Greener mining - Mining Magazine

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More mining firms are sponsoring biodiversity initiatives in move to reduce environmental footprint. Jax Jacobsen reports

Mining companies are becoming ever more aware of the need to ‘green’ their projects as much as possible, with some turning towards embracing biodiversity and sponsoring projects near or on their properties.

The pressure on the industry to be more environmentally conscious is perhaps even greater now, following the November 2015 dam collapse at Brazil’s Samarco iron more mine. This event killed 19 people and caused the country’s worst environmental disaster, following the collapse of a dam containing mining waste.

Three mining companies – operating in Africa, northern Canada, and the southwestern US – have undertaken substantial works to improve biodiversity around their respective projects, and all three insist that it’s well worth the financial cost to do so.

Sensitive biome

Vedanta Resources’ Zinc International is undertaking mining of the massive Gamsberg zinc deposit in the remote Northern Cape district of South Africa. Though mining companies like Anglo American have known about the deposit for years, none had initiated work on it because it was located in a rare biome, one of only four in South Africa.

More than 77,000 plants have been harvested from the Gamsberg footprint

“The reason that Gamsberg never became a mine despite being owned by several mining companies is because it was a very marginal ore body, and the biodiversity sensitivity was very extreme, even for that time,” Vedanta Zinc International CEO Deshnee Naidoo tells *Mining Magazine*.

Zinc International decided it would take on the environmental challenge when it decided to develop the deposit, as part of the company’s plan to spread its footprint from India into Africa.

“One of the things the team did in 2014 when Vedanta said we would build the deposit, we came up with the biodiversity offset agreement with the Northern Cape Department of Environment and Nature Conservation. Every bit of land that we disturbed in the area that was biodiversity-sensitive, we would restore that in an area that was nearby,” Naidoo explains.

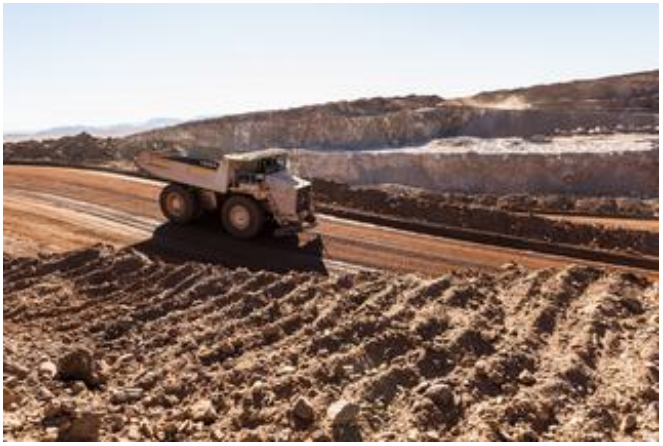
“What it meant was we would have to acquire 12,500ha of land around the project, and make sure we restore the biodiversity lost in the area we mined so that the region as a whole was no worse off.”

The company is still in the process of fencing off biodiversity-sensitive areas, and relocating where waste rock will be stored to manage drainage. Vedanta Zinc International has also relocated some of the access road.

Some 12.5Mt of overburden has been removed thus far at Gamsberg in preparation for the start of bulk mining in mid-2018

Ground was broken at the site in mid-2015, and 12.5Mt of soil has been moved in preparation for the start of bulk

mining in mid-2018. As part of the biodiversity offset agreement that was reached, the company is required to locate some 10,000 plants from endangered species; however, the company plans to relocate more than 60,000.



The company will then spend 3.5 million South African rand (US$259,000) per year – which will go up year-on-year – to maintain the 12,500ha acquired around the project. This land will be managed as a national conservation park.

Though development of the zinc project had to be slowed down to negotiate with the local government department, Gamsberg is back on track according to Naidoo, while the company is trying to accelerate it to take advantage of strong zinc prices.

Naidoo hopes that this project will serve as a beacon for other mining companies.

“If we pull this off, this will definitely be a new way of doing projects in terms of biodiversity,” Naidoo says. “That’s absolutely a benchmark I want to create with this project.”

Conserving caribou

Across the world in Canada’s Northwest Territories, Dominion Diamond Corp (DDC) is also taking action to help local communities preserve the caribou population in the sparsely populated but mineral-rich region.

DDC has funded the ‘Boots on the Ground’ caribou monitoring programme

DDC has now funded the ‘Boots on the Ground’ caribou monitoring programme. It is an indigenous-led environmental monitoring programme that gathers locals to investigate the reasons behind the caribou’s decline in the region, located near the Ekati diamond mine which DDC took over in 2013. The programme runs for about four to six weeks in July and August, monitoring the caribou on foot to determine impacts on the herd from natural and human activities.

The pilot season kicked off in mid-2016, working with teams from the Tłı̨chǫ community and representatives from Kugluktuk, an Inuit community in Nunavut.

“The coming years of the project will elaborate this methodology to develop a long-term Traditional Knowledge monitoring programme,” Boots on the Ground organisers say.

