b>2013 Mine-Related Total Maximum Daily Load (TMDL) Implementation - UPDATES</b></p> <p>In 2013 DRMS received a grant from CDPHE to improve water quality in Colorado by providing technical assistance in the characterization and assessment of watershed planning processes as they relate to “legacy” mine in the state, by the development of local partnerships to ensure that projects are implemented technically correctly and by the implementation of mine reclamation projects.</p> <p>The DRMS provides assistance in all aspects of watershed restoration including watershed planning, site characterization, project planning, project implementation, 319 proposal review, and financial assistance. Division personnel have attended watershed meetings, participated in sampling events, conducted reconnaissance activities, and provided project management and technical assistance to numerous watershed groups, and various government agencies. The grant also has provided funding for DRMS to work with the CDPHE and other government entities to outline a list of mining impaired "priority watersheds" in the State and assist with the updating of the management plan. Specifically, the grant provides funding for</p>		<p>CDPHE, USFS, USGS, EPA</p>

