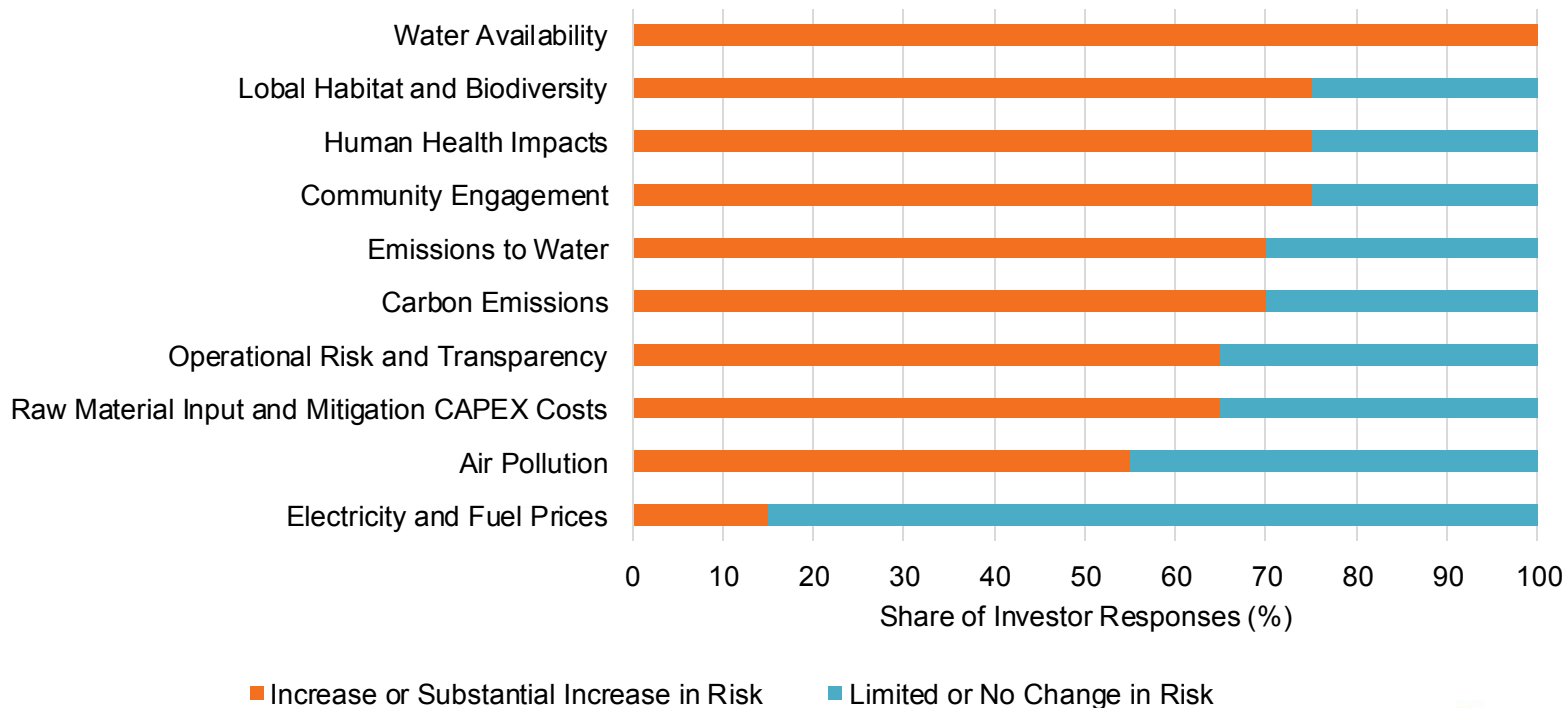




Mine Water Efficiency Improvement

The Challenge

According to investors, water scarcity is the largest increasing risk to the mining and metals sector