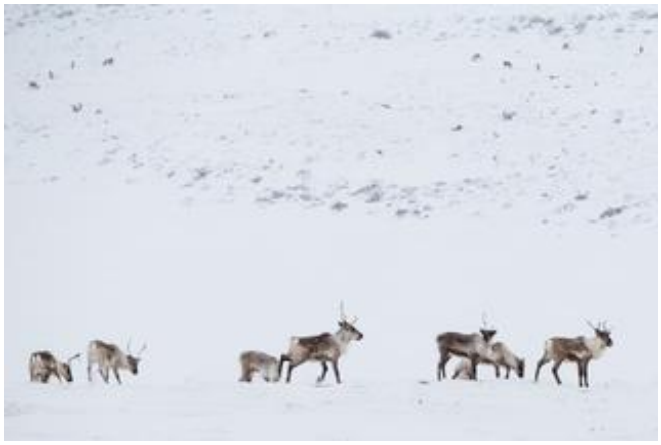
The input of the local aboriginal groups has also had an impact on how mining operations have proceeded at Ekati.

The ‘Boots on the Ground’ programme monitors the caribou to determine impacts on the herd from natural and human activities

Aboriginal groups advised DDC to change the structure of the future Jay pipe access road – a critical component of the Ekati mine – to make it less intrusive on the caribou habitat, by placing it on the narrowest part of the ‘caribou highway’ to minimise disruption to the herd.

Dominion has also vowed to spend over C$1 million to fund geo-fenced collars, which the company hopes will shed more light on the diminishing number of Arctic caribou. Dominion also plans to use the funds to develop strategies to strengthen caribou herds and further mitigate any impacts mining activity could have on the population.

Water provision



Further down the American continent, Resolution Copper – a joint venture between Rio Tinto and BHP Billiton – is working to preserve desert biodiversity in Arizona, US, by providing new water solutions to the community.

The joint venture is working on the old Magma copper mine to dewater the old mine workings, which allows for new exploration work, Resolution Copper environmental manager Dr Casey McKeon tells *MM*.

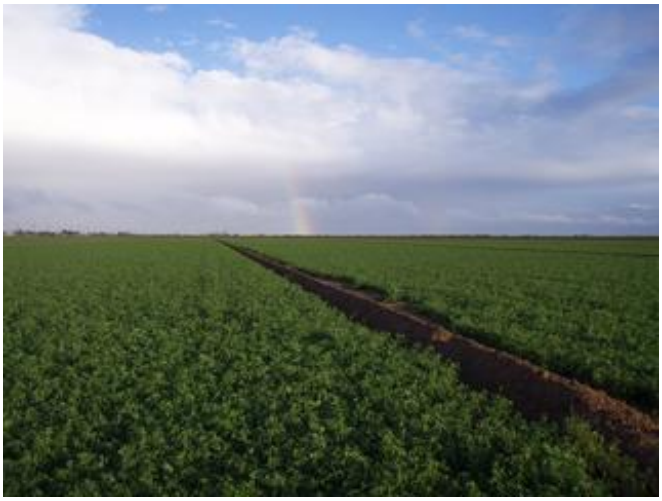
Resolution Copper's water treatment plant, which treats the mine water to remove metals and bring the pH into an agronomically acceptable range

The JV has been working on dewatering the mine site since 2009, treating the water and delivering the cleaned water to local farmers at no cost.

The operation tackles two problems simultaneously: preserving the limited water supply in the region and providing irrigation for the local farming community.

“We supplement the local area’s irrigation programme, and are already irrigating 5,000 acres [2,023ha] of crops,” Dr McKeon says. “It’s small but important, because it prevents us from having to pump groundwater. We supplement less than 4% from the [US$20 million water treatment] plant, and the farmers appreciate it. We monitor their soil a few times a year to make sure there’s no impact.”

Resolution Copper has provided approximately 17,000 acre feet [20,970,000m^3] of water to district, none of which is hard-to-replenish groundwater. The water is used to cultivate wheat, cotton, alfalfa, and turf grass crops, and guards against the desertification of local farmland.



The water provided by Resolution Copper is used to cultivate crops such as alfalfa

“Rio Tinto is also working with Arizona on the allocation of Colorado River water. When there is excess water, we purchase that and store it 30 miles [48km] away from the project,” Resolution Copper senior manager of environment, permitting and external affairs Victoria Peacey explains.

“Surface water is replenished more quickly, and is more sustainable than using groundwater,” Peacey points out.

This method of water retention and recycling could provide a model for other regions of the world grappling with water shortages, Resolution Copper communications manager Bill Tanner tells *MM*.

“In many quarters of the world, water availability – in Africa, in Asia – is critical and immediate, so as the world’s population increases, those people are going to require the minerals we provide as well as water,” Tanner says.

“We look at what we’re doing here as a template not just for mining companies in Arizona, but other mining and other agriculture projects around the world.”

Innovation required

Though these mining-sponsored initiatives to improve biodiversity around projects is encouraging, biodiversity is likely to come under pressure from an increased demand for battery metals, a Verisk Maplecroft report found in December 2015.

The global market for rechargeable batteries is expected to double by 2025, driven by the increased use of hydroelectric and electric vehicles as well as electronic devices like smartphones. Thus, demand for lithium is projected to skyrocket, which may harm biodiversity in areas like the Democratic Republic of the Congo.

“Biodiversity concerns could also complicate the exploitation of new sources in metals in certain situations and companies looking to supply metals to the growing battery market will need to manage those concerns,” Verisk Maplecroft analyst Dr Rory Clisby wrote in the report.

Innovation will be key to improving mining techniques and environmental preservation, Prof Kip Jeffrey of the Camborne School of Mines tells *MM*.

“The innovation goal is to go to the keyhole surgery-type mining in the future,” Prof Jeffrey says. “We’re already seeing movement towards that, as never before with automation and mechanisation in standard mines. We ourselves are doing research work with companies which are already scoping this out and developing the technology.”

He concludes: “It’s happening now, and that is what companies will do in the future.”