Implementing the IUCN RHINO approach in Minas-Rio, Minas Gerais state, Brazil

About the IUCN RHINO approach

The IUCN RHINO approach provides a science-based, actionable track for companies, governments, and civil society to deliver Rapid, High-Integrity Nature-positive Outcomes and contribute to the KMGBF and the UN Sustainable Development Goals (SDGs). Focusing on reducing species extinction risk and ecosystem collapse, it provides a means for companies to embark on no-regrets actions that are robust and scientifically supported.

RHINO's core metric is STAR (Species Threat Abatement and Restoration), derived from the IUCN Red List. It quantifies global extinction risk reduction through $STAR_T$ (Threat abatement) and $STAR_R$ (Restoration of historical impacts), which are spatially explicit, scalable, and support aggregation across sites, portfolios, and jurisdictions. IUCN RHINO pilots are based on the use of $STAR_T$, as the mitigation of threats in places where biodiversity still occurs is the most effective mechanism to reduce the loss of biodiversity.

The calculation of $STAR_T$ scores involves summing the proportion of a threatened species' Area of Habitat (AOH) within the considered area, weighted by its IUCN Red List extinction risk category (100 for Near Threatened, up to 400 for Critically Endangered). The scores are disaggregated by threat, to show the relative contribution of different threat types to the overall STAR score and identify priority actions to reduce the species extinction risk.

Background, objectives and implementation of the pilot

Since 2018, when the global mining company publicly committed to achieving a Net Positive Impact (NPI), Anglo American has strengthened their biodiversity standard to ensure rigorous application of the mitigation hierarchy at all stages of its operations, with the aim of achieving its NPI goal. Their biodiversity management programme (BMP) is designed to support the achievement of NPI and to deliver Nature Positive outcomes, aligned to the Kunming Global Biodiversity Framework (KM-GBF).

As an early adopter of the Taskforce on Nature-Related Financial Disclosures (TNFD) framework, Anglo American was interested in piloting the RHINO approach with IUCN to understand how using a science-based metric like $STAR_T$ could further inform their BMP to contribute to Nature Positive outcomes and strengthen their species-related disclosures.

The pilot project was implemented over a five-month period between May and September 2024 and involved Anglo American Group support, two Brazilian team members based on site with expertise in environment and GIS, as well as IUCN and UNEP-WCMC global teams.

Implementing IUCN RHINO's Direct Impact Track

A1. Locate

The Locate phase aims to provide a thorough understanding of an organisation's interface with areas important for biodiversity. In the context of this pilot, the Locate phase applied to the selection of the pilot site for Anglo American.

Screen and prioritise for the pilot

Out of 22 Anglo American mining sites assessed in Africa, South America and Oceania with the IBAT *Disclosure report*, the Minas-Rio mining site in Brazil presents the highest estimated $STAR_T$ score (1,486.5 centi-stars). This high $STAR_T$ score and the willingness of the local team to pilot were the main reasons for the site selection.

Gathering pilot location information and data

The Minas-Rio mine began operating in 2014 and has a projected operational lifespan extending until 2074, with potential expansion prospects under consideration. The site is located in the Southern Espinhaço Mountain Range, a mountain range in Brazil that stretches through Minas Gerais and is designated as a Biosphere Reserve. The region is home to fragments of the Atlantic Forest biome, including fragments of semi-deciduous forest as well as ferruginous rupestrian grasslands[1] characterised by high floral endemism. Some of the forests have been under pressure since the 19th century and converted into pastureland, while rupestrian grasslands have remained relatively well preserved thanks to their location on mountain tops, where their inaccessibility and soil make them unsuitable for grazing or agriculture. The region hosts a diverse fauna, including several endangered species.

