Vale SA - Forests 2022

F0. Introduction

F0.1

(F0.1) Give a general description of and introduction to your organization.

Vale S.A. is one of the largest metals and mining companies in the world, based on market capitalization. Vale is one of the leading mining companies in the global market for iron ore, iron ore pellets and nickel, with operations in more than 20 countries and five continents. The company is headquartered in Rio de Janeiro, Brazil, and has 213.4 thousand employees (72.2 thousand own and 141.1 thousand third parties).

Vale S.A. also produces iron ore pellets, manganese ore, ferroalloys, metallurgical and thermal coal, copper, platinum group metals (PGMs), gold, silver and cobalt. In addition, we operate large logistics systems in Brazil and other regions of the world, including railroads, maritime terminals and ports, which are integrated with our mining operations. We have a distribution center to support the delivery of iron ore worldwide, directly and through affiliates and joint ventures. We also have investments in energy and steel businesses.

Our five Strategic Pillars consider sustainability as a main issue: Safety and Operational Excellence, New pact with society, Basic Metals Transformation, Discipline in Capital Allocation and Maximizing "flight to quality" in Iron Ore (for more information, please see our Vale_Integrated_Report_2021, page 23). Our key values and behaviors have been updated to reflect the changes we are experiencing. We believe that mining is essential for the development of the world and that it only serves society by generating prosperity for all and taking care of the planet. This is reflected in our values, which are defined as life first, acting with integrity, valuing who makes our company, making it happen and respecting our planet and communities.

In 2019, Vale updated its sustainability goals for the coming years, in line with the Sustainable Development Goals (SDGs) of the United Nations Agenda 2030. Regarding biodiversity, the Agenda brings the Forestry Goal - Recover and protect 500,000 hectares of areas by 2030.

Vale has established a long-term goal to reach No Net Loss, focused on managing impact and risks, and reducing significant biodiversity losses in new projects. This commitment is completely aligned with the commitments made in the Sustainability Policy and with the company's sustainability strategy. To achieve this goal, we are working to implement and reinforce the entire risk, impact, attributes and performance management process.

As a member of ICMM, Vale is committed to the principles established by the Board and in 2019 reinforced its commitment to Performance Expectation, which is focused on not operating in World Heritage Areas and on the implementation and strengthening of the impact mitigation hierarchy, with the objective of not having considerable biodiversity losses. In 2021 we reinforce our commitment not to operate in UNESCO World Natural Heritage Site areas (see http://www.vale.com/esg/pt/Paginas/Biodiversidade.aspx - Reports and KPIs).

Since 2019, Vale's highest priority was to respond to the impacts caused by Dam I failure at the Córrego do Feijão mine, in Brumadinho, Minas Gerais continues to be repaired. More than 11,4 thousand of people have been individually indemnified with individual and labor agreements signed, and out of a total of BRL 3 billion committed, BRL 2.6 billion have already been paid for the agreements formalized. This amount excludes expenses with dam de-characterization. The company has also implemented efforts to contain, remove and dispose of tailings, and dredge the most impacted area. So far, of the 9 million cubic meters of material to be removed from the channel of the coal iron stream, due to the b1 dam rupture, more than 50% have been moved and are in the process of final disposition. Considering the areas impacted by the rupture and its surroundings, we have reforested 26 hectares (of a total of 140) by planting approximately 30,000 seedlings of species native to the region. In addition, in 2021, Vale contributed USD 1.3 billion in socio-environmental expenditures, including those related to Brumadinho, which represented an increase of 28% compared to 2020, and for environmental expenditures, the contribution totaled in USD 804.2 million, with water resources, environmental liabilities and energy. Social expenditures totalled USD 473.5 million, of which 73% were with own resources and 27% through laws incentive.

This is also the concern of the company's shareholders, represented by this Board of Directors, all deeply committed to actions to receive and reparation damage to those affected and to the entire region of Brumadinho. We understand the scale of the impact caused and our obligation to develop support and repair actions while working to ensure that something like this never happens again. That is why, from the very beginning, we have committed ourselves to transparency, maintaining a constant dialogue with the entities involved in the recovery process and with society in general.

F0.2

(F0.2) State the start and end date of the year for which you are reporting data.

	Start Date	End Date
Reporting year	January 1 2021	December 31 2021

F0.3

(F0.3) Select the currency used for all financial information disclosed throughout your response.

USD

F-MM0.7/F-CO0.7

(F-MM0.7/F-CO0.7) Select the option that best describes the reporting boundary for which biodiversity-related issues are being reported?

Companies, entities or groups over which operational control is exercised

F-MM0.8/F-CO0.8

(F-MM0.8/F-CO0.8) Within your reporting boundary, are there any geographical areas, business units or mining projects excluded from your disclosure?

Yes

F-MM0.8a/F-CO0.8a

(F-MM0.8a/F-CO0.8a) Please report your exclusions and describe their potential for biodiversity-related risk.

Exclusion	Description of exclusion	Potential for biodiversity-related risk	Please explain
Mining project(s)	In this reporting year, 7 complex sites were selected, covering the iron ore mines in Brazil that represent our largest production of this commodity and are located in the Atlantic Forest and Amazon biomes, as well as the PTVI nickel mine located in Indonesia, which represents the base metals site with the greatest impact on forests. These sites represent 99,1% of iron ore and 39,7% of nickel production in 2021. Each complex aggregates mines located in the same geographical region and which are under the same management, which is why they are described in this way here. This report excludes active mines that have less impact on forests (Canadá and Mozambique) and mineral research areas (Peru, Chile, Serbia), as well as our logistics operations and industrial plants (Malawi, Japan, United kingdom, Oma, Malaysia, China) and inoperative mines. Therefore, this report will not include the Córrego do Feijão Mine (Brumadinho - MG). It is inactive, there was no other type of operational activity in progress. At that time, the project is a reparation of the area affected by the dam failure and is being developed.	Potential for biodiversity-related risks evaluated, but not disclosing to CDP	With operations in more than 20 countries on five continents, Vale S. A. is one of the leading mining companies in the global market in iron ore, iron ore pellets and nickel. The company also produces manganese, ferroalloys, copper, metals of the platinum group metals (MGPs in Portuguese), gold, silver, cobalt, and metallurgical and thermal coals. Operating this variety of raw materials requires an infrastructure that includes mineral exploration, administrative offices and operational units connected by modern integrated logistics systems, comprising railroads, maritime terminals and ports. Our operations today occupy around 818 km², with the main risks and direct and indirect impacts on biodiversity being associated with changes in natural environments and changes in land use, which alter the components of the physical environment, which in turn instead, serve as support for the elements of the biotic environment (flora and fauna). In 2015, Vale carried out a study to map and classify the risks to biodiversity resulting from our operations, from nine categories of areas and/or territories relevant to biodiversity, according to global and national organizations (KBA, Protected Areas, Wilderness Areas, Hotspots, the occurrence of Endangered Species IUCN, among others) to which weights have been attributed that characterize their importance to biodiversity. The analyzes were made considering the insertion of the operational areas in these areas and/or territories, which generated the risk note. Several active sites were chosen for this year's report, covering Vale's largest businesses as well as our largest impacts on forests and biodiversity risk. We represent here our biggest iron ore and nickel production, as well as our sites with the biggest impacts on forests and biodiversity risks, located in Brazil and Indonesia. The sites will be approached to identify all the essential information related to biodiversity and forest management to be collected for reporting to our investors under CDP Forest. We aim to deepen our compilation of information each year to be able to produce an increasingly complete and comprehensive report.

F9 Current state

F-MM9.1/F-CO9.1

(F-MM9.1/F-CO9.1) Provide details on the mining projects covered by this disclosure, by specifying your project(s) type, location and mining method(s) used.