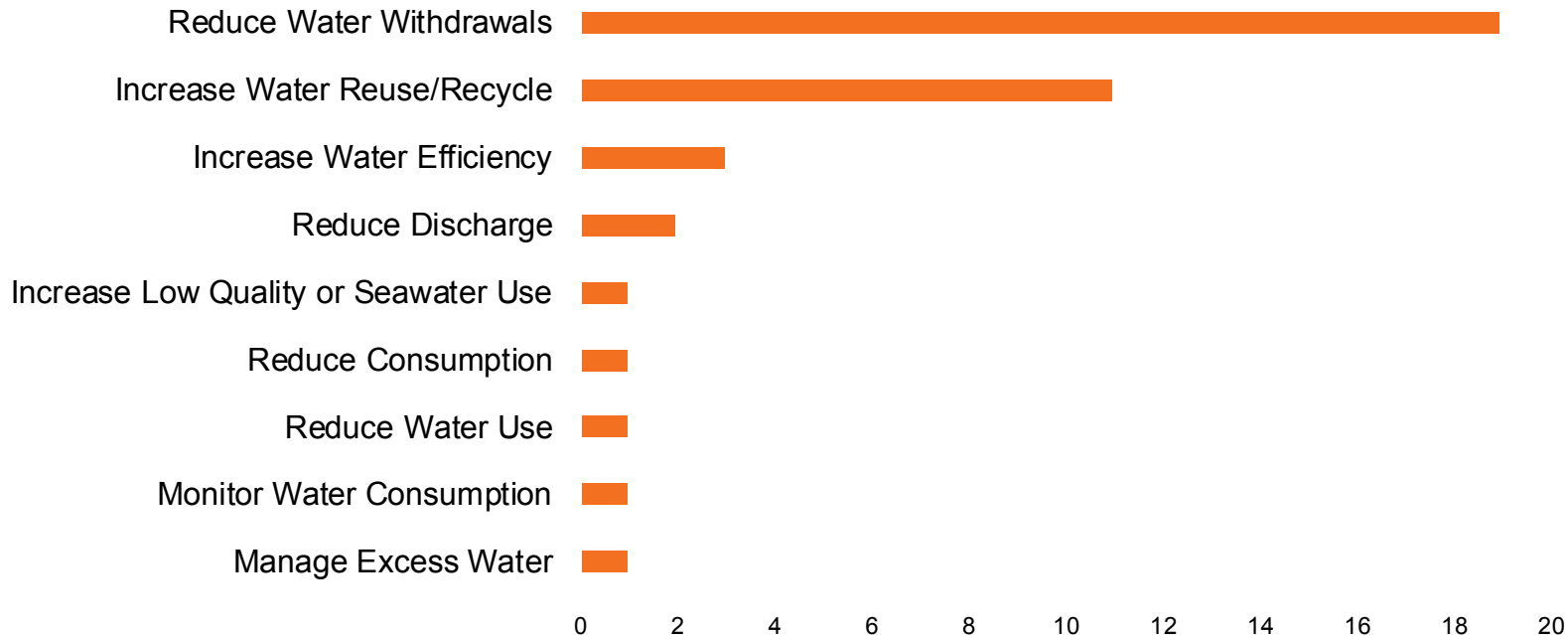
The Response

The International Council on Mining and Metals (ICMM) has placed increased focus on responsible water management, calling members to:

- Promote Operational Efficiency (minimize and reuse water)
- Reduce Freshwater Withdrawals
- Control water quality and quantity to minimize impact to environment

Specific Member Targets

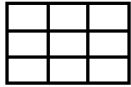
Most ICMM Members have established water stewardship goals



Methodology



1. **Metric Development:** KPIs based on strategic priorities



2. **Data Collection:** Collect water usage and mining data from sustainability reports to calculate metrics for global mining operations



3. **Benchmarking:** Compare water usage metrics at sites of interest to like mines around the world to quantify strengths and weaknesses



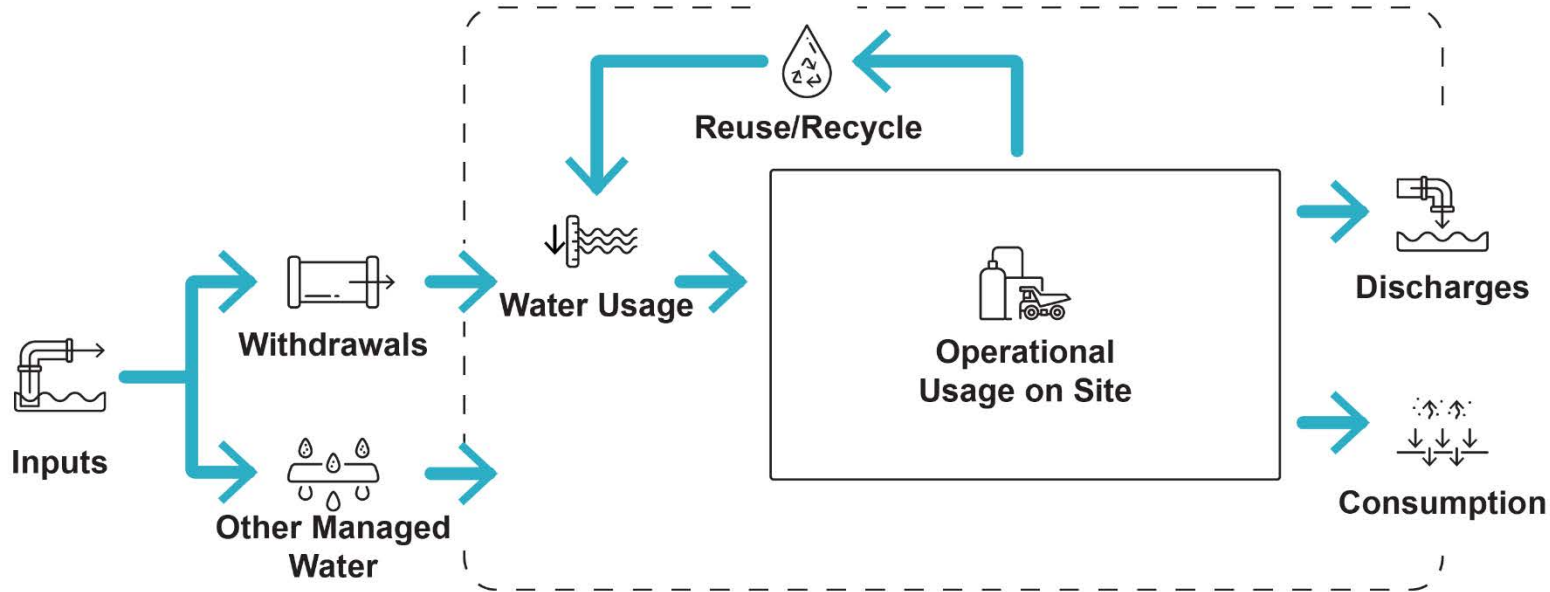
4. **Opportunities:** Identify areas of improvement based on benchmarking



