Agenda

1) Mining history / impacts to Colorado.
2) Mine Impacted Streams Task Force.
3) Innovative collaboration approach.
4) Questions?
Mining History

- Gold Rush in Colorado 1850s.
- Most mining prior to current environmental regulations (1970s).
- Acid rock drainage.
- 1,800 stream miles impaired.
Questions:

- Where are the abandoned mines in Colorado?
- Which ones impact water quality?
- Any more with backed up water?

Mine Impacted Streams Task Force:

- Water Quality Control Division.
- Division of Reclamation Mining and Safety.
- Hazardous Materials and Waste Management Division.
Two initiatives developed:

• Inventory of abandoned mines.

• Study - Water quality of draining mines.
Goal - Create publicly available comprehensive interactive map of abandoned mine sites in Colorado.

- Colorado Geologic Survey.
- Colorado Office of Archeology and Historical Preservation.
- Colorado Department of Natural Resources.
- Colorado Department of Public Health and Environment.
- Trout Unlimited.
- Bureau of Land Management (BLM).
- Department of Energy (DOE).
- Environmental Protection Agency (EPA).
- National Park Service.
- United States Forest Service (USFS).
- U.S Fish and Wildlife.
Abandoned Mine Lands Hub

- Presents existing federal and state data sources.
- Publicly available web based interactive map.
- More than 50,000 records.
- Updatable.
- Completed in 2017.
Abandoned Mines Water Quality Study

Goal - Survey and collect water quality data at mines suspected of impacting water quality without recent investigations or restoration.
Abandoned Mines Water Quality Study

1. Division of Reclamation Mining and Safety & Water Quality Control Division partnership.

2. Study championed by Governor Hickenlooper in 2016 state of the state address.

   • Survey included site observations, photographs, field parameters and water quality sampling.

https://erams.com/co-abandoned-mines-water-quality
Abandoned Mines Water

Mine Name: Swan River Mine (Tiger Mine)
SiteID: DRMS-148
Mine Category and Description: Red - Draining mines without recent investigations or restoration project.
Comments:
Latitude: 39.5207
Longitude: -105.964
Visit Date: 11/03/2016 13:30:00
Field Form: https://s3.amazonaws.com/erams-cdphe/SwanRiverTiger.pdf
SampleID: 20179172000
Stream Temperature: 6.88 degrees C
Stream Conductivity: 597.9 uS/cm
Stream pH: 6.88
Flow: 68 gpm
Aluminum(dis): <21 ug/L
Aluminum(tot): <110 ug/L
Arsenic(dis): 3.9 ug/L
Arsenic(tot): 6.1 ug/L
Cadmium(dis): 5.6 ug/L
Cadmium(tot): 6.6 ug/L
Calcium(dis): 95 mg/L
Calcium(tot): 120 mg/L
Chromium(dis): <0.97 ug/L
Chromium(tot): <4.9 ug/L
Copper(dis): <3.7 ug/L
Copper(tot): 45 ug/L
Iron(dis): 4000 ug/L
Iron(tot): 6300 ug/L
Lead(dis): <0.11 ug/L
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum Value</th>
<th>Median Value</th>
<th>Maximum Value</th>
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</thead>
<tbody>
<tr>
<td>Flow (GMP)</td>
<td>0.05</td>
<td>13.4</td>
<td>1,497</td>
</tr>
<tr>
<td>Cadmium (ug/l)</td>
<td>Below Detection</td>
<td>2.35</td>
<td>1,100</td>
</tr>
<tr>
<td>Cadmium (lb/day)</td>
<td>Below Detection</td>
<td>0.00042</td>
<td>0.065</td>
</tr>
<tr>
<td>Zinc (ug/l)</td>
<td>Below Detection</td>
<td>905</td>
<td>320,000</td>
</tr>
<tr>
<td>Zinc (lb/day)</td>
<td>Below Detection</td>
<td>0.14</td>
<td>14.13</td>
</tr>
<tr>
<td>pH (standard units)</td>
<td>2.21</td>
<td>6.55</td>
<td>8.66</td>
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## Study Summary

<table>
<thead>
<tr>
<th>Water Quality Impacts</th>
<th># of Mines</th>
<th>% of Mines</th>
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</thead>
<tbody>
<tr>
<td>Discharge exceeds stream standards and receiving stream is impaired.</td>
<td>48</td>
<td>33%</td>
</tr>
<tr>
<td>Discharge exceeds stream standards and receiving stream attains standards.</td>
<td>51</td>
<td>35%</td>
</tr>
<tr>
<td>Discharge meets stream standards.</td>
<td>45</td>
<td>31%</td>
</tr>
</tbody>
</table>
MISTF Impacts

1. Changing/improving how abandoned mine information is shared.

2. Public is more informed about abandoned mines.

3. Federal, state and local stakeholders using data and tools for collaborative decision making.
Innovative Collaboration

1. Identify common goals.

2. What can my agency do to help.

3. Right level of leadership to make decisions.

4. Understand other agency capabilities / limitations.

5. Contributing staff resources, expertise and budget technology.

6. Management and other decision makers like contributions from other agencies.
Questions & Resources

Webpage - Mine Impacted Streams Taskforce

www.colorado.gov/cdphe/WQ-Mine-Impacted-Streams-Task-Force

Handouts Available

Contact Information

Skip Feeney
303-691-4928
Skip.Feeney@state.co.us
Environmental Data Unit
Figure 3 - General AML Information Hub Structure and Data Flow Diagram

NOTES:
AML - Abandoned Mine Land
AMLSC - Abandoned Mine Land Steering Committee
ArcGIS - ESRI ArcGIS
BLM AMSCM - Bureau of Land Management Abandoned Mine Site Cleanup Module
CDPHE DM - Colorado Department of Public Health and Environment
Draining Mine Water Quality Study
CDRMS - Colorado Division of Reclamation, Mining, and Safety
CGS - Colorado Geological Survey
CGS IS64 - Colorado Geological Survey Information Series 64
DOE DRUM - Department of Energy Defense-Related Uranium Mines
EPA GIS - Environmental Protection Agency Region 8 Geographical Information Systems
EPA ULD - Environmental Protection Agency Uranium Location Database
eRAMS - Risk Assessment and Management System - Colorado State University
Healthy Water - Healthy Watershed Tool
NPS - National Park Service
PP / DDS - Professional Paper / Digital Data Series
USGS - U.S. Geological Survey
USMIN - U.S. Mineral Resource Database
WRAP - Watershed Rapid Assessment Protocol Tool