Mining project ID
Project 1

Name
Carajás Complex

Share (%)
100

Country/Area
Brazil

Latitude
-6.411223

Longitude
-50.341333

Project stage
Production

Mining method
Open-cut

Raw material(s)
Iron ore

Year extraction started/is planned to start
1985

Year of closure
2062

Description of project
The operation in Carajás started in 1985 and today is responsible for around 150 180 million tons of iron per year. The ore produced in Carajás is exported through a system that integrates mines, plants, railroads and ports. After the mining and processing phase, the product is transported in wagons through the Carajás Railway to the Ponta da Madeira Maritime Terminal, in São Luís in Maranhão. In this unit, through five mines, we produce three types of products derived from iron: the Sinter Feed, Pellet Feed and the Granulate with differentiation, only, in its granulometry (size). In this way, Carajás consolidates itself as one of Vale's most important operations. The Carajás complex consists of 3 divisions: Serra Norte, Serra Leste and Complex S11D. The Carajás Complex has the largest iron ore mining projects in the world and is located in the Carajás region, within the Amazon biome, known as the S11D Complex. This Complex has a production capacity of 90 Mtpy of iron ore per year and 66.7% of iron

content is the purity of the iron ore produced in the S11D. More than US $ 6.4 billion was invested in the construction of the mine and the plant. In addition to favoring the competitiveness of Brazilian ore, the project brings modern and sustainable solutions, with a reduction in diesel consumption and processing to natural humidity, without using tailings dams. Investments in innovation, combined with Vale's experience in the sector, enable a more efficient operation and less impact on the environment. Like every development project, its implementation had impacts on biodiversity but also highlights approaches to avoid and minimize impacts, as well as recover and conserve important areas for biodiversity. In 2017 and 2018 we used the framework of the mitigation hierarchy for identification, prioritization and mapping of biodiversity risks for the mine complex and a Biodiversity Action Plan (BAP) focused on mitigating and monitoring risks and impacts of future expansions. These actions are now part of a Carajás Biodiversity Management Plan. The mines in the Carajás complex are of greenfield projects and the entire complex follows Brazilian environmental legislation, having its environmental impact and environmental management studies.

Mining project ID
Project 2

Name
Itabira Complex

Share (%)
100

Country/Area
Brazil

Latitude
-19.593314

Longitude
-43.221605

Project stage
Production

Mining method
Open-cut

Raw material(s)
Iron ore

Year extraction started/is planned to start
1957

Year of closure
2041

Description of project
The complex in Itabira is formed by two large mines, Conceição and Cauê - the latter already in the process of environmental recovery. In addition to the pits of Minas do Meio, formed by the pits of Periquito, Dois Córregos, Onça, Camarinha and Chacrinha. Itabira Complex has been operating since 1957 and all its mines are in the production phase. Currently, the Itabira Mining Complex has two ore processing plants, the Cauê and Conceição Ore Treatment Facilities. This process generates four products: NBCA (granulated), sinter feed, pellet feed and PCCA (super thin), which are sent to storage silos and then loaded, through three silos, onto the railway cars. Since its discovery until today, the place has been transformed by technological initiatives and investments, including increasing the capacity and increasing the useful life of mines, always respecting the surrounding environment. The mines of the Itabira Complex are brownfield projects and the entire complex follows Brazilian environmental legislation, at the federal, state and municipal levels. All mines have their impact and environmental management studies, to mitigate and offset the impact generated on biodiversity. There is proximity to urban centers, and to avoid a visual impact and also from dust, a green curtain with an extensive area of forest cover, similar to a barrier, was implemented. One of the main progress in 2021 was the execution of the Experimental Landfills at Itabira and Brucutu, this enabled the implementation of the filtered tailings pile (PDR in Portuguese) projects.

Mining project ID
Project 3

Name
Mariana Complex

Share (%)
100

Country/Area
Brazil

Latitude
-20.257595

Longitude
-43.524328

Project stage
Production

Mining method
Open-cut

Raw material(s)
Iron ore

Year extraction started/is planned to start
1969

Year of closure
2038

Description of project

Formed by the Alegria, Fábrica Nova, Fazendão and Timbopeba mines. The Complex is located in the cities of Ouro Preto, Mariana and Catas Altas, places rich in historical, cultural and natural assets. All production is transported by the Vitória-Minas Railway (EFVM) and part of it is destined for the foreign market, being transported through the Port of Tubarão. The Mariana complex is part of the Quadrilátero Ferrífero, Minas Gerais (Brazil), covered by Cerrado and Atlantic Forest biome formations. This region has the largest production of iron ore at the national level. The mines in the Mariana Complex are brownfield projects, the entire complex follows Brazilian environmental legislation, with its environmental impacts and environmental management studies. In addition, in 2021 Vale produced 21.778 thousand metric tons of iron ore in the Mariana Complex.

Mining project ID
Project 4

Name
Vargem Grande Complex

Share (%)
100

Country/Area
Brazil

Latitude
-20.091264

Longitude
-43.945276

Project stage
Production

Mining method
Open-cut

Raw material(s)
Iron ore

Year extraction started/is planned to start
1996

Year of closure
2089

Description of project
Vargem Grande Complex is formed by the operational units of Abóboras, Capitão do Mato, Tamanduá, Vargem Grande, Pico, Galinheiro and Sapecado, in addition to the Scaffolding Railway Terminal (TFA). The Terminal is responsible for transporting the ore produced in these units to the port. The Complex also has 8 ore beneficiation plants and a pelletizing plant, which transforms iron ore into pellets - small ore pellets with high value for the steel market. The annual production capacity of this complex is 58 million tons of iron ore. The concern with the environment is present in all of our projects, we observe the legal requirements of the locations where we operate, investments in technologies and research to improve our environmental controls. The mines in the Vargem Grande Complex are brownfield projects, the entire complex follows Brazilian environmental legislation, with its environmental impacts and environmental management studies. In addition, in 2021 Vale produced 31.310 thousand metric tons of iron ore in the Vargem Grande Complex.

Mining project ID
Project 5

Name
Paraopeba Complex

Share (%)
100

Country/Area
Brazil

Latitude
-20.106026

Longitude
-43.959732

Project stage
Production

Mining method
Open-cut

Raw material(s)
Iron ore

Year extraction started/is planned to start
1930

Year of closure
2042

Description of project
Paraopeba Complex consists of the Capão Xavier, Mutuca, Mar Azul, Jangada, Tod, Fábrica and Viga mines. Ten plants of ore beneficiation are located in Paraopeba and the pelletizing plant at the Mine, The annual production capacity of this complex is almost 32 million tons of iron ore, generating jobs, contributing to tax collections, and making sustainable mining of excellence. Subsequently, production is transported by rail to the Guaíba and Sepetiba (RJ) and Tubarão (ES) terminals. From there, the cargo ships to different locations in the world. This report will not include Dam I of the Córrego do Feijão Mine (Brumadinho - MG) and the accident that occurred, because it was intended for the disposal of tailings from production. It was inactive (did not receive tailings), did not have the presence of a lake and there was no other type of

operational activity in progress. At that time, the project to deface the dam was under development. The mines in the Paraopeba Complex are brownfield projects, the entire complex follows Brazilian environmental legislation, with its environmental impacts and environmental management studies. In addition, in 2021 Vale produced 22.975 thousand metric tons of iron ore in the Paraopeba Complex.

Mining project ID
Project 6

Name
Brucutu Água Limpa Complex

Share (%)
100

Country/Area
Brazil

Latitude
-19.946214

Longitude
-43.383113

Project stage
Production

Mining method
Open-cut

Raw material(s)
Iron ore

Year extraction started/is planned to start
2006

Year of closure
2040

Description of project
The Brucutu Água Limpa Complex is formed by the Brucutu mine, located in the municipality of São Gonçalo do Rio Abaixo, and Água Limpa mine, located in the municipalities of Rio Piracicaba and Santa Bárbara, in Minas Gerais. The Complex's annual production capacity is around 38 million tons of iron ore. Production is transported by the Vitória-Minas Railway, which takes the ore to the Port of Tubarão, from where ships leave for customers from different countries. The Brucutu mine is the first mine in Vale and Brazil to have the transport of large trucks (off-road) 100% autonomous, that is, without the need for operators. In the territory of the Brucutu Água Limpa Complex, we have important areas of environmental preservation that we help to protect. There are three Private Natural Heritage Reserves, with a total area of 334.79 hectares. The mines of the Brucutu Água Limpa Complex are brownfield projects and the entire complex follows Brazilian environmental legislation, at the federal, state and municipal levels. All mines have their impact and environmental management studies, to mitigate and offset the impact generated on biodiversity. And there are no urban centers near the Brucutu mine. In addition, in 2021 Vale produced 19.306 thousand metric tons of iron ore in the Brucutu Complex.

