

Region 2 Mine Inspection Prioritization

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Objective

The purpose of this document is to summarize the results of the effort to prioritize unremediated mines for inspection, based on an evaluation of potential threat to water quality. A full description of the evaluation process can be found in a companion document, *Mine Prioritization Quality Assurance Project Plan/Data Quality Objectives (Including Inspections with XRF)*. Briefly, existing and new sources of data describing characteristics of the mine, mining waste, and site connectivity to and impairment status of receiving waters was used to score and rank each mine according to its estimated potential to impact water quality.

Inspection Prioritization

The high, medium, and low priorities for inspection are listed in Table 1 as well as a brief summary of the factors contributing to the resultant ranking. Significant outcomes resulting from this effort include:

1. Bella Oak, a mercury mine located in Napa County was reduced from high to medium priority due primarily to the lack of hydraulic connectivity.
2. Alma, a sulfur mine in the Oakland Hills of Alameda County was located and evaluated as a low priority. Previous inspectors could not locate the mine due to inaccurate data sources (old USGS maps/lists). Recent updates in USGS databases confirmed that the acid rock drainage (ARD) identified by staff near the Leona Heights Sulfur Mine results from Alma. The ARD was observed to discharge to a storm drain, and follow-up with the City of Oakland suggests impacts to receiving waters located far downstream is unlikely.
3. Chileno Valley, a mercury mine in Marin County increased in priority due to satellite reconnaissance, which suggests mining waste may be eroding into drainages. This would mean that previous mitigation measures may be failing.
4. The location of Borges Mercury Mine was in question prior to this effort; however, Terry Seward was able to locate the mine in Napa County near the border with Solano County, during satellite reconnaissance. The subsequent evaluation reduced its priority.
5. Hastings, a mercury mine in Solano County nearby a known high-priority mine (St. Johns) increased in priority due primarily to its connectivity to a highly impaired receiving water.
6. The prioritization tool was re-run in 2020 to reflect new data, including additions to the 303(d) list and updates to mine databases, including:
 - a. Hooker Creek copper, silver, and gold mine was upgraded from low to medium priority. The mine is on a slope above Los Gatos Creek as short distance from Lexington Reservoir, which was added to the list as impaired due to mercury. Mercury may have been used to process ore at the site. This will be investigated as resources allow.
 - b. The ranking of Borges mercury mine increased but remains low because the watershed it drains to is a tributary to Napa River and a nearby reach was listed due to mercury. No hydrologic connection was found, however.

- c. Chileno Valley and St. John's mercury mines were upgraded in ranking due to new data suggesting gangue may contain sulfur, which could cause ARD. These two mines were already amongst our highest priorities. We did not observe evidence of ARD on inspections.

Mines that scored "High" and "Medium" will be inspected as part of this effort, according to ranking and as access issues permit. Inspection of low priority sites will be deferred until the high and low priority mines have been inspected and necessary regulatory action is taken, unless additional information suggests a higher ranking.

Known Mines That Will Not Be Inspected

Several mines in Region 2 will not be inspected as part of this current project. Many have already been remediated and are closed or in the verification phase (monitoring and maintenance). Others are in the process of being investigated or remediated either by staff working in the TMDL or Site Cleanup & Land Disposal Programs (Carrie Austin and myself). Table 2 lists these mines and describes their status. A GeoTracker case will be created for each of these mines if one does not already exist (this effort will primarily take place during the wet season when staff are not needed on inspections). A few mines are worth discussing briefly:

1. Several mines not previously known to Region 2 staff were identified in this effort, primarily due to updates to USGS and other databases combined with the ability to virtually explore our Region using satellite-based mapping tools such as Google Earth and ArcGIS. Thousands of potential mines were identified, though most are likely prospects (sites that proved unproductive) that do not threaten water quality. Significant staff resources would be required to cull out productive mines and include them in this prioritization project, thus the decision was made to delay action. However, brief descriptions of mines identified during the process are included in the MSD and the QAPP describes how to access the necessary location and descriptive information in the USGS database for future work.
2. Satellite reconnaissance suggests there may be exposed mining waste at Newman Chromium Mine. Evaluation of the prioritization factors concluded that there might be a medium water quality threat; however, staff is primarily concerned with the inhalation risk of hexavalent chromium dust to nearby residents. This site should therefore be referred to DTSC for further evaluation of human health hazards.
3. Corda, a mine in Marin County was listed in Region 2 records as a mercury mine, however credible data sources indicate it is a manganese mine.

