



**FEATURE**  
**PHILIPPINES**

## Coral Reef Restoration

Raising the Bar  
on Environmental  
Protection

## BACKGROUND

The world's reefs are in decline, and the United Nations Environment Program (UNEP) reports that 97% of the coral reefs within the Philippines are under threat. In the surrounding areas of Aroroy (Masbate), dynamite fishing, cyanide fishing, and overfishing are rampant and continue unabated. These activities have a significant effect on the coral reef environment by destroying habitat and decimating fish stocks. The damage from these methods can take generations to naturally repair, and in many cases will never return.

B2Gold's Masbate Mine is an active leader in environmental stewardship in the Philippines. In 2017, B2Gold was able to encourage the establishment of the Colorado Marine Protected Area (MPA) in the municipality of Aroroy. This MPA now protects 129 ha of marine environment, which is now being rehabilitated by the company. Prior to intervention, the mean coral cover in this area was estimated at less than 12%.

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## THE DECISION PROCESS

The process leading up to the establishment of the Colorado MPA and subsequent rehabilitation began in 2015, two years before the MPA was officially declared in September 2017.

Sites with historic populations of corals may be a good candidate for restoration. However, if environmental conditions have significantly changed they may no longer support healthy coral communities. Surveys of the Colorado MPA throughout 2015, 2016 and 2017 clearly indicated that a core zone of substrate supporting coral building species of around 40 ha existed. However, it has been significantly damaged, primarily by illegal dynamite fishing. The surrounding buffer zone also has significantly damaged substrate and large areas that no longer support coral building species.

Even though the location of the MPA is outside of Masbate's project boundary, B2Gold worked in cooperation with the Local Government Units (LGUs) in order to influence and deter the practice of unsustainable fishing methods in the area and to form the Colorado MPA.

Since natural population recovery of coral in the area was at risk, the decision was made to supplement natural regeneration with artificially enhanced reef structures. The project also set biological and socio-economic objectives.

Biological objectives:

- promote recovery of biodiversity;
- increase biomass and productivity of important reef species;
- assist recovery of key reef species or ecosystem processes; and
- mitigate damage or degradation to coral reef framework.

Socio-economic objectives:

- build public awareness and environmental education;
- develop alternative livelihoods to reduce resource use on coral reefs; and
- increase ecosystem services to local communities.

Fisherfolk and users of the area were consulted and participated in the planning and decision making of the project. This allowed for the setting of realistic objectives and reduced potential conflicts. Engaging community stakeholders throughout the project encouraged local stewardship for the restoration site, crucial for its sustainability.

## CREATING A FOUNDATION FOR CORAL GROWTH

Natural recovery of coral reef ecosystems requires many years because of the slow growth of most corals. The restoration of the Colorado MPA is expected to see best results over a period of 5 to 10 years.

B2Gold is working with the Reef Ball Foundation in order to develop a comprehensive Reef Ball program for the purpose of coral stabilization. B2Gold fabricates Reef Balls using marine-friendly concrete with a rough textured surface which facilitates natural coral recolonization. The construction of the Reef Balls is completed by residents of Barangay Tigbao, which enables the community to be directly involved in the restoration of these damaged environments. In 2017, 125 Reef Ball units were deployed and propagated. The Reef Balls range in size from small (100 kg) to large (2,000 kg), allowing for a non-uniform reef design that promotes better habitat complexity. B2Gold intends to deploy an additional 600 Reef Balls in 2018, and reach 10,000 propagated corals for the MPA.

The focus of the reef restoration project, to date, has been to re-establish coral cover in degraded areas by propagating fragments of broken or detached coral (due primarily to dynamite fishing) onto the Reef Balls. These fragments are either directly planted to the Reef Ball structure or grown further in a nursery before out planting. Coral fragments are not taken directly from healthy coral colonies as these are left to preserve the natural reef structure. Population enhancement through propagation helps increase the local reef ecosystem health and complexity and creates essential habitat.



## MONITORING

Monitoring is critical to evaluate the program's success throughout its many phases. B2Gold has set a benchmark of 80% survival, which is currently being exceeded and is a strong indicator for the long-term success of the program. The results from baseline studies of fish were alarming (population and size per area indicating low biomass estimates) and further highlighted the extreme pressure that has been applied to the reef system through unsustainable fishing methods, particularly dynamite fishing. Of particular interest in the area is the decline of herbivorous fish species. These fish species are critical for the control of microalgae that can compete with and smother reef-building coral colonies or new coral recruits.

Continued monitoring of the MPA over the coming years is important to the project. Already, there are positive signs of success. Since the Colorado MPA was established in September 2017, there has been no further evidence of the use of dynamite in the area. Six wardens now patrol the area, which is clearly making an improvement to the area's security, the protection of remaining natural reefs, and the success of propagation work. There have been two sightings of the hawksbill turtle (*Eretmochelys imbricate*) within the MPA since its formation, which is of significance due to its Critically Endangered status given by the International Union for Conservation of Nature (IUCN). This species has not been recorded in the area over the past eight years of monitoring.

Active restoration must be combined with holistic management efforts for long-term restoration success of degraded reefs. B2Gold is committed to ensuring these principles are adhered to in the rehabilitation of the Colorado MPA and hope to spread this initiative to other coastal communities surrounding the mine site.