Mining project ID
Project 7

Name
PTVI – PT Vale Indonesia

Share (%)
44.3

Country/Area
Indonesia

Latitude
-2.56812

Longitude
121.389641

Project stage
Production

Mining method
Open-cut

Raw material(s)
Nickel

Year extraction started/is planned to start
1968

Year of closure
2045

Description of project
The operation is under the legal framework of Contract of Work which was amended on October 17th, 2014, and is valid until December 28th, 2025 with a concession area of 118,017 hectares covering South Sulawesi (70,566 hectares), Central Sulawesi (22,699 hectares) and Southeast Sulawesi (24,752 hectares). The Company mines laterite nickel ore and processes it into the final product of nickel in matte. The average volume of nickel production per year reaches 75,000 tons. In producing nickel in the Sorowako Block, it is used pyro metallurgical technology (in melting the laterite nickel ore). The nickel product is exported entirely to Vale Canada Limited and Sumitomo Metal Mining in a long-term special contract agreed upon by the two companies. The Company also continues its plan to construct a nickel processing plant and its facilities in Sambalagi, Morowali Regency, Central Sulawesi and Pomalaa, Kolaka Regency, Southeast Sulawesi. The project in Bahodopi is to build a smelter to process saprolite nickel ore and produce ferronickel, the main material for stainless steel making. In Pomalaa, the project is to build a processing facility with HPAL (High-Pressure Acid

Leaching) technology to process limonite ore and produce an intermediate product that can be further processing into material for Electric Vehicles (“EV”) battery.

F-MM9.2/F-CO9.2

(F-MM9.2/F-CO9.2) Can you disclose the mining project area and the area of land disturbed for each of your mining projects?

	Disclosing mining project area and area of land disturbed?	Comment
Row 1	Yes	The corporate area monitors the area of land disturbed for each of Vale's mining sites on an annual basis by reporting the impacted area indicator related to GRI indicator 304-1, which can be followed in our Integrated Report. All mining projects undergo a complete environmental impact study that analyses the full extent of the impact on fauna and flora. The impacts are also reported annually related to the GRI 304-2 indicator.

F-MM9.2a/F-CO9.2a

(F-MM9.2a/F-CO9.2a) Provide details on the mining project area and the area of land disturbed for each of your mining projects.

Mining project ID
Project 1

Total area of owned land/lease/concession (hectares)
75584.95

Total area disturbed to date (hectares)
10909.26

Area disturbed in the reporting year (hectares)
173.51

Type(s) of habitat disturbed in the reporting year
Modified habitat
Natural habitat

Comment
The calculation of the area affected by each Vale operation is reported annually by the operational areas directly to the Sustainability Directorate and is stored for information management, in a GIS tool. All these data and information are calculated and reported annually against the GRI indicators in the Integrated Report, referring to biodiversity data (specifically MM1). The area interfered in the reported year was calculated from the difference between the values reported in 2021 and 2020. This GIS platform also houses information about Vale's properties in its various areas of activity. The total area disturbed to date brings modified and natural habitats, with forest and field formation.

Mining project ID
Project 2

Total area of owned land/lease/concession (hectares)
20626.8

Total area disturbed to date (hectares)
5742.5

Area disturbed in the reporting year (hectares)
20.5

Type(s) of habitat disturbed in the reporting year
Modified habitat
Natural habitat

Comment
The calculation of the area affected by each Vale operation is reported annually by the operational areas directly to the Sustainability Directorate - Executive Management of Corporate Environmental Management in forms and is stored for information management, in a GIS tool. All these data and information are calculated and reported annually against the GRI indicators in the Sustainability Report, referring to biodiversity data (specifically MM1). The area interfered in the reported year was calculated from the difference between the values reported in 2021 and 2020. This GIS platform also houses information about Vale's properties in its various areas of activity. The total area disturbed to date brings modified and natural habitats, with forest and field formation.

Mining project ID
Project 3

Total area of owned land/lease/concession (hectares)
28597.21

Total area disturbed to date (hectares)
3721.14

Area disturbed in the reporting year (hectares)
112.66

Type(s) of habitat disturbed in the reporting year
Modified habitat
Natural habitat

Comment
The calculation of the area affected by each Vale operation is reported annually by the operational areas directly to the Sustainability Directorate - Executive Management

of Corporate Environmental Management in forms and is stored for information management, in a GIS tool. All these data and information are calculated and reported annually against the GRI indicators in the Sustainability Report, referring to biodiversity data (specifically MM1). The area interfered in the reported year was calculated from the difference between the values reported in 2021 and 2020.This GIS platform also houses information about Vale's properties in its various areas of activity. The total area disturbed to date brings modified and natural habitats, with forest and field formation.

Mining project ID
Project 4

Total area of owned land/lease/concession (hectares)
23714.64

Total area disturbed to date (hectares)
4513.71

Area disturbed in the reporting year (hectares)
20.47

Type(s) of habitat disturbed in the reporting year
Modified habitat
Natural habitat

Comment
The calculation of the area affected by each Vale operation is reported annually by the operational areas directly to the Sustainability Directorate - Executive Management of Corporate Environmental Management in forms and is stored for information management, in a GIS tool. All these data and information are calculated and reported annually against the GRI indicators in the Sustainability Report, referring to biodiversity data (specifically MM1). The area interfered in the reported year was calculated from the difference between the values reported in 2020 and 2021. This GIS platform also houses information about Vale's properties in its various areas of activity.

Mining project ID
Project 5

Total area of owned land/lease/concession (hectares)
24051.78

Total area disturbed to date (hectares)
4784.33

Area disturbed in the reporting year (hectares)
14

Type(s) of habitat disturbed in the reporting year
Modified habitat

Comment
The calculation of the area affected by each Vale operation is reported annually by the operational areas directly to the Sustainability Directorate - Executive Management of Corporate Environmental Management in forms and is stored for information management, in a GIS tool. All these data and information are calculated and reported annually against the GRI indicators in the Sustainability Report, referring to biodiversity data (specifically MM1). The area interfered in the reported year was calculated from the difference between the values reported in 2021 and 2020. This GIS platform also houses information about Vale's properties in its various areas of activity. The total area disturbed to date brings modified and natural habitats, with forest and field formation.

Mining project ID
Project 6

Total area of owned land/lease/concession (hectares)
13444.63

Total area disturbed to date (hectares)
3662.53

Area disturbed in the reporting year (hectares)
184.04

Type(s) of habitat disturbed in the reporting year
Modified habitat
Natural habitat

Comment
The calculation of the area affected by each Vale operation is reported annually by the operational areas directly to the Sustainability Directorate - Executive Management of Corporate Environmental Management in forms and is stored for information management, in a GIS tool. All these data and information are calculated and reported annually against the GRI indicators in the Sustainability Report, referring to biodiversity data (specifically MM1). The area interfered in the reported year was calculated from the difference between the values reported in 2021 and 2020. This GIS platform also houses information about Vale's properties in its various areas of activity. The total area disturbed to date brings modified and natural habitats, with forest and field formation.

Mining project ID
Project 7

Total area of owned land/lease/concession (hectares)
118.01

Total area disturbed to date (hectares)
6766.8

Area disturbed in the reporting year (hectares)
261.1

Type(s) of habitat disturbed in the reporting year
Natural habitat

Comment
By 2021 PTVI opened natural forests and post-mined areas have been reclaimed and the re-disturbance of the reclaimed area is required to dispose of overburden from mining activities. The calculation of the area affected by each Vale operation is reported annually by the operational areas directly to the Sustainability Directorate - Executive Management of Corporate Environmental Management in forms and is stored for information management, in a GIS tool. All these data and information are calculated and reported annually against the GRI indicators in the Sustainability Report, referring to biodiversity data (specifically MM1). This GIS platform also houses information about Vale's properties in its various areas of activity.

F-MM9.3/F-CO9.3

(F-MM9.3/F-CO9.3) Are any of your mining projects located in or near legally protected and internationally recognized areas?

