

Table 2. Biodiversity controls management at the Martabe Gold Mine - Alignment With The Mitigation Hierarchy

Hierarchy Level	Description	General Comments	Controls	Source
Avoidance	Avoidance of biodiversity loss by means of decisions made early in the project planning stage. The most likely opportunities involve site selection, project design and project scheduling.	As for many mines, opportunities for avoidance of biodiversity impacts at the project planning stage were limited. There were no alternative deposits to consider and the footprint of the Tailings Facility was determined by topography and geotechnical constraints. Extensive support facilities were located in the lowlands outside of areas of critical habitat. Efforts are now being directed towards the scheduling of pits LOM to maximise opportunities for in-pit placement of tailings and waste rock (avoidance of pit voids). COP requirements 1.1 to 1.3 are aimed at ensuring that opportunities for avoidance and minimisation of biodiversity impacts are evaluated at the project planning stage in accordance with the mitigation strategy.	Project Pre-Feasibility Studies (PFS) shall include a preliminary assessment of biodiversity impacts and risks associated with the project. A desktop study may be sufficient at PFS level (if existing studies for similar ecosystems are available for reference). The PFS shall take into account preliminary costing of required biodiversity controls, including closure costs. Key findings shall be included in the PFS report executive summary.	CoP Biodiversity Management - Requirement 1.1
			If the preliminary assessment (above) indicates the potential for significant project-related biodiversity impacts, the PFS shall evaluate opportunities for avoidance and minimisation of these impacts in accordance with the mitigation hierarchy. Key findings shall be included in the PFS report executive summary.	CoP Biodiversity Management - Requirement 1.2
			In the case where several project alternatives are being evaluated, the PFS shall include a preliminary assessment of the biodiversity impacts and risks associated with each alternative. This information shall be taken into account in the evaluation and ranking of alternatives. Key findings shall be referenced in the PFS report executive summary.	CoP Biodiversity Management - Requirement 1.3
Minimisation	Minimizing biodiversity loss due to impacts that are unavoidable if a project is implemented. There are three main classes of minimisation controls: <i>physical controls</i> related to the design of infrastructure, <i>operational controls</i> such as rules and procedures, and <i>abatement controls</i> on pollution.	COP Requirement 1.4 requires that controls for minimising operational biodiversity impacts be identified and costed as part of the Feasibility Study for any new project. COP Requirements 2.1. and 2.2 require that Amdal impact assessment studies for new projects properly address biodiversity risk. The Amdal Addendum shall document mitigation measures for minimisation of biodiversity impacts reflective of industry leading practices. Operational controls on clearing are key for minimising operational impacts on biodiversity at the site and in exploration areas.	If a Pre Feasibility Assessment indicates the potential for significant project-related biodiversity impacts and risks, a following Feasibility Study (FS) shall include a more detailed impact assessment including required controls to mitigate biodiversity impacts. This assessment shall include a biodiversity survey of areas to be disturbed by the project conducted by ecologists familiar with local ecosystems. The FS financial analysis shall take into account the costs of required biodiversity controls including closure costs. Key findings of this impact assessment shall be included in the FS report executive summary.	CoP Biodiversity Management - Requirement 1.4
			During the planning stage for any project or development at the Martabe Gold Mine, biodiversity risk shall be assessed as part of the impact assessment studies required under the Amdal process. This assessment shall be carried out by specialist environmental consultants with expertise in the biodiversity of forest areas surround the mine. An input into this assessment shall be a fauna and flora survey in the planned area of disturbance that specifically addresses the requirements of IFC PS6. These surveys shall specifically include assessment of orangutan habitat and the presence of <i>Pongo tapanuliensis</i> or evidence of previous use of the area by <i>Pongo tapanuliensis</i> .	CoP Biodiversity Management - Requirement 2.1
			Based on this impact assessment, mitigation measures reflective of industry leading practice shall be documented in the associated Amdal or Amdal Addendum. These measures shall be aligned with the mitigation hierarchy for protection and conservation of biodiversity as presented in IFC Performance Standard 6 .	CoP Biodiversity Management - Requirement 2.2
			All clearing of vegetation at the site shall be strictly controlled by application of the Land Access Disturbance Request (LADR) procedure. When completing the Environment clearance section of a LADR, Manager Environment shall (1) verify that the area of clearing shown in the LADR falls with area approved for clearing under the Amdal / Amdal Addendums, (2) verify that the area of clearing is no larger than that required for the activity covered by the LADR, (3) ensure that pre-clearing inspections are specified as a required control, (4) ensure that surface water controls for minimising Impacts on downstream waterways are specified as a required controls. All areas of clearing shall be approved by Director Operations by means of an authorized LADR. Unapproved clearing shall be subject to disciplinary sanction.	CoP Biodiversity Management - Requirement 3.1