[1] Classified as T1.3 Tropical & subtropical montane forests in the Global Ecosystem Typology. For more information on this ecosystem: A Azevedo, L., Zappi, D.C., de Oliveira, D.M.G., Meyer, L., Nic Lughadha, E., Clegg, R., Meireles, L.D., de Melo, P.H.A., Pennington, R.T. and Neves, D.M. (2024), On the rocks: Biogeography and floristic identity of rocky ecosystems in eastern South America. J. Syst. Evol., 62: 305-320.

https://doi.org/10.1111/jse.13052

Map stakeholders at the landscape level

Communities that live in the surrounding area are rural. The most important economic activity is raising cattle, while small-scale agriculture and breeding animals, such as hens and pigs, are subsistence activities. Land tenure is characterised by large properties that shelter small-scale producers on a partnership basis.

Key strategic frameworks guide biodiversity action in the area, such as the PAT do Espinhaço (Territorial Action Plan) and the PAN do Espinhaço (National Action Plan for the Conservation of Endangered Species) which establish conservation priorities and coordinated actions to protect the region's unique and highly threatened fauna. Other relevant PANs - such as those focused on pollinators, amphibians, and cave fauna - intersect with Espinhaço's biodiversity priorities.

Define the Area of Influence of Anglo American Minas-Rio site

The 'Area of Influence' refers to the geographic area where a site's activities, including associated facilities, could potentially impact biodiversity and ecosystem services. It encompasses zones of direct, indirect, and cumulative effects. It is the area for which a meaningful action to deliver IUCN RHINO outcomes with clear accountability mechanisms should be developed and managed.

The project team agreed that the area of influence of Anglo American for Minas-Rio is the watershed encompassing the Santo Antônio and Peixe river basins (323,640 hectares). This area includes the mine operational site (43,700 hectares) and the designated offset areas, and overlaps three important State and federal protected areas: Serra da Ferrugem Natural Monument (867 ha), Serra do Intendente State Park (13,509 hectares) and Salão de Pedras Municipal Park (857,621 ha). Figure 1 shows the defined Area of Influence for the pilot site.

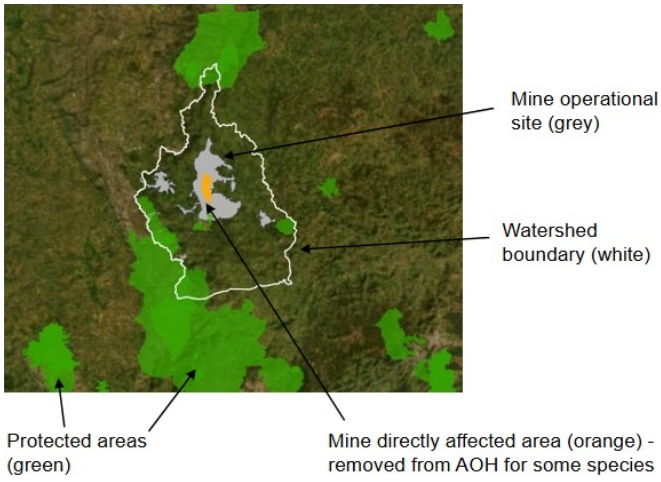

Figure 1: Map of the Area of Influence – Anglo American's Minas-Rio, Minas Gerais, Brazil (source Anglo American)

Compile preliminary threatened species and associated threat data

The pilot used existing data and studies on mammals, birds and amphibians previously collected by the site with the support of experts. No additional data collection was performed.

An *IBAT Species Report (estimated STAR)* was generated for the Area of Influence, to provisionally identify the drivers causing impacts on the globally threatened species present in the area, and their relative importance, based on estimated $STAR_T$ scores. This report identified a list of 43 species included in the estimated $STAR_T$ score for the watershed. The estimated $STAR_T$ score of the watershed (15,132.0 centi-stars) accounts for 10 times the score of the mining site alone measured in the screening step, while the watershed area is 7.5 times larger than the mine operational site. This confirms the richness and vulnerability of species in the area.

Results from this step could be used by Anglo American to inform the TNFD LEAP L4 component 'Interface with sensitive locations'.