	Are any of your projects in or near?	Comment
Legally protected area(s)	Yes	Part of the area of the Carajás Complex is inserted in the Carajás National Forest, which is a conservation unit of sustainable use according to Brazilian legislation and the creation decree allows anthropic activities, among them mining. This protected area corresponds to IUCN category VI. Vale's operations impact less than 2,5% of the area. Along with our operations located in the Iron Quadrangle - Minas Gerais state/Brazil (Paraopebas, Vargem Grande and Mariana Complex), which has interference in the Southern Environmental Protection Area - APA Sul, also a sustainable use conservation unit (IUCN Category V), and the creation decree allows anthropic activities, among them mining. Protected Areas near or adjacent to our operations are mostly composed of conservation units owned by Vale (Private Reserves of Natural Heritage - IUCN Category IV - already established and some still in the process of being created) purposely located near our operational units to ensure their effective management, in addition to conservation units created and supported by Vale - such as Campos Ferruginosos National Park (IUCN Category II) created in the scope of the licensing of the S11D Eliezer Batista Complex. It is important to make clear that we consider adjacent Protected Areas located within a 10 km buffer from the operations.
UNESCO World Heritage sites	No	In 2021, Vale publicly committed not to operate on UNESCO World Natural Heritage sites. The Vale Nature Reserve (RNV), a protected area owned by the company for the conservation of 23,000 ha of remnants of the Atlantic Forest; as well as the Reserve (REBio) of Sooretama, an area that Vale protects in partnership with ICMBio, are part of the World Natural Heritage Site Reserves of the Atlantic Forest Discovery Coast, also being a Key Biodiversity Area.
UNESCO Biosphere Reserves	Yes	Our operations located in the Iron Quadrangle - Minas Gerais state/Brazil (Paraopebas, Vargem Grande and Mariana Complex) have interference in the Espinhaço Range Biosphere Reserve.
Ramsar sites	No	
Key Biodiversity Area(s)	Yes	Part of the area of the Carajás Complex is inserted in the Carajás National Forest and this area is in the overlapping territory of the layers of the Key Biodiversity Area. The Mariana complex and PTVI have portions overlapping KBAs.

F-MM9.3a/F-CO9.3a

(F-MM9.3a/F-CO9.3a) Provide details on mining projects that are in or near legally protected and internationally recognized areas.

Mining project ID
Project 1

Type of legally protected/ internationally recognized area
Legally protected area

Protected area category (IUCN classification)
Category IV- VI

Name of area
Carajás National Forest

Proximity
Overlap

Area of overlap (hectares)
9000

Please explain
The Carajás National Forest (FLONA) is one of the largest blocks of native vegetation in southeast Pará. Created by Decree No. 2.486 on February 2, 1998, with a total area of approximately 400,000 hectares, covering the municipalities of Parauapebas, Canaã dos Carajás and Água Azul do Norte, it is managed by the Chico Mendes Institute for Biodiversity Conservation (ICMBio), with Vale's support. The region is known for its great mineral wealth and high biodiversity value. Besides being a protected area, it is recognized as a Key Biodiversity Area. Scientific research, conservation, inspection and education activities are carried out in this area with Vale's support. The National Forest creation decree allows mining activity and brings the possibility of partnerships for the conservation of the area. The calculation of the area affected by each Vale operation is reported annually by the operational areas directly to the Sustainability Directorate - Executive Management of Corporate Environmental Management in forms and is stored for information management, in a GIS tool. All these data and information are calculated and reported annually against the GRI indicators in the Sustainability Report, referring to biodiversity data (specifically MM1). This GIS platform also houses information about Vale's properties in its various areas of activity.

Mining project ID
Project 2

Type of legally protected/ internationally recognized area
Legally protected area

Protected area category (IUCN classification)
Category Ia-III

Name of area
Água Santa Municipal Park

Proximity
Up to 10 km

Area of overlap (hectares)
<Not Applicable>

Please explain
There are some conservation units closer to the project area, with respective 10 km radii representing the buffer zones. Part of the Itabira Complex is located in the buffer zone of the Municipal Park Água Santa. The park has 1.2ha of green area in the center of the city of Itabira. In it is the Poço da Água Santa (Holy Water Well), a place of great scenic beauty and historical value. In addition, this well is famous for its thermal waters that spring from rock fractures or geological faults of great depths.

Mining project ID
Project 2

Type of legally protected/ internationally recognized area
Legally protected area

Protected area category (IUCN classification)
Category Ia-III

Name of area
Intelecto Municipal Park

Proximity
Adjacent

Area of overlap (hectares)
<Not Applicable>

Please explain
The Intelecto Municipal Natural Park was created on December 27, 1991, by Municipal Law No. 2.770, called at that time Parque Municipal do Campestre. In an area of 21.6 hectares, in 2003 by Municipal Decree No. 1,851 the green area called Pico do Amor was incorporated. In 2006 Municipal Law Nº 4.105 changed the name from Campestre Municipal Park to Intelecto Municipal Natural Park, reiterating the incorporation of the green area of the Pico do Amor, increasing its size to 35.13 hectares. The Intelecto Municipal Park presents the remaining vegetation of the Atlantic Forest, it has forest remnants, with diversified flora, including specimens of Jatobá, Cedar, Vinhático, Sapucaia, Juçaras, Braúnas, among others. As in the past, the area was part of a farm, we also find exotic species, mainly fruit trees. Located in Itabira city, it also provides leisure areas for the community, with trails, kiosks, and a playground. In addition, this Park has a Management Plan. This is a technical document, which establishes zoning and the rules that should preside over the use of the area and the management of natural resources, including the implementation of the physical structures necessary for the management of the unit.

Mining project ID
Project 2

Type of legally protected/ internationally recognized area
Legally protected area

Protected area category (IUCN classification)
Category Ia-III

Name of area
Ribeirão São José Municipal Park

Proximity
Up to 5 km

Area of overlap (hectares)
<Not Applicable>

Please explain
The Ribeirão São José Municipal Natural Park was created by law Nº 3465, of DECEMBER 10, 1998. On July 16, 2003, Law 3779 was approved, which changed the name of the Municipal Park to Municipal Natural Park of Ribeirão São José. The UC has an area of 74.33 hectares. The basic objective of the UC is to preserve natural ecosystems of great ecological relevance and scenic beauty, enabling scientific research, the development of environmental education and interpretation activities, as well as recreation in contact with nature and ecological tourism. The Park is located in the place called Ribeirão São José, located more than 8km from the Cauê mine.

Mining project ID
Project 2

Type of legally protected/ internationally recognized area
Legally protected area

Protected area category (IUCN classification)
Category Ia-III

Name of area
Mata Do Bispo Municipal Biological Reserv

Proximity
Up to 5 km

Area of overlap (hectares)
<Not Applicable>

Please explain
Initially, the conservation unit was created as Mata do Bispo Municipal Park through Law No. 3466 of December 10, 1998. Later, on July 16, 2003, through Law No. 3783, the category of Conservation Unit was changed from Municipal Park to Municipal Biological Reserve of Mata do Bispo, because of the existing natural attributes, especially concerning forest formation typical of the Atlantic Forest and water resources to be preserved. This law also rectified the area to 691.8750 hectares. In November 2003, Law nº 3794 was approved, which revised some points of the descriptive memorial of the Conservation Unit. The area is a Conservation Unit (UC) of Integral Protection, located northeast of the municipality of Itabira-MG in the region of Ribeirão São José, and it is located more than 6km from the Cauê mine. This area has the objective of the

integral preservation of the biota and other natural attributes existing in its limits, without direct human interference or environmental modifications, except for the measures of recovery of its altered ecosystems and the management actions necessary to recover and preserve the natural balance, biological diversity and natural ecological processes.

Mining project ID
Project 3

Type of legally protected/ internationally recognized area
UNESCO Biosphere Reserves

Protected area category (IUCN classification)
<Not Applicable>

Name of area
Espinhaço Range Biosphere Reserve

Proximity
Overlap

Area of overlap (hectares)
3721.14

Please explain
The Serra do Espinhaço Biosphere Reserve extends in the North-South direction, over a length of approximately 1,200 km, from the Belo Horizonte Region to the northern border of Bahia with the states of Pernambuco and Piauí, its width varying from a few kilometers to over 100 km. It constitutes a set of territories of high relevance for biodiversity conservation, encompassing protected areas, ecological corridors and watersheds, with the main objective of combining environmental conservation and sustainable human development. The Iron Quadrangle is the southern continuation of the Espinhaço Range, located in the southern portion of the Biosphere Reserve. Thus, all the mineral complexes located in this region of Minas Gerais are within the Biosphere Reserve and are part of the process of building sustainable development allied with biodiversity conservation. Our operations bring impacts but also contribute to the conservation of an area approximately three times larger than the area occupied by the mines and associated structures in this region. To calculate the overlap area, the total area disturbed to date by the complex reported in question 9.2a was considered.

