

Suggested Best Practices for Water Stewardship in Mining

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Abstract

There is increasing stakeholder and societal pressure on mining companies and other large users of water to understand their dependency and impact on water in recognition that water is a shared resource. Potential risks to water security impact both operational performance and the community. These risks will become more visible as competition for water resources increases due to population growth, urbanization, and climate change trends. In response to these conditions, companies are incorporating climate uncertainty in the management of water resources and are transitioning to proactive water stewardship programs.

All around the world, there are ongoing conflicts between mines and local communities. The high-profile Resolution Copper project in Arizona, USA, has been facing steep opposition from the local Apache tribe due to concerns that the development would destroy sacred land and put the local groundwater supplies at risk for the surrounding communities. In Peru, MMG Limited has announced that they are suspending operations at the Las Bambas copper mine due to protests over numerous social and environmental conflicts, including accusations that dust from the mine is polluting local water sources. In Serbia, the government revoked Rio Tinto's lithium exploration license for the Jadar project due to environmentalist groups' concerns over air and water pollution and insufficient communication to local communities. Each of these are examples of current, ongoing issues where mining companies are clashing with local communities over several concerns, not the least of which is water. Often times when communities oppose a mining projects, it is due to fear of contamination of the water supply, loss of access of water for the people or seeing the mine as competing for water resources from established industries such as farming or manufacturing.

A water stewardship program can help companies manage risks related to society, governance, supply, and quality by planning for the unknown in factors such as water management, supply, and resilience. It has become clear that traditional, stationary designs, or solutions that are not adapting to today's changing world, are no longer effective in water management, and companies must seek solutions that are forward looking. By including potential risks, impacts, and mitigation options in a water stewardship plan, a

company can be prepared to handle various situations related to water management and stewardship and its impact on local communities. There are many protocols and frameworks that provide guidance on water stewardship, such as the Mining Association of Canada (MAC) Water Stewardship Protocol, the International Council on Mining and Metals (ICMM) Water Stewardship Framework, and the Alliance for Water Stewardship (AWS) standard. MAC and ICMM guidance are very prominent in the mining industry but AWS has gained a lot of traction with some industries such as food and beverage, technology, agriculture and manufacturing; because AWS is not industry specific, and the guidance that it offers can easily be applied to a variety of operations. These frameworks have been successful in helping to incrementally guide companies towards initiatives that they need to take to understand and plan for the issues are to be addressed in a water stewardship plan. It is common for members of these organizations to follow their framework; however, smaller non-member companies can still follow and implement guidance without formally joining an organization.

The mining industry is not unique in trying to implement water stewardship solutions to help mitigate community concerns and address water challenges. The food and beverage industry has historically been very active in water stewardship, as water is often directly used in their products. In recent years, water quality and quantity planning has become an increasing concern in the textile, manufacturing, and technology industries as well. There are shared challenges across industries related to water stewardship, and lessons learned from other industries can easily be applied to the mining industry.

Water stewardship programs need to consider the following at minimum:

- water quality issues on site and surrounding areas
- water quantity issues on site and surrounding areas
- stakeholder and community concerns
- water-related infrastructure on site and surrounding the site
- site-related water use
- surrounding water uses in the catchment
- water governance initiatives in the catchment
- water-related legal and regulatory requirements

Understanding these issues will allow for a site to have decent knowledge of their water challenges and can set a baseline for creating mitigation programs for identified vulnerabilities. This presentation will focus on considerations that, based on experience, are the best practices for water stewardship programs. These concepts include incorporating the effects of climate change in water management (quality and quantity) in planning and design, having strong corporate/site interface in water stewardship training and implementation, and prioritizing collective action mitigation solutions.