A2. Evaluate

During this phase of the IUCN RHINO approach, the project team confirmed and revised species occurrence and threat presence on the ground within the Area of Influence of Minas-Rio. A calibrated $STAR_T$ score was calculated to serve as a baseline for the species extinction risk and provide a more detailed evaluation of nature-related dependencies and impacts.

Confirm species

The species in the *IBAT Species report* presenting estimated $STAR_T$ scores were compared against Anglo American existing surveys and expert knowledge.
As a result, 18 species identified in the *IBAT Species Report (estimated STAR)* were confirmed to be present in the watershed and included in the calculation of calibrated STAR: one amphibian (frog *Leptodactylus watu*) with the EN status; eight birds most of which with a NT status and one with the EN status (Vinaceous-breasted Amazon); nine mammals most of which with a VU status and two with a EN one (Bokermann's Nectar Bat, Moojen's Atlantic spiny rat).

For these 18 species, IUCN and Anglo American teams worked together to refine species' Areas of Habitat (AOH) and improve accuracy of results. This step was implemented as part of a pilot project and calculations were performed manually, however the new IBAT module supporting the calibration process of STAR will not require such refinement. Site-level insights from Anglo American were used to refine information from global AOH layers. Areas directly affected by mining operations were excluded from the AOH. For some species, the AOH was expanded to include part of the Area of Influence.

Confirm threats

The Anglo American team revised the threats that were listed in the *IBAT Species report (estimated STAR)* for each species present in the watershed. The team referred to the IUCN Threats Classification Scheme, which Level 2 is used to define threats for STAR scores.

They evaluated the scope and severity of threats using academic sources and local knowledge. Each threat was quantified as a percentage of population decline (based on Mair et al. 2021), as shown in Figure 2. This work, by far the most challenging and labour-intensive part of calibration, proved critical as it provides important insights to identify priorities for action.

		Severity					
		Very rapid declines	Rapid declines	Slow, significant declines	Negligible declines	No decline	Causing/could cause fluctuations
Scope	Whole (>90%)	63	24	10	1	0	10
	Majority (50-90%)	52	18	9	0	0	9
	Minority (<50%)	24	7	5	0	0	5

Figure 2: Translating population decline into numeric percentage (based on Mair et al. 2021)

Calculate first version of baseline

In total, the final calibrated $STAR_T$ score amounts to 95,877.29 centi-stars, which represents six times the estimated $STAR_T$ score. This higher score is driven by a higher proportion of threatened species' AOH in the Area of Influence. A higher threat intensity was also noted at the site level, compared to the global average for key species. Table 3 shows the scores of the 18 species.

While the calculation was performed manually for the pilot, the new IBAT module supporting the process will calculate the calibrated $STAR_T$ score based on ground-truthed data confirmed by users. The IBAT Species Report (calibrated STAR) meets the requirements for species of the TNFD E3 phase related to measuring changes to the state of nature and E4 which recommends assessing the severity of impact for materiality assessment.

Common Name	Taxa	IUCN Red List status	Final Global AOH	% AOH within AOI	STAR score	% STAR score
Frog Leptodactylus watu	**Amphibians**	**EN**	**3,347**	**49.3%**	**18,897**	**20.1%**
Rio de Janeiro Antbird	**Birds**	**NT**	**51,881**	**4.63%**	**2,837**	3.0%
Vinaceous-breasted Amazon	**Birds**	**EN**	**173,538**	**0.95%**	**430**	0.5%
Buffy-fronted Seedeater	**Birds**	**VU**	**206,153**	**0.96%**	**356**	0.4%
Three-toed Jacamar	Birds	NT	177,734	0.75%	205	0.2%
Blue-winged Macaw	Birds	NT	3,768,232	0.07%	26	0.0%
Rusty-margined Guan	Birds	NT	4,307,909	0.04%	13	0.0%
Turquoise-fronted Amazon	Birds	NT	4,060,425	0.04%	10	0.0%
Ornate Hawk-eagle	Birds	NT	9,144,492	0.01%	1	0.0%
Moojen's Atlantic spiny rat	**Mammals**	**EN**	**1,910**	**20.94%**	**56,638**	**60.3%**
Bokermann's Nectar Bat	**Mammals**	**EN**	**2,130**	**10.56%**	**13,028**	**13.9%**
Large-headed Rice Rat	**Mammals**	**VU**	**54,675**	**3.02%**	**1,126**	1.2%
Atlantic Titi	**Mammals**	**VU**	**143,901**	**0.82%**	**224**	0.2%
Southern Tiger Cat	Mammals	VU	2,070,356	0.16%	18	0.0%
Brown Howler Monkey	Mammals	VU	1,028,825	0.11%	31	0.0%
Maned Wolf	Mammals	NT	4,306,491	0.08%	22	0.0%
Northern Tiger Cat	Mammals	VU	9,304,343	0.02%	3	0.0%
Hoary Fox	Mammals	NT	1,677,865	0.03%	3	0.0%