Mining project ID
Project 3

Type of legally protected/ internationally recognized area
Key Biodiversity Area

Protected area category (IUCN classification)
<Not Applicable>

Name of area
Ouro Preto/Mariana

Proximity
Overlap

Area of overlap (hectares)

Please explain
This area encompasses an expressive set of extensive forest remnants, largely still contiguous, that cover the mountains around the cities of Mariana and Ouro Preto, at the southern limit of the Espinhaço Range. It is considered an area of extreme importance mainly because of the large remnants of the Atlantic Forest in these locals. The forests of the region, of a semideciduous character, comprise montane and riparian formations, being locally replaced by clean or dirty fields. In sectors of higher altitude, such as the Pico do Itacolomi area, there are typical rupestrian fields. Industrial-scale mining is a common activity in several sectors of the region, being an important threat to the preserved environments in the area. Our operations bring impacts but also contribute to the conservation of an area approximately three times larger than the area occupied by the mines and associated structures. Almost all the mines in the Complex are overlapping this KBA, except for the Alegria mine pit. The overlap was confirmed from IBAT and GIS tools.

Mining project ID
Project 3

Type of legally protected/ internationally recognized area
Key Biodiversity Area

Protected area category (IUCN classification)
<Not Applicable>

Name of area
Serra do Caraça

Proximity
Up to 5 km

Area of overlap (hectares)
<Not Applicable>

Please explain
The Serra do Caraça, about 120 km from Belo Horizonte, stands out in the regional landscape, this massif encloses a significant altitudinal gradient, along which different floristic formations succeed each other: montane Atlantic forest, mostly secondary, high montane forest, full of bromeliads and other epiphytes, and rupestrian fields, which are replaced by high altitude fields or blend with these on the mountain tops. In addition to the RPPN Santuário Caraça, the area includes the unprotected portions of the massif until near Brumal (Santa Bárbara), at the base of the mountain. Mining is a threat to the natural environments in the region and has caused changes in some unprotected parts of the Serra do Caraça and its immediate surroundings. Burning in the rupestrian and high altitude fields represents an additional important threat because it eliminates the native vegetation cover and opens the way for the invasion of alien plants to these peculiar environments. We help protect part of this area in our RPPNs and support fire prevention and fighting actions in the region. The area is in the surroundings of the Alegria mines, about 4 5 km away.

Mining project ID

Project 3

Type of legally protected/ internationally recognized area
Legally protected area

Protected area category (IUCN classification)
Category IV- VI

Name of area
Environmental Protection Area to the south of the Belo Horizonte Metropolitan Region

Proximity
Up to 5 km

Area of overlap (hectares)
<Not Applicable>

Please explain
The Mariana Complex is located near the Environmental Protection Area to the south of the Belo Horizonte Metropolitan Region (APA Sul RMBH), a conservation unit of sustainable use according to Brazilian legislation, belonging to category V of the IUCN. With an area of 1625.32 km², it encompasses part of the municipalities of Barão de Cocais, Belo Horizonte, Brumadinho, Caeté, Catas Altas, Ibirité, Itabirito, Mário Campos, Nova Lima, Raposos, Santa Bárbara, Sarzedo and the entire municipality of Rio Acima. Mining is a permitted activity in this category of conservation unit, being the main economic activity of the APA and was responsible for the development of population centers in the region. In addition, the objective of this area is to protect and conserve natural systems essential to biodiversity, especially the water resources necessary to supply the population of the Metropolitan Region of Belo Horizonte and adjacent areas, to improve the quality of life of the local population, protect ecosystems and sustainable development. The location of the areas about the complexes was determined by consulting the IBAT and using GIS tools.

Mining project ID
Project 3

Type of legally protected/ internationally recognized area
Legally protected area

Protected area category (IUCN classification)
Category IV- VI

Name of area
Cachoeira Das Andorinhas Environmental Protection Area

Proximity
Adjacent

Area of overlap (hectares)
<Not Applicable>

Please explain
The Mariana Complex is located nearly the Cachoeira das Andorinhas Environmental Protection Area, a conservation unit of sustainable use according to Brazilian legislation, belonging to category V of the IUCN. The area was created in 1989 and covers an area of 18.7 thousand hectares, begins on the boundary between Ouro Preto and the district of São Bartolomeu and runs north to the boundary with the municipalities of Itabirito and Santa Bárbara.

Mining project ID
Project 3

Type of legally protected/ internationally recognized area
Legally protected area

Protected area category (IUCN classification)
Category IV- VI

Name of area
Uaimii State Forest

Proximity
Adjacent

Area of overlap (hectares)
<Not Applicable>

Please explain
Created on October 21, 2003, the State Forest covers an area of 4,398 hectares in the municipality of Ouro Preto. It is a protected area of sustainable use, according to the Brazilian system of conservation units. It is the second State Forest of Minas Gerais, which is home to an important remnant of the Atlantic Forest and endemic species of flora and fauna. It is located around the Timbopeba mine, part of the Mariana Complex. It is characterized by an area with a forest cover of predominantly native species and has the objective of the sustainable multiple use of forest resources and scientific research, with emphasis on methods for sustainable exploitation of native forests. In addition, it is a model of Conservation Unit that allows public use, that is, allows public visitation conditioned to the standards established for the management of the Unit.

Mining project ID
Project 3

Type of legally protected/ internationally recognized area
Legally protected area

Protected area category (IUCN classification)
Category Ia-III

Name of area
Gandarela National Park

Proximity
Adjacent

Area of overlap (hectares)
<Not Applicable>

Please explain
The Serra do Gandarela National Park was created on October 13, 2014 and is an important environmental conservation area in the heart of the Iron Quadrangle and the southern portion of the Espinhaço Range, 40 km from Belo Horizonte/MG. The Park's vegetation is composed of continuous fragments of the Atlantic Forest in transition with cerrado formations, such as rusty and quartz fields. It is an important source of water resources, forming large aquifers and contributing to the supply of several cities, including the capital of Minas Gerais. The Park is located around the Alegria mine and close to the Timbopeba mine (>5Km), and Vale has several properties within the park, including RPPNs, contributing to the protection and regularization of land ownership.

Mining project ID
Project 4

Type of legally protected/ internationally recognized area
Legally protected area

Protected area category (IUCN classification)
Category IV- VI

Name of area
RPPNs Andaime

Proximity
Adjacent

Area of overlap (hectares)
<Not Applicable>

Please explain
Vale maintains some Private Heritage Reserves (RPPN in Portuguese) in Minas Gerais focused on environmental compensation and voluntary habitat and species conservation. The protected areas mentioned here are officially created and are part of the environmental compensation for the Vargem Grande Complexe. This protected area has 175 ha and was created in 2004 in Vale's properties, adjacent to the operations, to facilitate their management and protection.

Mining project ID
Project 4

Type of legally protected/ internationally recognized area
Legally protected area

Protected area category (IUCN classification)
Category Ia-III

Name of area
Estação Ecológica De Arêdes

Proximity
Adjacent

Area of overlap (hectares)
<Not Applicable>

Please explain
The Arêdes Ecological Station was established by Decree No. 45,397 of June 14, 2010, according to the National System of Conservation Units and is located in an area of 1,157 hectares in the municipality of Itabirito / MG. The reason for its creation is the protection of flora, fauna, water resources and also the historical archaeological heritage, as well as the development of scientific research. This protected area is located in the surroundings of the Pico mine structures in the Vargem Grande Complex.

Mining project ID
Project 4

Type of legally protected/ internationally recognized area
Legally protected area

Protected area category (IUCN classification)
Category IV- VI

Name of area
Environmental Protection Area to the south of the Belo Horizonte Metropolitan Region

Proximity
Overlap

Area of overlap (hectares)
4436

Please explain
The Vargem Grande Complex is located in an area overlapping the Environmental Protection Area to the south of the Belo Horizonte Metropolitan Region (APA Sul RMBH), a conservation unit of sustainable use according to Brazilian legislation, belonging to category V of the IUCN. With an area of 1625.32 km², it encompasses part of the municipalities of Barão de Cocais, Belo Horizonte, Brumadinho, Caeté, Catas Altas, Ibirité, Itabirito, Mário Campos, Nova Lima, Raposos, Santa Bárbara, Sarzedo and the entire municipality of Rio Acima. The APA SUL RMBH is fully inserted in the context of the Iron Quadrangle of Minas Gerais which is among the most important metallogenetic provinces of Brazil. and mining is a permitted activity in this category of conservation unit, being the main economic activity of the APA and was responsible for the development of population centers in the region.

Mining project ID
Project 4

Type of legally protected/ internationally recognized area
Legally protected area

Protected area category (IUCN classification)
Category Ia-III

Name of area
Parque Estadual Serra Do Rola Moça

Proximity
Adjacent

Area of overlap (hectares)
<Not Applicable>

Please explain
The park was created in 1994 and has an area of about 4000 ha with formations of the Atlantic Forest and Cerrado, covering areas in the municipalities of Belo Horizonte, Brumadinho, Nova Lima and Ibirité. It is an integral protection conservation unit according to the Brazilian legislation, belonging to category II of the IUCN.