5. **Prioritization:** Prioritize opportunities based on cost and impact

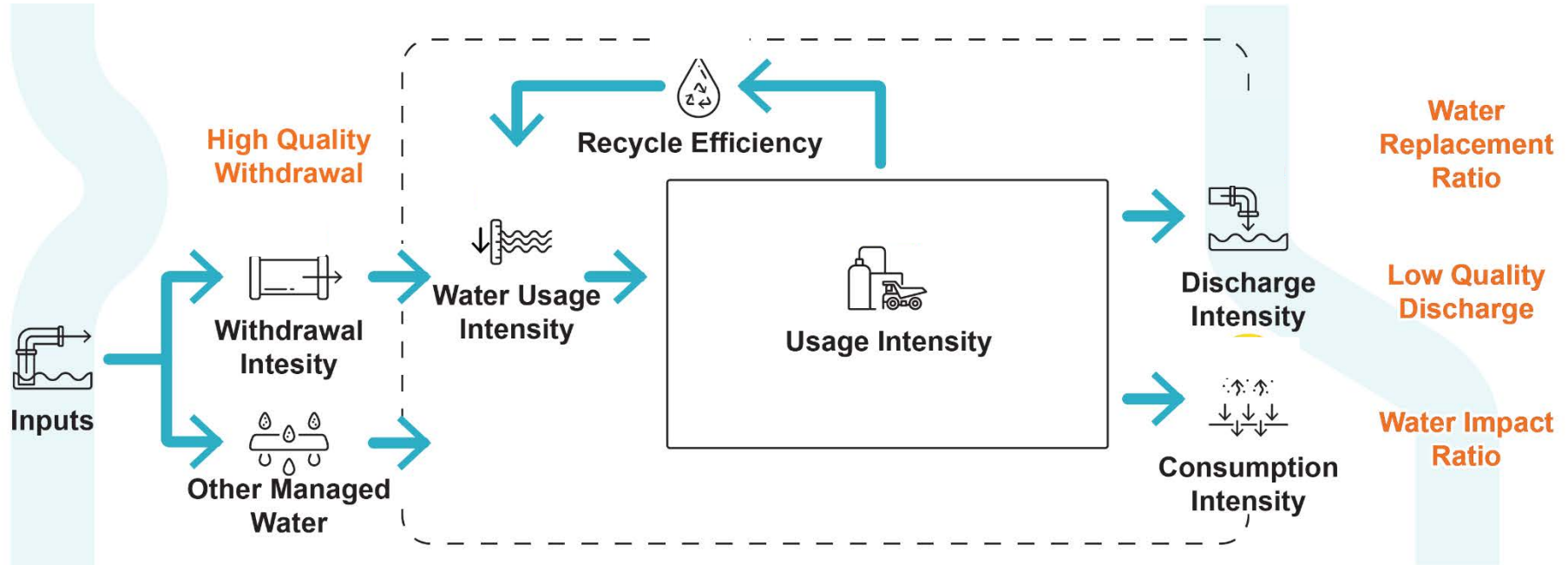
Metric Development

Metrics were developed based on ICMM reporting standards



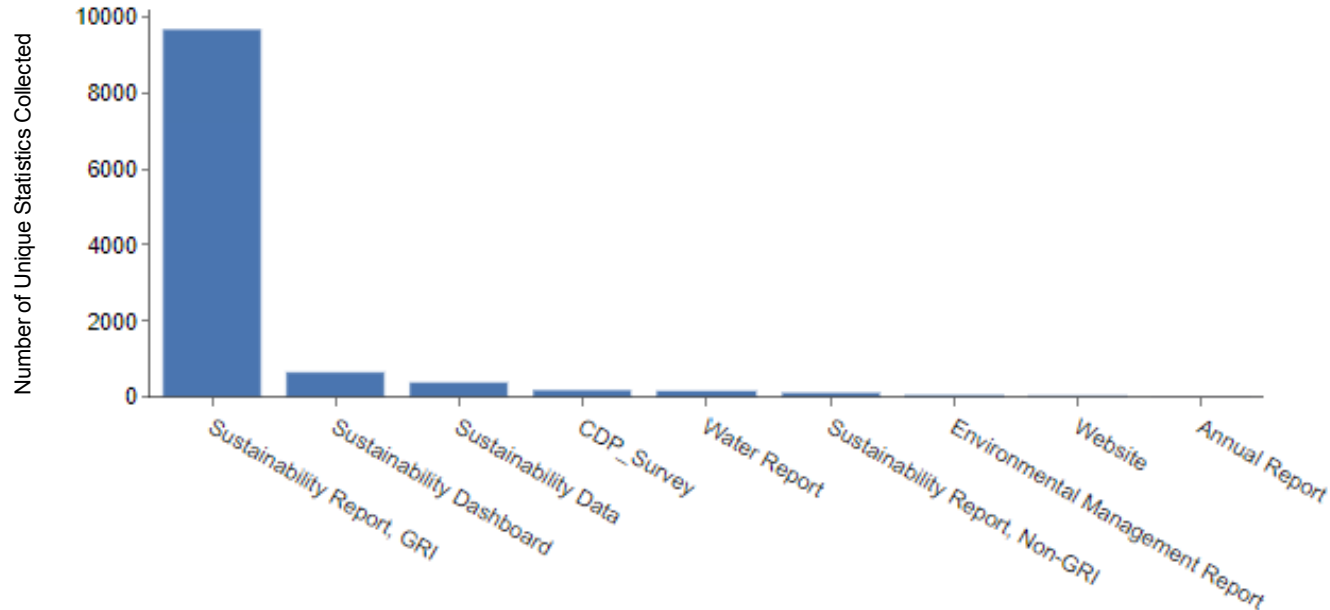