Table 3: Calibration results by species

A3. Assess

Through this phase of RHINO, a company will identify, from the *IBAT Species Report (calibrated STAR)*, the threats that are most important to mitigate and consult with stakeholders to refine the analysis.

Assess most important threats

The threats contributing the most to the calibrated STAR score (80% of total calibrated $STAR_T$ score) include fire and fire suppression (accounting for 21% of the score), livestock farming and ranching (20%), roads and railroads (18%), annual and perennial non-timber crops (11%) and mining and quarrying (10%). The complete analysis is shown on Figure 4.

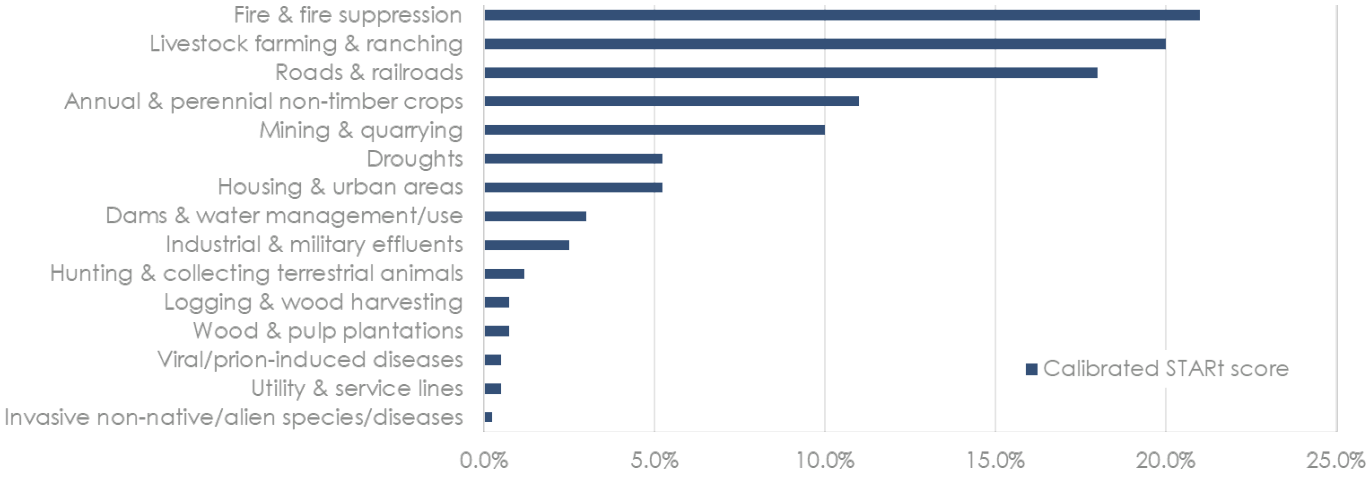

Figure 4: Ranking of the main drivers of species loss in the watershed (calibrated $STAR_T$)

Three endemic species, all with status EN, account for about 94% of the score and should therefore be prioritised for threat abatement and conservation action: Moojen's Atlantic spiny rat *(Trinomys moojeni)* accounting for 61%, frog *Leptodactylus watu* for 20% and Bokermann's Nectar Bat *(Lonchophylla bokermanni)* for 13%. As shown in Table 3, a significant proportion of the Area of Habitat of these three endangered species is located in the Area of Influence of the Minas-Rio site. Livestock farming and ranching and fires are key threats for the two mammals, as well as roads for the rat. Dams/water management, agriculture, and effluents from all sources are key threats to *Leptodactylus watu*.