Hierarchy Level	Description	General Comments	Controls	Source
			Immediately prior to any clearing of native vegetation at the site (within 24 hours), Environment personnel shall conduct a walk-through inspection of the area to check for the presence of species classified as critically endangered (<i>orangutan, tiger, pangolin, hornbill</i>). If individuals of these species are recorded during a pre-clearing inspection, clearing activities in the vicinity must be immediately halted and a defined procedure followed to ensure the animal is protected. The procedure at Section 8 (see below) shall apply without exception. All pre-clearing inspections shall be recorded using the form approved for this purpose, signed by the team leader. These records shall be retained by the Environment Department. A similar pre clearing fauna inspection procedure applies to exploration drill pads.	CoP Biodiversity Management - Requirements 3.2, 4.5
			All field staff involved in clearing operations shall undergo basic species recognition training, and shall be instructed to report immediately any potential sighting of an endangered or critically endangered species in or near the area of operations. All such sightings are to be reported to PTAR Manager Environment on the day of the sighting.	CoP Biodiversity Management - Requirement 3.3
			Mine planning shall place priority on minimising area of disturbance and wherever possible routing of roads and sighting of infrastructure to avoid high value forest habitat.	CoP Biodiversity Management - Requirement 3.4
		Aside from controls on clearing, various other operational controls minimise biodiversity impacts associated with a wide range of activities at site and to regional exploration activity	Impacts on downstream waterways shall be managed in accordance with the requirements of Code of Practice Site Water Management and site discharge permits.	CoP Biodiversity Management - Requirement 3.5
			Hunting and collection of plants or animals for personal use is prohibited and shall be strictly controlled.	CoP Biodiversity Management - Requirements 3.6, 4.1
			Burning of vegetation in the Project Area is prohibited and shall be strictly controlled.	CoP Biodiversity Management - Requirements 3.7, 4.2
			Logging or timber getting by third-parties in the Project Area is prohibited and shall be strictly controlled.	CoP Biodiversity Management - Requirements 3.8, 4.3
			From time to time, illegal activities might be conducted by third parties within the Contract of Work. Examples could include clearing of vegetation and/or logging, or illegal mining and processing. If PTAR becomes aware of such an occurrence, the Chief Geologist shall report this to Director Government Relations and Senior Manager Government Relations and discuss response required. A monitoring program will be implemented as appropriate and agreed with senior management.	CoP Biodiversity Management - Requirement 4.8
			Hazardous waste shall be managed in compliance with B3 waste regulations.	CoP Biodiversity Management - Requirements 3.9, 4.4
			All sightings of endangered and critically endangered species shall be reported in the monthly operations report.	CoP Biodiversity Management - Requirement 3.10
			Feral animal occurrence around camp and office areas shall be monitored, and as needed feral animal control programs shall be implemented.	CoP Biodiversity Management - Requirement
			Non-local species used in the site rehabilitation program (such as legumes and grasses) will be limited to those that have little potential for invasion of native ecosystems.	CoP Biodiversity Management - Requirement 3.12

Hierarchy Level	Description	General Comments	Controls	Source
			The site HSE Induction shall describe basic requirements for the protection of fauna and flora applying to all employees. Information on biodiversity protection shall be included in the site's HSE awareness communications (alerts, posters and publications). A biodiversity management training course addressing the requirements of this COP shall be made available by PTAR Training. This shall be a "Required" competency for PTAR staff according to role as documented in Departmental LNAs.	CoP Biodiversity Management - Requirement 3.13
			Biodiversity monitoring as required by the Amdal shall be implemented using a standard site protocol developed for this purpose.	CoP Biodiversity Management - Requirement 3.14
Restoration	Measures taken to recover biodiversity losses that have not been addressed through avoidance and/or minimization. The common example in mining is site rehabilitation.	Site rehabilitation leading to the restoration of native forest ecosystem is a key element of the biodiversity management strategy established for the Martabe Gold Mine. Mine site rehabilitation techniques for the restoration of tropical forest are now well established.	All areas of the site will be rehabilitated to a safe and stable state following mining, including the removal of all major surface infrastructure (some required infrastructure shall be retained for a period, such as the WPP).	CoP Biodiversity Management - Requirement 5.1
			Drill sites shall be reclaimed in accordance with Exploration SOP 00073 Drill Site reclamation.	CoP Biodiversity Management - Requirement 4.7
			Wherever possible, site rehabilitation will be progressively implemented as areas become available.	CoP Biodiversity Management - Requirement 5.2
			The mine closure plan will provide for the restoration of most areas of the site to a native forest association similar to that originally disturbed. Tree species known to be important food sources or shelter for orangutan will be used across all these areas. Expert advice will be sought in the development of rehabilitation specifications.	CoP Biodiversity Management - Requirement 5.3
			Biodiversity monitoring will be periodically implemented on both rehabilitation areas and nearby natural vegetation in accordance with protocols established by expert consultants.	CoP Biodiversity Management - Requirement 5.4
			Rehabilitation areas will be maintained through ongoing measures such as weeding, replanting and fertilizer application until mine closure criteria as established by ESDM have been met.	CoP Biodiversity Management - Requirement 5.5
Offset	Measurable conservation outcomes designed to compensate for residual adverse impacts persisting after appropriate avoidance, minimization and restoration measures have been taken.	A High Conservation Value (HCV) habitat mapping study done for the Martabe Gold Mine in 2014 included a recommended that a biodiversity offset be considered for the site. PTAR has implemented two biodiversity offset feasibility studies, in 2015 and 2016. A third study is planned for 2022	The PTAR Biodiversity Strategy and Action Plan commits the Company to implement studies to assess the feasibility of a biodiversity offset for the Martabe Gold Mine.	PTAR Biodiversity Strategy and Action Plan (section 7.3).