Mining project ID
Project 4

Type of legally protected/ internationally recognized area
Legally protected area

Protected area category (IUCN classification)
Category Ia-III

Name of area
Estação Ecológica De Fechos

Proximity
Adjacent

Area of overlap (hectares)
<Not Applicable>

Please explain
The Fechos Ecological Station (EEF) was created in 1994, is considered category Ia by the IUCN and covers an area of 554 hectares, located in the municipality of Nova Lima. It was created to protect the water source in the basin of the ribeirão dos Fechos and the existing natural environments, composed mainly of forests.

Mining project ID
Project 5

Type of legally protected/ internationally recognized area
Legally protected area

Protected area category (IUCN classification)
Category Ia-III

Name of area
Estação Ecológica De Fechos

Proximity
Adjacent

Area of overlap (hectares)
<Not Applicable>

Please explain
The Fechos Ecological Station (EEF) was created in 1994, is considered category Ia by the IUCN and covers an area of 554 hectares, located in the municipality of Nova Lima. It was created to protect the water source in the basin of the Ribeirão dos Fechos and the existing natural environments, composed mainly of forests. Its waters supply about 280,000 people in the Metropolitan Region of Belo Horizonte (RMBH), on the southern axis. The Fechos basin became even more important for RMBH after the Brumadinho dam rupture, which compromised the Paraopeba River, the second most important for the region. The location of the areas about the complexes was determined by consulting the IBAT and using GIS tools.

Mining project ID
Project 5

Type of legally protected/ internationally recognized area
Legally protected area

Protected area category (IUCN classification)
Category IV- VI

Name of area
Environmental Protection Area to the south of the Belo Horizonte Metropolitan Region

Proximity
Overlap

Area of overlap (hectares)
1400

Please explain
The Paraopeba Complex is located in an area overlapping the Environmental Protection Area to the south of the Belo Horizonte Metropolitan Region (APA Sul RMBH), a conservation unit of sustainable use according to Brazilian legislation, belonging to category V of the IUCN. With an area of 1625.32 km², it encompasses part of the municipalities of Barão de Cocais, Belo Horizonte, Brumadinho, Caeté, Catas Altas, Ibirité, Itabirito, Mário Campos, Nova Lima, Raposos, Santa Bárbara, Sarzedo and the entire municipality of Rio Acima. The APA SUL RMBH is fully inserted in the context of the Iron Quadrangle of Minas Gerais which is among the most important metallogenetic provinces of Brazil. and mining is a permitted activity in this category of conservation unit, being the main economic activity of the APA and was responsible for the development of population centers in the region. The location of the areas about the complexes was determined by consulting the IBAT and using GIS tools.

Mining project ID
Project 5

Type of legally protected/ internationally recognized area
Legally protected area

Protected area category (IUCN classification)
Category Ia-III

Name of area
Parque Estadual Serra Do Rola Moça

Proximity
Adjacent

Area of overlap (hectares)
<Not Applicable>

Please explain
The park was created in 1994 and has an area of about 4000 ha with formations of the Atlantic Forest and Cerrado, covering areas in the municipalities of Belo Horizonte, Brumadinho, Nova Lima and Ibirité. It is an integral protection conservation unit according to the Brazilian legislation, belonging to category II of the IUCN. The site has several springs that supply the Metropolitan Region of Belo Horizonte, in addition to a rich diversity of fauna, with endangered species, such as the brown jaguar, ocelot, maned wolf, the wild cat, the macuco and the deer. Located in the transition zone between the Cerrado and the Atlantic Forest, the park houses rare species such as orchid, bromeliad, candeia, jacarandá, cedar, jequitibá, arnica and the ema cinnamon, which has become the symbol of the Park. The location of the areas about the complexes was determined by consulting the IBAT and using GIS tools.

Mining project ID
Project 6

Type of legally protected/ internationally recognized area
Legally protected area

Protected area category (IUCN classification)
Category IV- VI

Name of area
Private Natural Heritage Reserve - Lending Peti Reserve

Proximity
Adjacent

Area of overlap (hectares)
<Not Applicable>

Please explain
This area is a Conservation Unit, registered at the federal level and belongs to the category of Private Natural Heritage Reserve. It was created through Ordinance No. 99, of September 3, 2001, of the Brazilian Institute for the Environment and Renewable Natural Resources. The property belongs to Vale and has 96.42 hectares. The distance between this area and the Brucutu mine belonging to the Brucutu Água Limpa Complex was calculated by a GIS tool. This protected area is characterized by semideciduous seasonal forest and is continuous with the Peti Environmental Station, forming an important ecological corridor for the fauna in a transition area between the Atlantic Forest and the Cerrado.

Mining project ID
Project 6

Type of legally protected/ internationally recognized area
Legally protected area

Protected area category (IUCN classification)
Category IV- VI

Name of area
Private Natural Heritage Reserve - Itajurú or Sobrado

Proximity
Up to 10 km

Area of overlap (hectares)
<Not Applicable>

Please explain
This area is a Conservation Unit, registered at the federal level and belongs to the category of Private Natural Heritage Reserve. It was created through Ordinance No. 102, of August 9, 2002, of the Brazilian Institute for the Environment and Renewable Natural Resources. The property belongs to Vale and has 43.06 hectares. The distance between this area and the Brucutu mine belonging to the Brucutu Água Limpa Complex was calculated by a GIS tool.

Mining project ID
Project 6

Type of legally protected/ internationally recognized area
Legally protected area

Protected area category (IUCN classification)
Category IV- VI

Name of area
Environmental Protection Area to the south of the Belo Horizonte Metropolitan Region

Proximity

Up to 10 km

Area of overlap (hectares)
<Not Applicable>

Please explain
The Brucutu/Água Limpa Complex is located nearly the Environmental Protection Area to the south of the Belo Horizonte Metropolitan Region (APA Sul RMBH), about 10 km away from Brucutu mine. This is a conservation unit of sustainable use according to Brazilian legislation, belonging to category V of the IUCN. With an area of 1625.32 km², it encompasses part of the municipalities of Barão de Cocais, Belo Horizonte, Brumadinho, Caeté, Catas Altas, Ibirité, Itabirito, Mário Campos, Nova Lima, Raposos, Santa Bárbara, Sarzedo and the entire municipality of Rio Acima. Mining is a permitted activity in this category of conservation unit, being the main economic activity of the APA and was responsible for the development of population centers in the region.

Mining project ID
Project 7

Type of legally protected/ internationally recognized area
Key Biodiversity Area

Protected area category (IUCN classification)
<Not Applicable>

Name of area
KBA Feruhumpenai - Matano

Proximity
Overlap

Area of overlap (hectares)

Please explain
Part of the mine area overlaps with KBA Feruhumpenai - Matano and the operation is adjacent (<5Km) to Danau Matano, a Nature Recreation Park, IUCN Category V. We use IBAT to check overlap. We don't have the shapes of the KBAs, so it is not possible to calculate the overlap area.

Mining project ID
Project 7

Type of legally protected/ internationally recognized area
Legally protected area

Protected area category (IUCN classification)
Category IV- VI

Name of area
Danau Matano Nature Recreation Park

Proximity
Adjacent

Area of overlap (hectares)
<Not Applicable>

Please explain
Part of the mine area overlaps with KBA Feruhumpenai - Matano and the operation is adjacent (<5Km) to Danau Matano, a Nature Recreation Park, IUCN Category V. PT Vale's mining operation areas are based on Contracts of Work with the Government of Indonesia, as amended in 2014. 41,822.95 ha or 59% of the total Sorowako operation area of 70,894 ha is adjacent to a protected forest.

Mining project ID
Project 2

Type of legally protected/ internationally recognized area
Legally protected area

Protected area category (IUCN classification)
Category IV- VI

Name of area
Área De Proteção Ambiental Municipal (APAM) Santo Antônio

Proximity
Overlap

Area of overlap (hectares)
600

Please explain
The APAM Santo Antônio has a surface area of 63,517 ha and it is located in the western part of the municipality of Itabira, which corresponds to the watershed of the Tanque river. It aims to ensure a balance between human actions and the conservation of the region's watersheds. The overlap was calculated from GIS tools.