Anglo American's existing Biodiversity Management Plan (BMP) in Minas-Rio includes a series of initiatives which do not directly target the three endemic endangered species but can nevertheless have positive impacts on them. These include investments to increase landscape connectivity (2% increase in forest cover, 4% reduction in area fragmentation, recovery of more than 1,600 hectares of land), restore forest in the Ribeirão Santo Antônio Basin (partnership with the Espinhaço Institute and rural

producers recognised by UNESCO), promote agroforestry and ecological restoration, and monitor fauna and threatened species. Specific monitoring efforts in the BMP focus on species considered as local priorities, such as *Pecari tajacu* (Collared Pecari, LC), *Puma concolor* (Puma, LC), or *Hydromedusa maximiliani* (Brazilian Snake-necked Turtle, VU) or *Chrysocyon brachyurus* (Maned wolf, NT).

Socialise results

The approach and results of the STAR calibration as well as Anglo American's key initiatives were first presented by IUCN, UNEP-WCMC and Anglo American during a webinar in August 2024. Participants included scientific and technical experts from the Southern Espinhaço Mountain Range region and the Minas Gerais state, involved in research, protected area management and NGOs, as well as business representatives operating in the area. The webinar was an opportunity to socialise the methodology itself and the use of STAR and the initial results.

Participants agreed on the relevance of STAR results to inform future actions. The webinar confirmed the existence of conservation initiatives led by all actors and the shared interest for closer collaboration to design a coordinated conservation action at landscape level for Moojen's Atlantic spiny rat, frog *Leptodactylus watu* and Bokermann's Nectar Bat, which habitat highly depend on the coordinated efforts of all actors in the watershed. Such efforts should be aligned with the objectives of the states of Minas Gerais and with Brazil's national biodiversity strategy.

Recalculate baseline in response to new data and insights

The first webinar with stakeholders did not lead to any adjustment to the assessment of threats. The calculation of the calibrated $STAR_T$ score remains unchanged. This score will serve as a baseline for target-setting and monitoring progress towards nature-positive outcomes.

The outcome of this phase of IUCN RHINO can inform, for the species-related elements, the TNFD LEAP A3 'Risk and opportunity measurement and prioritisation' and A4 'Risk and opportunity materiality assessment'.

A4. Prepare

During this phase, as part of the IUCN RHINO approach, the objective is to understand how to respond to the material impacts on nature identified in the Evaluate phase and risks to the organisation identified in the Assess phase. The outcome will be the formulation of an action plan to address the most important threats, thereby delivering the greatest contribution to Nature Positive outcomes. The action plan can be translated into a science-based target for the reduction of the threats that cause species extinction risk.

While the pilot with Anglo American led in 2024 ended at the end of the Assess phase, the need for a Prepare phase was immediately recognised. In the next stages to be implemented in 2025-2026, a multi-stakeholder dialogue embedded in existing governance frameworks will be facilitated by IUCN. The calculation of calibrated $STAR_T$ scores with National Red List data will also be performed to assess and compare with results obtained with global data and the implications in terms of priority threats and actions. The objectives will be to define a meaningful action plan for the Minas-Rio watershed, shared by the landscape stakeholders and aligned with national and global priorities, and to calculate a target $STAR_T$ to estimate the possible contribution of this plan to Nature Positive.

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Picture credit: Protected area around Anglo American Minas-Rio operations plant in Brazil, © Nitro Historias Visuais

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