



## CRITICAL MINERAL MINING ON U.S. PRIVATE LANDS: WATER POLLUTION CONTROL AND WASTE MANAGEMENT

FACT SHEET

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*One major environmental hazard associated with mining for critical minerals is the massive amounts of waste created and the creation of water pollution from that waste. Mining operations have generated vast quantities of waste (i.e. tailings, sludges, and residues) that contain toxic contaminants such as arsenic, mercury, and iron sulfide. These materials pose long-term risks to water resources through acid mine drainage and leaching, especially where legacy waste remains unmanaged. Currently, the US lacks a comprehensive framework for managing mine waste and the resulting water pollution. Instead, mine waste is largely exempt from the federal toxic substance control statutes. This leaves a patchwork of water pollution control laws and state specific mining permitting schemes to manage waste and water pollution.*

### **What Are Water Pollution Control and Waste Management Standards?**

Water pollution is one of the biggest problems mine waste creates. Mine wastes contain toxic contaminants like arsenic, mercury, and iron sulfide which interact with air, water, and microbes to create acid drainage that can leach into soil and waterways. Mine waste management and water pollution controls are two ways of managing the issue of acid mine drainage and the resulting water pollution. Waste management policies seek to regulate the disposal and storage of mine waste to prevent the release of hazardous materials from the waste. In contrast, water pollution controls seek to regulate the amount of pollutants entering waters by setting limits on the discharge of pollutants. Thus mine waste management regulations and water

pollution control policies can prevent acid mine drainage from contaminating drinking water and aquatic ecosystems.

## **Why Water Pollution and Waste Management Matter for Private Land Mining**

- **Regulatory exemptions create protection gaps.** Congress exempted mine wastes from U.S. federal law that governs the creation and disposal of hazardous wastes until the Environmental Protection Agency (EPA) could assess the issue further. EPA later found most mine wastes do not constitute hazardous wastes and were thus not covered by the Act. Instead, acid mine drainage may be managed through water pollution discharge permits and a patchwork of state mining permitting schemes.
- **Historic mine waste sites are pollution hazards and are a missed opportunity for sustainable mineral recovery.** Legacy mine waste dating back over 200 years still lingers on the landscape unmanaged and unmonitored. This waste can contain valuable critical minerals that at the time of creation were uneconomical or technologically infeasible to recover. The U.S. is currently lacking but could be a leader in sustainable critical mineral sourcing by repurposing legacy mine wastes for critical mineral production.<sup>1</sup>
- **The Clean Water Act's (CWA) National Pollution Discharge Elimination System (NPDES) prevents some water pollution from mine waste but is insufficient to prevent acid mine drainage from occurring.** This issue is only exacerbated with recent rollbacks in the scope of the Clean Water Act, exposing millions of miles of streams and over 80 percent of wetlands to pollution without any federal discharge permit or oversight.

## **Current Policy and Gaps**

### **Federal Framework**

The Resource Conservation and Recovery Act (RCRA) is the primary federal statute that governs hazardous waste from creation to disposal. However, the Bevill Amendment exempted mine wastes from RCRA pending a determination by EPA that mine wastes should be regulated as hazardous wastes under the Act. EPA subsequently studied the issue and determined that 18 of the 20 types of mine waste studied were not hazardous and thus would not be regulated under the hazardous waste provision, Subtitle C, of RCRA. While mine wastes are excluded from regulation under RCRA, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) may impose liability on mine operators for contamination cleanup if there is a release or threatened release of a covered substance. This scheme imposes post contamination liability and does nothing to regulate the creation of the contamination.

Historic mine sites that are contaminated are good candidates for clean up under CERCLA and other mine reclamation programs such as the Abandoned Hardrock Mine Reclamation (AHMR) program.<sup>2</sup>

Instead, water pollution from mine waste may be controlled through the NPDES permitting scheme. This scheme created by the CWA controls the discharge of pollution from point sources by setting effluent limitations for certain categories of pollutants and requiring that discharges of pollutants don't lead to the violation of those limitations. However, this system for controlling water pollution from mine waste is insufficient because it assumes some level of pollution discharge instead of requiring specific measures to ensure mine drainage is not created in the first place. Further, the NPDES program only applies to discharges into 'Waters of the United States' (WOTUS). WOTUS is a legal term of art in the CWA, the definition of which has been significantly narrowed over the last decade and the extent of which is currently subject to additional rulemaking expected to eliminate protection for even more streams. Since fewer waters are covered by the act than previously, mining operations may escape regulation if they are not near covered waters.<sup>3</sup>

### **State Variations and Private Land Gaps**

While federal law largely fails to manage mine waste management, some states have stepped in to fill the gap. Siting of disposal sites on private lands may be subject to state permitting schemes and local land use laws. Some states may also have their own mine site reclamation programs.<sup>4</sup>

- **Michigan** - Michigan requires permits for non-ferrous and metallic mining. Part 632 of Michigan's Natural Resources and Environmental Protection Act (NREPA) requires nonferrous mining permit applicants to submit a detailed plan for mining and reclamation that will minimize the impacts of the operation with a special emphasis on preventing and controlling acid-mine drainage.<sup>5</sup>
- **Wisconsin** - Similar to Michigan, Wisconsin requires non-ferrous and metallic mining permits. Applications for these permits require the proposed operator to submit plans for the operation of mining waste facilities and reclamation plans.<sup>6</sup>
- **Nevada** - Nevada law focuses on water pollution control by requiring a zero discharge performance standard for any facility using chemicals for processing. Any operator of a mining, milling, or other beneficiation process must receive a Water Pollution Control Permit (WPCP) prior to construction whether or not a discharge of pollution is intended or not.<sup>7</sup>