Mining project ID
Project 2

Type of legally protected/ internationally recognized area
Legally protected area

Protected area category (IUCN classification)
Category IV- VI

Name of area

Área De Proteção Ambiental Municipa (APAM) Piracicaba

Proximity
Overlap

Area of overlap (hectares)
2400

Please explain
The APAM Piracicaba has an area of 38,034 ha and it is located in the western part of the municipality of Itabira, which corresponds to the watershed of the Rio do Peixe and tributaries of the Rio Santa Barbara. It is an area in general extensive, with a certain degree of human occupation, endowed with abiotic, biotic, esthetic or cultural attributes especially important for the quality of life and well-being of human populations, and has as basic objectives to protect the biological diversity, discipline the occupation process and assure the sustainability of the use of natural resources. The overlap was calculated from GIS tools.

Mining project ID
Project 1

Type of legally protected/ internationally recognized area
Legally protected area

Protected area category (IUCN classification)
Category Ia-III

Name of area
Campos Ferruginosos National Park

Proximity
Adjacent

Area of overlap (hectares)
<Not Applicable>

Please explain
The Campos Ferruginosos National Park is an integral protection conservation unit created by the Presidential Decree of June 5, 2017. The creation of the park was the result of a partnership between Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio) and Vale, meeting one of the specific conditions of the license granted by Ibama to Vale to operate the S11D Mine. It is located between the Pará cities of Canaã dos Carajás and Parauapebas, in the southeast of the state. The park is formed mostly by portions of land of the Carajás National Forest - Flona Carajás and adjacent areas in the Bocaina Mountains. The creation of this park aimed at the biological diversity protecting of the Bocaina and Tarzan Mountains, as well as guaranteeing the continuity of ecosystem services, ensuring the protection of the speleological heritage of ferruginous formation, the vegetation of rustic rupestrian fields, contributing to the environmental stability of the region.

Mining project ID
Project 1

Type of legally protected/ internationally recognized area
Legally protected area

Protected area category (IUCN classification)
Category Ia-III

Name of area
Tapirapé Biological Reserve

Proximity
Up to 10 km

Area of overlap (hectares)
<Not Applicable>

Please explain
The Tapirapé Biological Reserve was created by Decree no. 97,719 on May 5, 1989, with an area of 103.000 ha and it is located in the southeast of the state of Pará, in the municipality of Marabá. The Tapirapé River, an important tributary of the left bank of the Itacaiunas River, gave rise to the name of the Reserve. The River has its source in the far west of the UC and runs all its northern boundary until it unwatering in Itacaiunas. At the time of its creation Vale was installed in the region where today is the Carajás National Forest, neighboring the Tapirapé Biological Reserve, mainly exploring iron. This area aims to protect samples of Amazonian ecosystems, especially the region of the chestnut trees. Safeguard the exceptional attributes of nature, reconciling the integral protection of flora, fauna and natural beauties, with the use for educational and scientific purposes.

Mining project ID
Project 1

Type of legally protected/ internationally recognized area
Legally protected area

Protected area category (IUCN classification)
Category IV- VI

Name of area
Tapirapé-Aquiri National Forest

Proximity
Up to 25 km

Area of overlap (hectares)
<Not Applicable>

Please explain
The Tapirapé-Aquiriri National Forest was created through Decree no. 97,720 of May 5, 1989, with an official area of 190,000 hectares in the municipalities of Marabá, for the most part, and São Félix do Xingu in the state of Pará. It is a conservation unit of federal instantiation, which has an advisory board, created through the Ordinance on April 21, 2005, whose purpose is to contribute to the actions aimed at the planning and development of the UC, mainly with regard to the implementation of its management

plan and the fulfillment of its creation objectives.

Mining project ID
Project 1

Type of legally protected/ internationally recognized area
Legally protected area

Protected area category (IUCN classification)
Category IV- VI

Name of area
Itacaiúnas National Forest

Proximity
Up to 50 km

Area of overlap (hectares)
<Not Applicable>

Please explain
It was created by Decree No. 2,480 of 02/02/1998, it presents about 71% of Open Ombrófila Forest and just over 28% of Dense Mbrófila Forest, inserted in the municipalities of Marabá. It has an area of 141,400 ha and aims at the sustainable multiple uses of forest resources and scientific research, with emphasis on methods for sustainable exploitation of native forests. In addition, this area forms jointly with the National Forests of Carajás and Tairapé - Aquiri a complex of forest areas in the union domain of 743,348 thousand hectares.

Mining project ID
Project 1

Type of legally protected/ internationally recognized area
Legally protected area

Protected area category (IUCN classification)
Category IV- VI

Name of area
APA Igarapé Gelado

Proximity
Overlap

Area of overlap (hectares)
1200

Please explain
The APA is located within the perimeter delimited by the Ministry of the Environment as a high priority area for conservation. This UC is part of the Carajás Mosaic and has an area of 23,285ha. The unit is inserted in the context of the Mineral Province of Carajás and, despite not having the practice of mining, has different types of ores, detected due to mining research in the locality, whose authorizations prevail to this day. In addition, there are two mining tailings dams in its interior (Gelado Dam and Geladinho Dam) and its locality is close to the mining project of Ferro Carajás from Vale in southeastern Pará. The participation of Fundação Vale is very remarkable in this APA because it operates on topics involving: education, generation of work and income, health and complementary topics. The latter include Culture, Sport, Promotion and Social Protection. In addition, this area has a Management Plan, approved by Ordinance ICMBio No. 58, of May 30, 2016, and it was created to ensure the protection of natural resources, experiencing binomial production and preservation, in a sustained way.

Mining project ID
Project 1

Type of legally protected/ internationally recognized area
Legally protected area

Protected area category (IUCN classification)
Please select

Name of area
Xikrin do Cateté Indian Reserve

Proximity
Up to 25 km

Area of overlap (hectares)
<Not Applicable>

Please explain
The area of the Xikrin of cateté is bathed by the Itacaiúnas and Cateté rivers and is located on firm land of tropical forest called in this region of vine forest, within the jurisdiction of the municipality of Parauapebas, but closer to the urban nucleus of Carajás. The Reserve has an area of 439,000 ha and a population of 1183.

F-MM9.4/F-CO9.4

(F-MM9.4/F-CO9.4) Are there artisanal and small-scale mining (ASM) operations active in your mining concessions or in their area of influence?
Data not available

F-MM9.5/F-CO9.5

(F-MM9.5/F-CO9.5) Have biodiversity-related issues led to detrimental impact(s) on your business in the reporting year?

	Biodiversity-related issues led to detrimental impacts on the business?	Comment
Row 1	No	

F-MM9.6/F-CO9.6

(F-MM9.6/F-CO9.6) In the reporting year, was your organization subject to any fines, enforcement orders, and/or other penalties for violation of biodiversity-related regulation?

	Any penalties for violation of biodiversity-related regulation?	Comment
Row 1	Yes	In alignment with the Dow Jones Sustainability Index (DJSI), we consider significant fines as those greater than USD 10,000.

F-MM9.6a/F-CO9.6a

(F-MM9.6a/F-CO9.6a) Provide details for all significant fines, enforcement orders and/or other penalties for biodiversity-related regulatory violations in the reporting year, and your plans for resolving them.

Mining project ID
Project 6

Type of penalty
Fine

Financial value of penalty
1803054.82

Type of incident
Other, please specify (Stop giving economic use to forest products obtained from the suppression of duly authorized native vegetation)

Please explain
Infringement notice was drawn up in the face of the company due to the alleged practice of "failing to give economic use to the products and by-products of the native flora whose exploitation has been previously authorized or licensed by the agency Competent." The company has filed an administrative defense against the Notice of Infraction and awaits its trial by the environmental agency.

Mining project ID
Project 3

Type of penalty
Fine

Financial value of penalty
724403.31

Type of incident
Unauthorized deforestation

Please explain
Infringement Notice about the alleged suppression of vegetation not authorized by the competent authority, as well as for "non-complying with or complying outside the conditional period approved in environmental licenses, including environmental control plans, mitigating measures, monitoring, or equivalent". The company has filed an administrative defense against the Notice of Infraction and awaits its trial by the environmental agency.

F10 Procedures

F-MM10.1/F-CO10.1

(F-MM10.1/F-CO10.1) Have biodiversity impacts and risks of your mining projects been assessed before the project development stage?