Key Metrics

ICMM standard were leveraged to provide insight into site operations



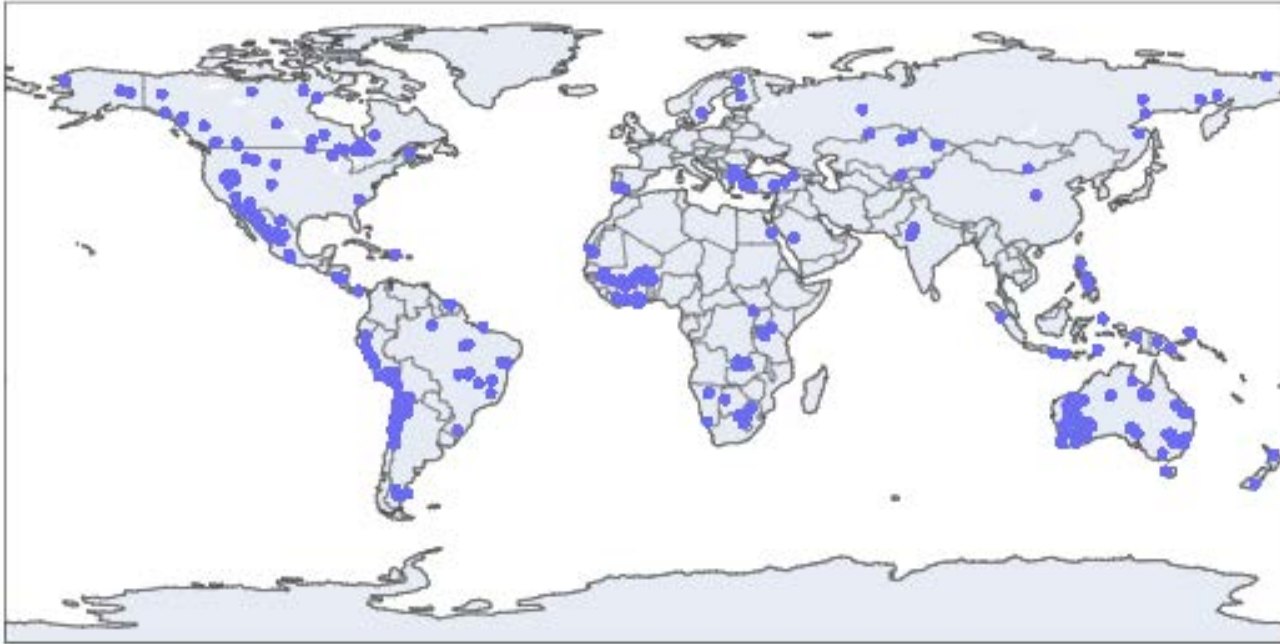
Data Availability

Over 90% of water usage data is from Sustainability Reports that use GRI reporting standards