Planning for and anticipating the effects of climate change on water management for a site is a key component of any water stewardship program. In addition, it is imperative that criteria and performance

expectations are established for a successful program. Due to changes in climate, mines and urban centers are encroaching on each other and competing for resources more and more. Just as population growth, globalization and increasing urbanization are important considerations in water stewardship programs, weather and climatic events are key design parameters in water stewardship programs. One way to account for climate change in water-related planning activities is to model climate change scenarios and incorporate them in water balances and other forecasting activities when evaluating future water needs and availability. The local climate system can be affected by human activity such as radiative forcing (where greenhouse gases trap radiation), land and water surface albedo reflecting radiation, and clouds and aerosols reflecting incoming solar radiation. Modelers can simulate key climatic variables such as air temperature, water temperature, pressure, density, vapor content, and horizontal and vertical wind velocities to estimate parameters related to water stewardship planning activities. In many cases, water balances that do not account for climate change may show that there is an adequate amount of water for production needs, but when climate change is accounted for, it may show a completely different story. Climate change projections can infer that a site may face water shortages, or even surpluses, in the near term. By including climate change in water planning, a site may be able to anticipate the challenges of doing business where water is a primary input to the economy. This can include planning engagement activities with local governments and interest groups that have influence over the changing water management landscape. Water stewardship programs extend beyond looking at immediate water needs, and most frameworks demand that companies look at forecasting future needs when creating action plans.

Similar to the implementation of health and safety programs across an organization, the same level of attention must be paid to the rollout of water stewardship initiatives. Corporate-level water-related pledges can be lost when the initiatives are transferred to the site level. A common practice for beverage companies is to implement required trainings at bottling facilities and/or individual breweries on the importance of water stewardship in day-to-day plant activities. By giving staff active on-site training, rather than issuing a new standard or internal memorandum, it allows for staff in charge of implementing water stewardship initiatives a chance to recognize the importance of the programs and take a proactive approach to the initiatives. An additional benefit to having a strong connection between corporate requirements and site implementation is that site personnel often feel very passionate about water in their local communities and understand how to best mitigate community concerns surrounding water. Strong water stewardship programs are not just another “corporate requirement” and are instead fully owned and implemented by the site, with the support of corporate-level initiatives.

Prioritizing collective action can enhance water stewardship mitigation measures. Catchment- or basin-wide solutions are generally seen as more effective than site-specific mitigation measures, especially when dealing with issues such as basin-wide water scarcity or water quality issues. A successful example

of collective action is the work being done in the Latin America Water Funds Partnership, which began as a partnership between The Nature Conservancy, the Inter-American Development Bank, the FEMSA Foundation, and the Global Environment Facility. Water funds are organizations that engage with public, private, and civil society stakeholders to assist with water security through solutions that incorporate nature-based infrastructure and sustainable management of watersheds. As of 2021, there are 24 water funds created throughout Latin America, and some water funds have up to 60 private sector members. Some examples include the establishment of water tariffs that require service providers to earmark 1% of revenue to infrastructure projects (Lima, Peru), establish drinking water protection for city residents (Monterrey, Mexico), and establish conservation and reforestation activities upstream (Andean region).

As more companies continue to work towards ensuring they are recognized as responsible water stewards, demand for tactics to deliver stewardship projects will continue to increase. It is important to not only consider the basics of water management, but to also consider best practices for future-ready water stewardship programs. Incorporating climate change in planning measures, building a strong connection between corporate requirements and site implementation, and prioritizing collective action in mitigation measures are concepts that, when considered as part of a water stewardship program, can strengthen the overall initiatives and improve outcomes. Companies in all industries, including mining companies, are increasing commitments to do the right thing by communities and the environment, and water is a great litmus test for the success of these efforts.

Brief Biography of the Author

Simone Dennison is an environmental engineer and project manager based in Denver, Colorado, with a focus on supporting water stewardship and water management projects in the United States, Latin America, and the Caribbean. Ms. Dennison has worked with numerous clients on developing and supporting water security and water stewardship initiatives at the corporate level, as well as implementing programs on individual sites. She has experience with stakeholder engagement, workshop facilitation, and collective action projects. Ms. Dennison holds an M.S. in Civil and Environmental Engineering and a B.S. in Engineering, both from the Colorado School of Mines in Golden, Colorado.

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