### **Voluntary Standards**

The Initiative for Responsible Mining Assurance (IRMA) is a globally focused non-profit that promotes environmentally responsible mining practices. IRMA's voluntary

standards require mitigation of identified risks from mine waste and requires management practices to be consistent with best available control technologies (BAT) and best available or applicable practices (BAP). Mitigation of risks shall align with the following hierarchy: First, priority should be given to source control measures that prevent generation of contaminants. Second, where source control is not practicable, mitigation control measures should be implemented to prevent or minimize movement of contaminants. IRMA also requires independent review of siting, design, or re-design of tailings storage facilities and other relevant mine waste facilities. IRMA requires that waters affected by mining projects be maintained at a quality enabling safe use for current purposes and potential future uses identified with stakeholders. IRMA recommends comprehensive monitoring and management during operations to identify contamination, adapt operations, and share performance data publicly.<sup>8</sup>

## **Four Critical Policy Gaps**

### **Gap 1: No Comprehensive Cradle-to-Grave Regulation**

- U.S. policy lacks a comprehensive scheme regulating the generation and disposal of mine wastes from cradle to grave. Mine wastes are excluded from regulation under RCRA through the Bevill Amendment.
- Mine waste containing toxic contaminants like arsenic, mercury, and iron sulfide can react with air, water, and microbes to create acid drainage that can leach into soil and waterways. Legacy mine waste dating back over 200 years still lingers on the landscape unmanaged and unmonitored.

### **Gap 2: Shrinking Number of Waters Covered by Federal CWA Requirements**

- The CWA's extensive point source pollution regulation only applies to 'Waters of the United States' (WOTUS), which is a legal term of art, the definition of which has been significantly narrowed in recent years.
- With fewer waterbodies covered by the CWA, the potential for unregulated discharges of pollution from mines increases. Since the water cycle is complex and interconnected, pollution in non-jurisdictional waters will lead to degradation of other waters.

### **Gap 3: Missed Opportunities for Critical Mineral Recovery**

- While comparison of U.S. law to IRMA best practices largely highlights the insufficiency of management of mine waste in the U.S., it does not highlight how mine waste can also be a valuable source of critical minerals.
- Legacy mine waste containing valuable critical minerals that were uneconomical or technologically infeasible to recover at the time of creation remains unutilized. The U.S. is missing an opportunity to be a leader in sustainable critical

mineral sourcing by repurposing legacy mine wastes for critical mineral production.

#### **Gap 4: No Independent Review of Waste Facilities**

- There is no overarching federal requirement for independent review of siting, design, or redesign of tailings and mine waste storage facilities on private and working lands.
- Without independent review, waste facilities may be inadequately designed or sited, increasing the risk of catastrophic failures. The lack of third-party verification creates potential conflicts of interest in facility design and safety assessments.

### **NWF Policy Recommendations for Responsible Private Land Mining**

#### **Recommendation 1: Regulate Mine Waste Under RCRA**

- While the Beville amendment excluded mine wastes from regulation under RCRA pending study and final regulatory decision by EPA, the act does not preclude EPA from regulating mine wastes under RCRA. EPA could, in theory, conduct a new study and regulate mine wastes if it found that such wastes were a risk to human health and the environment.
- Congress should clarify EPA's authority to regulate mine waste or pass legislation specifically addressing mine waste management with clear standards for characterization, handling, and disposal.
- Establish specific requirements for waste characterization that consider both disposal location and source material to determine potential for acid rock drainage or metals leaching.

#### **Recommendation 2: Prevent Further Erosion of the CWA's Reach**

- Address the shrinking definition of WOTUS by commenting on the EPA's proposed rule revising the definition of "waters of the United States."
- Lay groundwork to prevent and reverse the narrowing of the CWA's regulatory jurisdiction by advocating for a congressional amendment to the CWA defining WOTUS at the statutory level.
- Recognize that the water cycle is complex and interconnected, and pollution in or loss of non-jurisdictional waters may lead to degradation of other waters.
- Support state and Tribal efforts to enact or strengthen protections for waters, including through increasing funding for key federal wetland conservation programs, including EPA's Wetland Program Development Grants Program.
- Support states that already regulate more waters than the federal standard and encourage other states to follow.

### **Recommendation 3: Incentivize Critical Mineral Extraction from Mine Wastes**

- A federal policy promoting R&D of technologies for extracting critical minerals from mine wastes and incentivizing deployment of these technologies would be both environmentally sustainable and politically feasible.
- Extracting critical minerals from domestic mine wastes would align with the Trump administration's goals of shoring up domestic critical mineral production to enhance the US economy and provide for national security.
- Create tax incentives and grants for companies developing and deploying technologies to extract critical minerals from legacy waste sites.

### **Recommendation 4: Establish Independent Review Requirements**

- Mandate independent third-party review of siting, design, or re-design of tailings storage facilities and other relevant mine waste facilities, following IRMA best practices.
- Create certification requirements for independent reviewers with specific expertise in geotechnical engineering and waste facility design.
- Implement ongoing independent monitoring and inspection requirements throughout the life of waste facilities.

## **Conclusion**

In sum, mine waste presents a significant problem for water resources by creating acid mine drainage. Acid mine drainage is not fully managed by waste management laws or water pollution control laws. As the U.S. looks to become a leader in the production of critical minerals it is imperative that policy is strengthened to manage mine drainage before more is created. Further, historic mine sites need to be managed to prevent further environmental degradation and can be leveraged as an asset with new technologies designed to extract critical minerals that are left behind in mine waste.

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*Cover page: Berkeley Pit in Butte Montana is a former copper and rare earths mine polluted with arsenic, cadmium, and acid. AP Photo/Matt Volz, File*

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#### **Endnotes**

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