Table 1. Inspection Priority of Region 2 Mines

<i>Priority</i>	<i>Score</i>	<i>Mine</i>	<i>Commodity</i>	<i>Comments</i>
<i>High</i>	19	St. John's Mine	Mercury	Commodity of high concern, evidence of productivity and mine drainage, connected directly to receiving water. Adjacent receiving waters are impaired.
	15	Hastings Mine	Mercury	Commodity of high concern and gangue indicating potential ARD, evidence of productivity and eroding waste piles. Potential connection to drainage and receiving water and adjacent receiving waters are impaired.
	16	Chileno Valley	Mercury	Commodity of high concern, evidence of productivity, possible eroding waste piles, connected to drainage. Distant surface water impaired with fish advisory in effect. Mitigation measures may have failed.
<i>Medium</i>	10	Silver Creek	Mercury	Commodity of high concern, evidence of productivity and eroding waste piles. Connected to drainage (not receiving water) and distant (but not adjacent) receiving waters are impaired.
	9	Bella Oak	Mercury	Commodity of high concern, evidence of productivity and eroding waste piles. However, lack of hydraulic connection - nearest surface water is distant over relatively flat grade.
	9	Pendarin	Coal	Commodity of medium concern, evidence of productivity and evidence of eroding waste, potentially connected to drainage, but no impairment of receiving water.
	9	Silverado	Silver	Commodity of medium concern and gangue might contribute to ARD (though buffer present). Minor evidence of productivity and waste piles, and evidence of erosion. Connected via drainage.

<i>Priority</i>	<i>Score</i>	<i>Mine</i>	<i>Commodity</i>	<i>Comments</i>
<i>Medium (cont.)</i>	8	Hooker Creek	Copper (Silver, Gold)	Commodity of medium concern, gangue that may contribute to ARD, but no evidence of waste. Mine is not directly connected to State waters, but sits on a slope draining to Los Gatos Creek, a short reach away from Lexington Reservoir, 303(d) listed for impairment due to mercury. Mercury may have been used to process silver and/or gold ore at the site.
	7	Palisades	Silver	Commodity of medium concern and gangue might contribute to ARD (though buffer present). Minor evidence of productivity and waste piles, but no evidence of erosion. Connected via drainage.
<i>Low</i>	6	Borges	Mercury	Commodity of high concern, evidence of eroding waste piles. However, lack of hydraulic connection - drains to culverts in residential neighborhood without surface water.
	6	Livermore Coal	Coal	Commodity of medium concern, but lower priority than mercury, minor evidence of eroding waste, potentially connected to drainage, but not receiving water and no impairment.
	5	Alma	Sulfur	Commodity of high concern and evidence of ARD discharging to storm drain. Discharge travels thousands of feet of drainpipe prior to discharge to receiving water. Concern mitigated by sufficient confluence with neutral pH water to precipitate metals before discharge to surface water.
	5	Union Gulch	Copper (Silver, Gold)	Commodity of medium concern, gangue that may contribute to ARD, but no evidence of waste and hydraulic connection through drainage (not direct to receiving waters).
	3	Section 14	Coal	Commodity of medium concern. No hydraulic connection, minor evidence of erosion or drainage.

Table 2. Region 2 Mines That Will Not Be Inspected For This Project

Mine	Commodity	Status	Comments
Guadalupe Mines	Mercury	Under Investigation, Cleanup in Progress	Under GWP oversight. Investigation, remediation planned, interim corrective action (soil erosion control) in place in high concern areas. Hick's Flat under TMDL oversight. (Ranked 20)
Hillsdale (Chaboya) Mine	Mercury	Under Investigation	Under GWP oversight. Investigation, remediation planned associated with residential housing development. (Ranked 7)
New Almaden Mines (Mine Hill)	Mercury	DTSC Cleanup Complete (CC), Cleanup in Progress (CIP), Monitoring and Maintenance, or Under Investigation.	Under TMDL oversight, including April (11), Cristobal (10), San Francisco (CC), Enriquita (CC), San Mateo (CC), Senator (CC) Mines and San Pedro Pit (CC), Hacienda Furnace Yard (21, CIP).
Gambonini Mine	Mercury	Cleanup Complete, Monitoring and Maintenance	In monitoring and maintenance phase under TMDL oversight.
Franciscan Mine	Mercury	Under Investigation	Investigation in progress under TMDL oversight. (Ranked 15)
Cycle Mine	Mercury	Under Investigation	Investigation in progress under TMDL oversight. (Ranked 16)
Santa Teresa Mine	Mercury	Under Investigation	Investigation in progress under TMDL oversight. (Ranked 12)
Bernal Mine	Mercury	Under Investigation	Investigation in progress under TMDL oversight. (Ranked 11)
La Joya Mine	Mercury	Cleanup Complete, Monitoring and Maintenance	Remediation installed. Blowout of soil (not mercury impacted) occurred in 2012. GWP oversight of monitoring and maintenance.
Challenge Mine (Stulsaft)	Mercury	DTSC Cleanup Complete	Closed by DTSC.
Leona Heights Mine	Sulfur	Cleanup Complete, Monitoring and Maintenance	Under GWP oversight. In monitoring and maintenance phase.

<i>Mine</i>	<i>Commodity</i>	<i>Status</i>	<i>Comments</i>
Black Diamond Mine	Coal	Mitigation Complete, Monitoring and Maintenance	Under GWP oversight. In monitoring and maintenance phase.
Newman Mine	Chromium	Summary Complete, Prioritized for Inspection, Refer to DTSC.	Commodity of high concern, however risk to human health via inhalation likely greater than water quality risk. Refer to DTSC.
All Magnesite and Manganese Mines	Magnesium & Manganese	Summary Complete, Suspend Further Prioritization Analysis	Commodity of low concern. Unlikely to produce COCs. May be source of sediment, similar to quarries.