

Environmental Management for Mining

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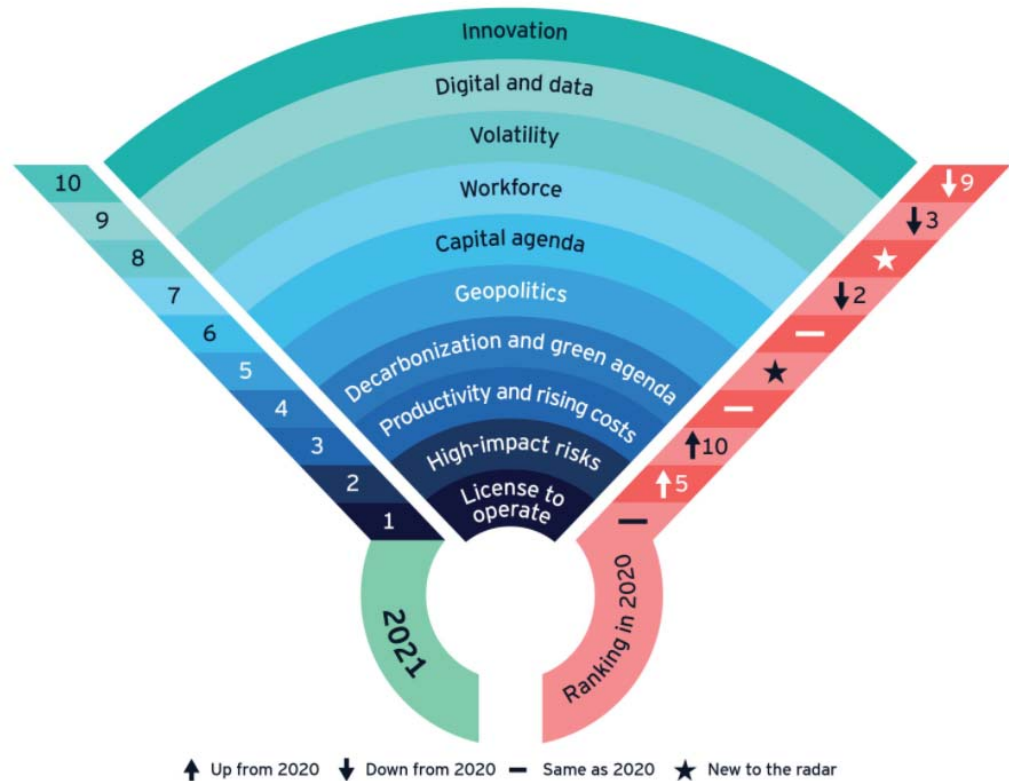
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Mining Risk

Types of Risks

- Operations
- Financial
- Reputation
- Social license
- Environment impacts

(Boston Common, 2013)



“I don’t care if you are in a B.C. rainforest or in the Atacama, water is the number one issue that miners face”. *Benjamin Cox*

Environmental Risks for Mining

- Potential for soil and water contamination (AMD)
- Water supply vs. increased stress on available resources
- Tailings dam failure
 - Landscape impacts
 - Spills
- Noise, air, dust



Perceptions Based on Historical Mining



The New Vocabulary



Regional Water Risks for Mining: The New Paradigm

- Water is a shared asset
- Water is expensive to manage
- Water is a growing source of conflict
- Citizens have the tools to take action
- Mining isn't the only activity that impacts local water resources
- Pressure for greater disclosure
- Short term data collection period extrapolated to decades of mine operation
- Climate change



Tia Maria, Peru
(Economist/AP)

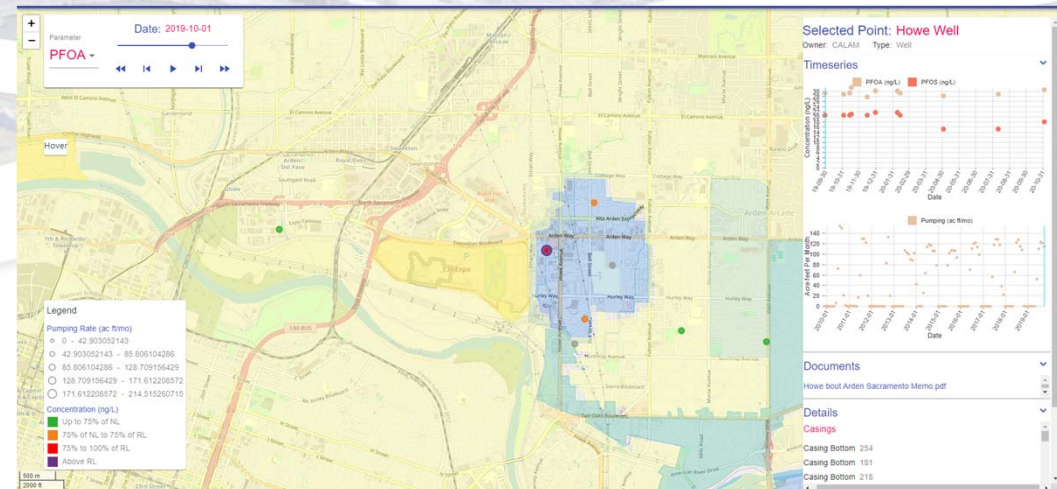
Sources of Mine Environmental Risks

- **Cultural dissonance**
 - Corporate goals vs. mine actions
- **Short-term goals vs. long-term plans**
 - Water and mine waste management are typically long-term issues
- **Deferred investment in closure**
- **National regulations vs BPs**
 - A mine can meet national regulations and still have substantial risk
- **Staffing, training and planning**
 - Plans need to be proactive, thorough and reviewed regularly
 - Plan implementation is only as good as the staff

Tools to Minimize Mine Environmental Risks



- Baseline Studies
- Operational Plans
- Closure Plan
- Project Quality Assurance Plans
- Data management
- Stakeholder Involvement



Minimizing Mining Environmental Risks - Summary

- **Good science and adequate characterization**
- **“Mining towards closure”**
- **Management plans**
- **Understand the social, cultural, economic and environmental value of water**
- **A robust and defensible baseline**
- **Water stewardship vs. water management**