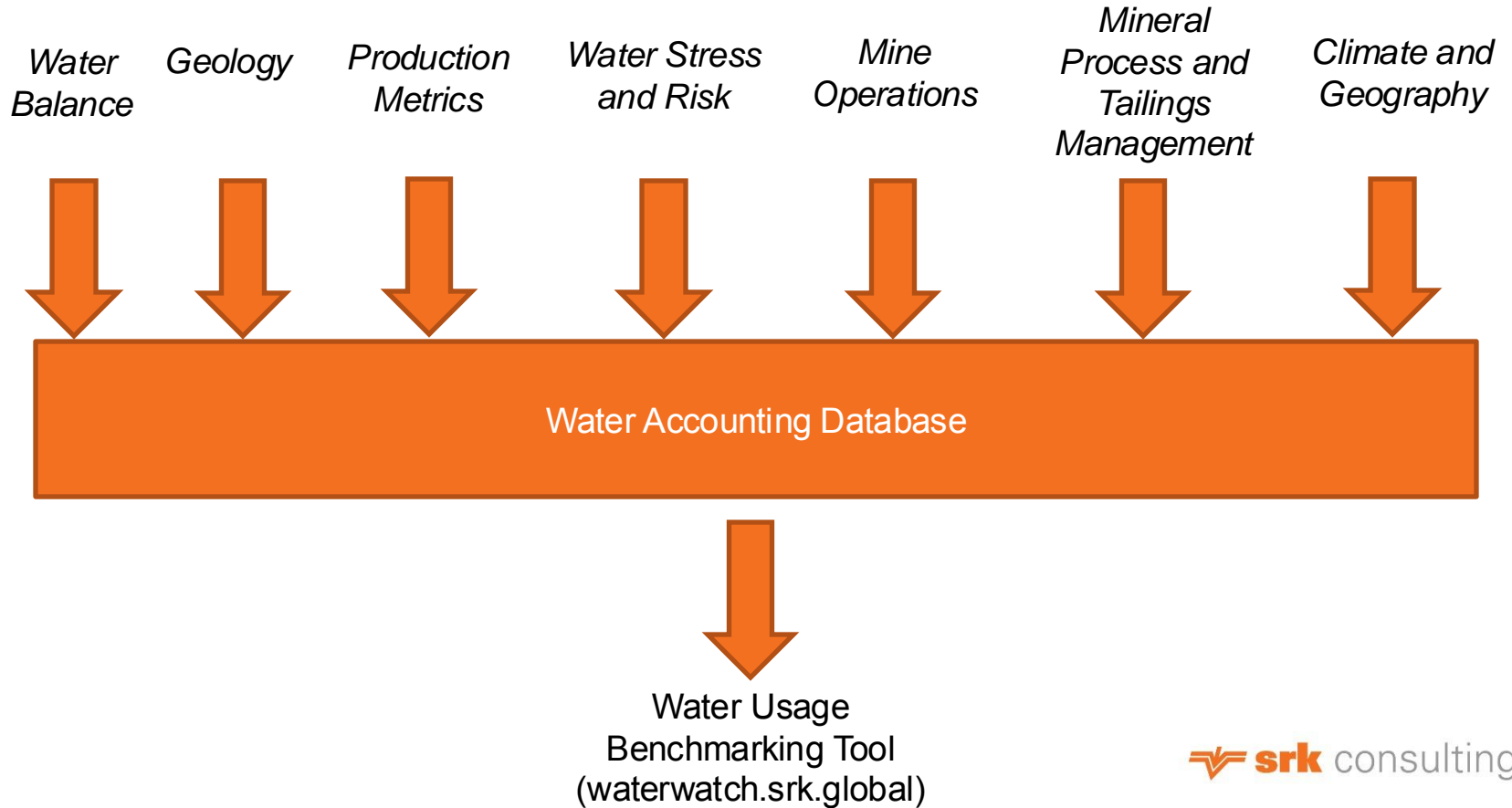


Data Availability

Data collected from ~350 mines over a 5-year period



Water Benchmarking - Model



Benchmarking

Limitations



Reporting Limitations

Not all companies report based on the ICMM/GRI best practices

Issues associated with self-reported data



Percentile Rankings

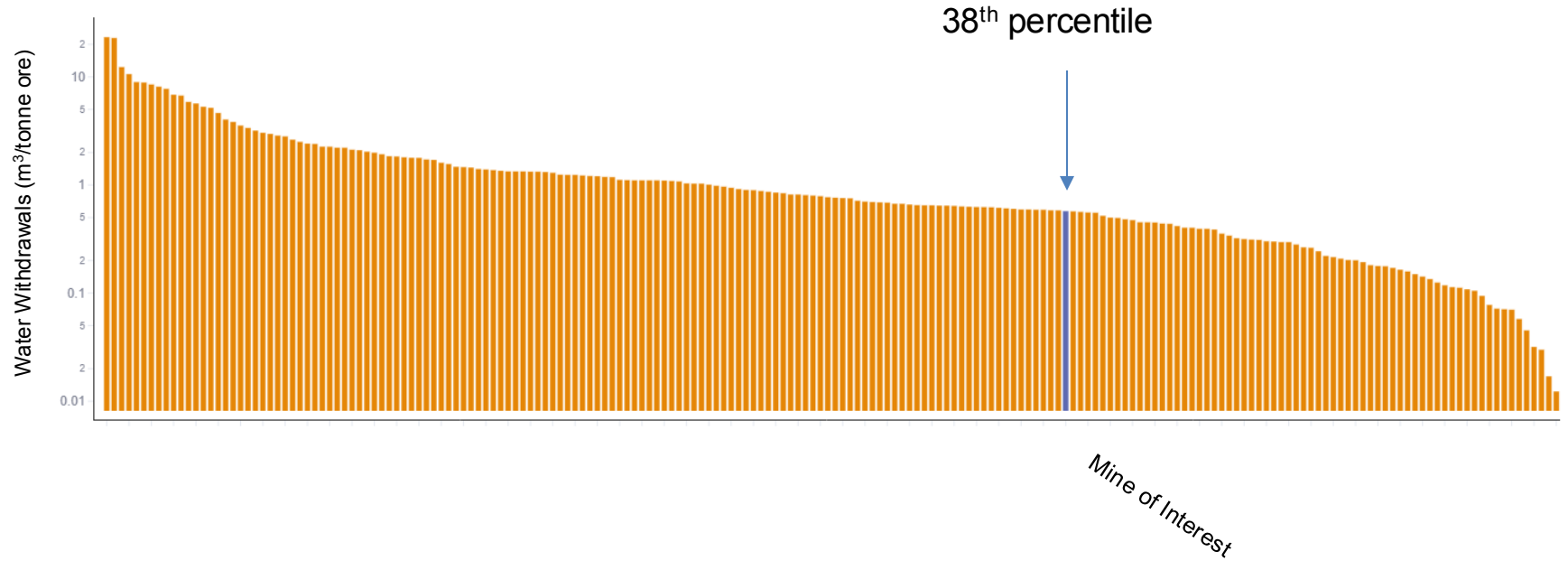
Database only benchmarks, and does not consider theoretical maximum values for each metric at each site



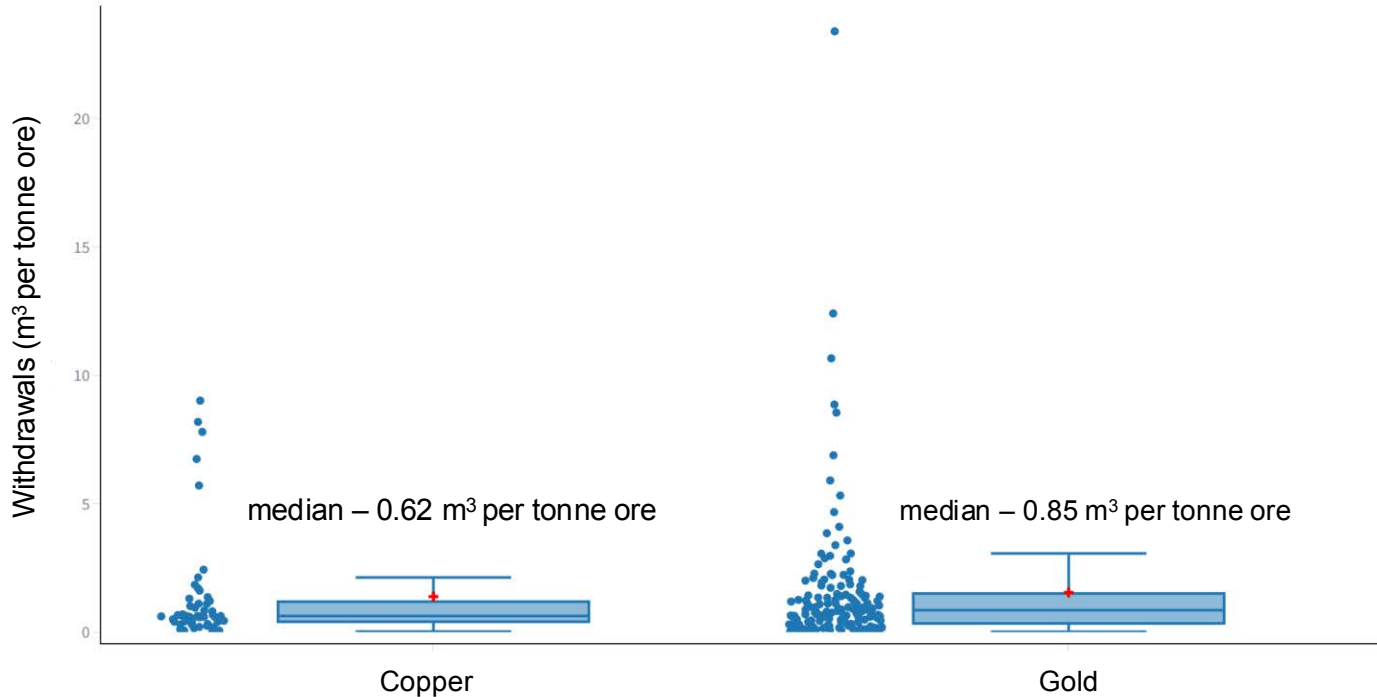
Regional Focus

Some jurisdictions have looser reporting guidelines

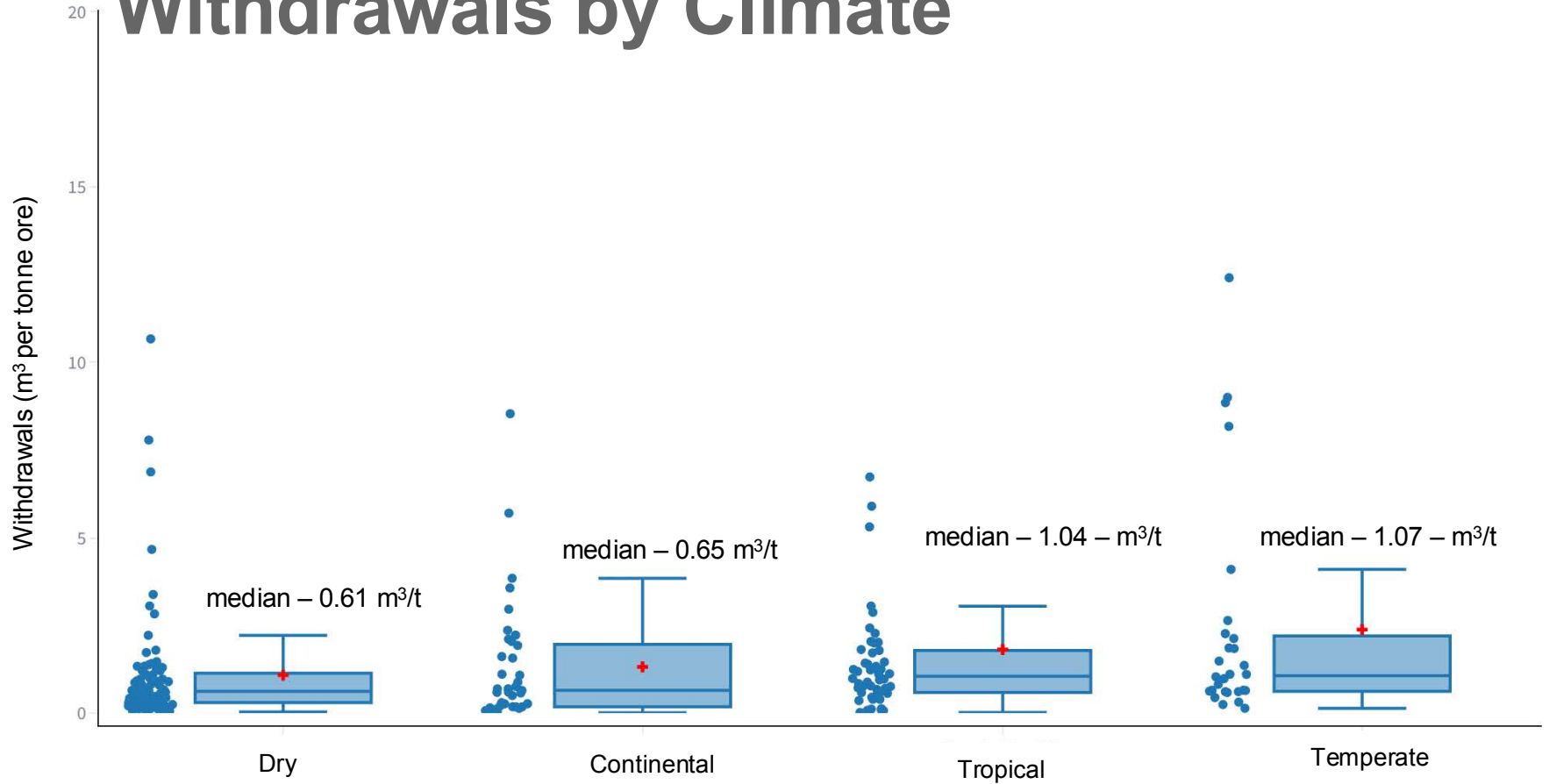
Benchmarking – All Mines



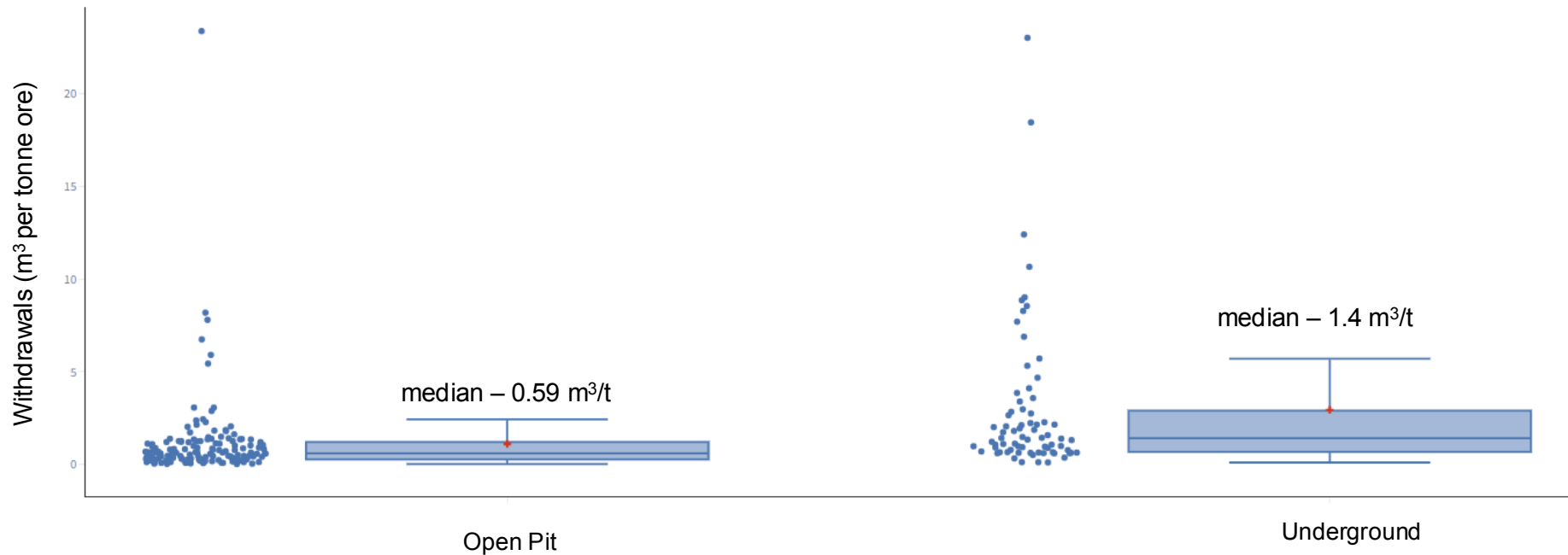
Withdrawals by Primary Commodity



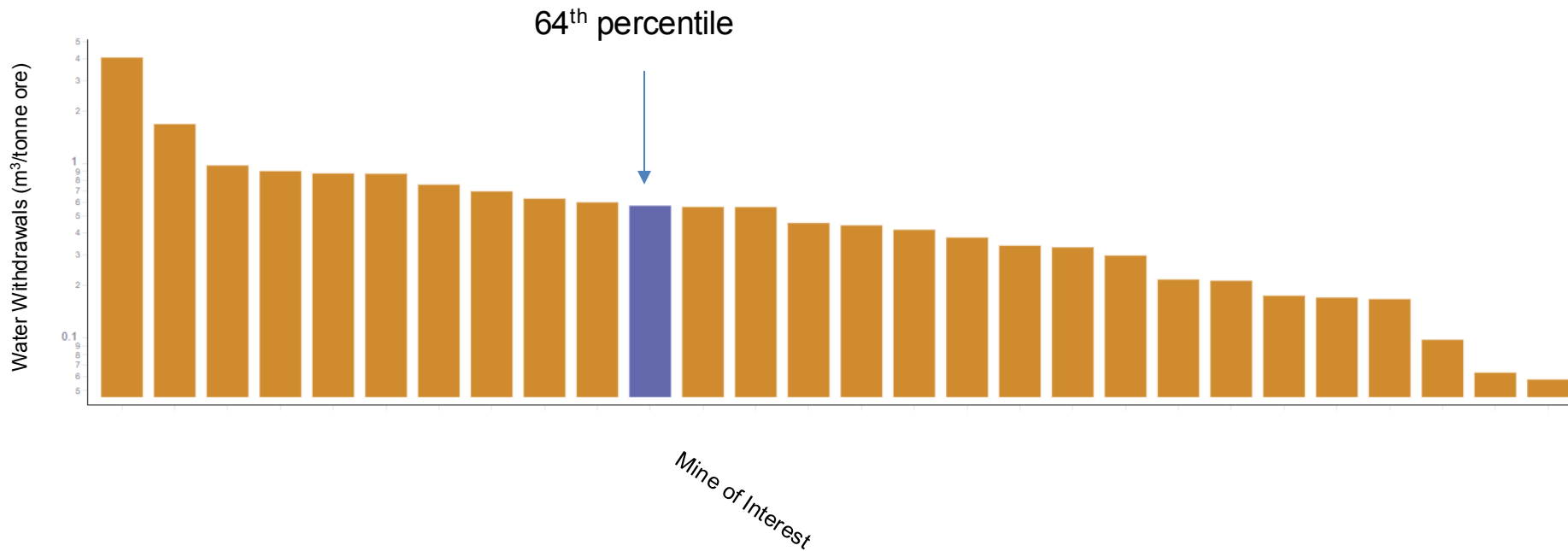
Withdrawals by Climate



Withdrawals by Primary Operation

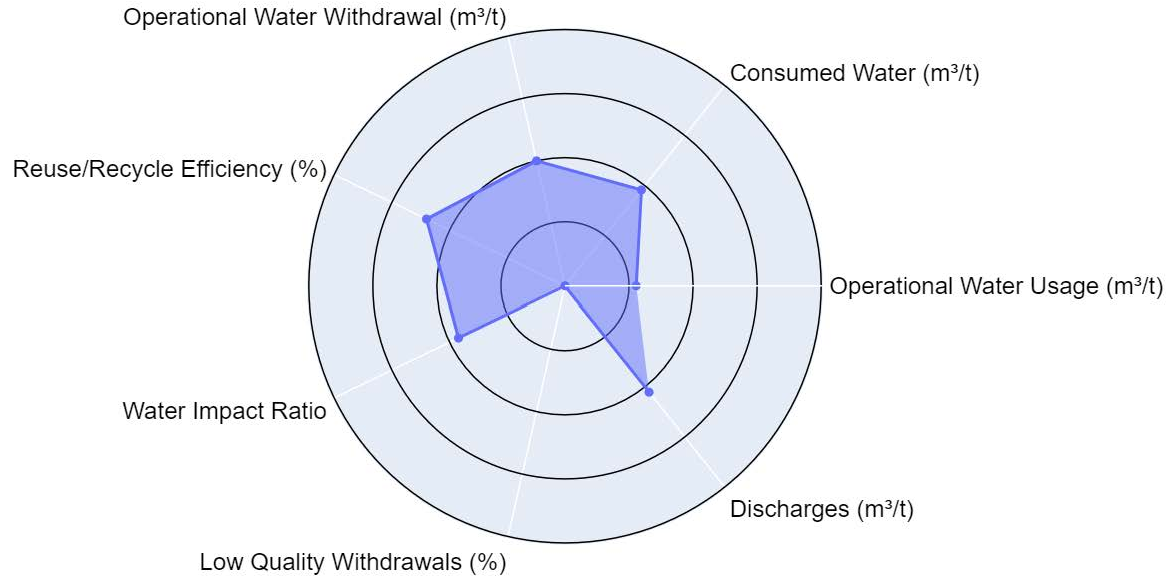


Benchmarking – Open Pit Copper Mines in Dry Climates



Radar Plot

Around median ranking across most metrics except water usage and low-quality withdrawals



Understanding the Context for Rankings

- Site knowledge and context is crucial in determining the impact of each metric
- Sites in a **positive water balance** may not prioritize water usage efficiency, but may prioritize reducing unneeded water on site
- Sites in a **negative water balance** will likely prioritize reducing water usage and consumption, and improving recycle efficiency
- The metrics must be analyzed through the context of site operations and water requirements
- Some sites may have taken efforts to reduce usage, but need a large quantity of water due to process needs (i.e. have taken efforts to 'max out' efficiency)