	Biodiversity impacts and risks assessed before the project development stage?	Please explain
Row 1	Yes, in all cases	In the risk and impact management, specific diagnoses are prepared, from planning entries into new territories up to project completion, seeking to evaluate possible interferences in natural heritage areas, protected areas, as well as sensitive habitats and species. In the initial stages of planning projects, we have the best opportunities to avoid and reduce impacts. All operational expansions and new projects are preceded by environmental impact studies according to the rules and regulations of each country and region in which they operate. This process is part of the principles established in our sustainability policy, which is focused on mapping and managing impacts and risks. Even though Vale always seeks the best technologies and methods that allow less interference in natural resources, our operations directly or indirectly impact natural habitats and the associated biota, mainly due to changes in land use and vegetation cover, as well as the environment's physical characteristics. These impacts result in vegetation suppression and other environmental changes that generate habitat loss and alteration for flora and fauna species. In 2019, Vale prepared a normative standard containing guidelines and processes for biodiversity management, focused on all stages of the life cycle, from project planning to post-closing, published in early 2020. The document reflects the company's commitments focused on risk and impact management, aligned with Vale's long-term objective to neutralize impacts aiming to reduce significant biodiversity loss. According to the guidelines and processes, projects have two types of environmental assessment before the development stage. First, a Preliminary Socio-Environmental Assessment is carried out and then Environmental Impact Studies that assess all the local biodiversity. The use of the Impact Mitigation Hierarchy occurs through an impact management approach that must be applied sequentially to anticipate and avoid, where the prevention of impacts is not possible, to minimize; if impacts occur, recover/restore; and where those taught remain to some extent, compensate. The focus of this approach is a less net loss of biodiversity, mitigating risks and impacts. Then, socio-environmental studies are conducted to evaluate the impacts and propose actions to reduce, control, mitigate, recover and compensate.

F-MM10.1a/F-CO10.1a

(F-MM10.1a/F-CO10.1a) Select the options that best describe your procedures for identifying and assessing biodiversity-related impacts and risks.

Mining project ID
Project 1

Type of assessment
Full-scale environmental and social impact assessment

Impacts considered
Direct impacts
Indirect impacts

Scope defined by
Governmental agency requirements
Company own standards and/or policies

Methods and tools
Desk-based research
Field surveys
Landscape-scale field surveys
Expert consultation
Stakeholder consultation/analysis
IBAT for Business
National specific tools and databases

Aspects considered
Locational alternatives
Threatened species
Migratory species
Endemic species
Protected areas
Critical habitats
Natural habitats
Ecosystem services

Baseline biodiversity data available?
Yes

Is the Environmental Impact Statement publicly available?
Yes

Please explain
Vale adopts this risk procedure through its internal policy entitled "Guidelines and Processes for Biodiversity Management". This policy covers all of Vale's operations in Brazilian territory. These guidelines are used because they are based on legal requirements and international good practices that govern performance standards for investments, in line with the Sustainability Policy and Vale's long-term strategic objective of achieving a neutral impact on biodiversity. In addition, all Vale mining projects have environmental impact studies. For the analysis of risks and impacts related to biodiversity, Vale has the following procedures: I) Expert consultation - Vale hires a company that has the necessary experience to carry out the environmental impact study. Through this expertise, a very detailed study of the region is carried out. II) National specific tools and databases - All available databases related to the region's biodiversity are checked. An important step for crossing data with field research. III) Desk-based research - A bibliographic survey is carried out regarding local biodiversity to understand records and descriptions of fauna and flora. IV) Field surveys - Field expeditions are scheduled before (baseline) and during the implementation and operation (monitoring) of the project to ascertain abiotic and mainly biotic aspects. V) Stakeholder consultation/analysis - From the beginning of the project until the end, the competent environmental agencies are consulted, as well as the company contracted for the study. Essential procedure to check if the environmental conditions are being fulfilled. Data on the main stakeholders are collected with the community relations teams in the territories, and for some studies interviews are included with those considered a priority, within the socioeconomic studies. Vale joined IBAT for deals between July 2020 and July 2021 which was used to update risk assessment. The environmental impact studies are public documents that can be consulted in the environmental agencies, either virtually or physically (example: http://licenciamento.ibama.gov.br/Mineracao/Vale%20Projeto%20N3%20-%20EIA%20-RIMA/).

Mining project ID
Project 2

Type of assessment
Full-scale environmental and social impact assessment

Impacts considered
Direct impacts
Indirect impacts

Scope defined by
Governmental agency requirements
Company own standards and/or policies

Methods and tools
Desk-based research
Field surveys
Landscape-scale field surveys
Expert consultation
Stakeholder consultation/analysis
IBAT for Business
National specific tools and databases

Aspects considered
Locational alternatives
Threatened species
Migratory species
Endemic species
Protected areas
Critical habitats
Natural habitats
Ecosystem services

Baseline biodiversity data available?
Yes

Is the Environmental Impact Statement publicly available?
Yes

Please explain
Vale adopts this risk procedure through its internal policy entitled "Guidelines and Processes for Biodiversity Management". This policy covers all of Vale's operations in Brazilian territory. These guidelines are used because they are based on legal requirements and international good practices that govern performance standards for investments, in line with the Sustainability Policy and Vale's long-term strategic objective of achieving a neutral impact on biodiversity. In addition, all Vale mining projects have environmental impact studies. For the analysis of risks and impacts related to biodiversity, Vale has the following procedures: I) Expert consultation - Vale hires a company that has the necessary experience to carry out the environmental impact study. Through this expertise, a very detailed study of the region is carried out. II) National specific tools and databases - All available databases related to the region's biodiversity are checked. An important step for crossing data with field research. III) Desk-based research - A bibliographic survey is carried out regarding local biodiversity to understand records and descriptions of fauna and flora. IV) Field surveys - Field expeditions are scheduled before (baseline) and during the implementation and operation (monitoring) of the project to ascertain abiotic and mainly biotic aspects. V) Stakeholder consultation / analysis - From the beginning of the project until the end, the competent environmental agencies are consulted, as well as the company contracted for the study. Essential procedure to check if the environmental conditions are being fulfilled. Data on the main stakeholders are collected with the community relations teams in the territories, and for some studies interviews are included with those considered a priority, within the socioeconomic studies. Vale joined IBAT between July 2020 and July 2021 which was used in the following projects and expansions but also to keep risk analysis updated in the territories in which we operate. The environmental impact studies are public documents that can be consulted in the environmental agencies and agencies, either virtually or physically. In Minas Gerais, the studies are published in http://www.vale.com/brasil/PT/aboutvale/servicos-para-comunidade/minas-gerais/Paginas/Projetos.aspx

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Mining project ID
Project 3

Type of assessment
Full-scale environmental and social impact assessment

Impacts considered
Direct impacts
Indirect impacts

Scope defined by
Governmental agency requirements
Company own standards and/or policies

Methods and tools
Desk-based research
Field surveys
Landscape-scale field surveys
Expert consultation
Stakeholder consultation/analysis
IBAT for Business
National specific tools and databases

Aspects considered
Locational alternatives
Threatened species
Migratory species
Endemic species
Protected areas
Critical habitats
Natural habitats
Ecosystem services

Baseline biodiversity data available?
Yes

Is the Environmental Impact Statement publicly available?
Yes

Please explain
Vale adopts this risk procedure through its internal policy entitled "Guidelines and Processes for Biodiversity Management". This policy covers all of Vale's operations in Brazilian territory. These guidelines are used because they are based on legal requirements and international good practices that govern performance standards for investments, in line with the Sustainability Policy and Vale's long-term strategic objective of achieving a neutral impact on biodiversity. In addition, all Vale mining projects have environmental impact studies. For the analysis of risks and impacts related to biodiversity, Vale has the following procedures: I) Expert consultation - Vale hires a company that has the necessary experience to carry out the environmental impact study. Through this expertise, a very detailed study about the region is carried out. II) National specific tools and databases - All available databases related to the region's biodiversity are checked. Important step for crossing data with field research. III) Desk-based research - A bibliographic survey is carried out regarding local biodiversity to understand records and descriptions of fauna and flora. IV) Field surveys - Field expeditions are scheduled before (baseline) and during the implementation and operation (monitoring) of the project to ascertain abiotic and mainly biotic aspects. V) Stakeholder consultation/analysis - From the beginning of the project until the end, the competent environmental agencies are consulted, as well as the company contracted for the study. Essential procedure to check if the environmental conditions are being fulfilled. Data on the main stakeholders are collected with the community relations teams in the territories, and for some studies, interviews are included with those considered a priority, within the socioeconomic studies. Vale joined IBAT between July 2020 and July 2021 which was used in the following projects and expansions but also to keep risk analysis updated in the territories in which we operate. The environmental impact studies are public documents that can be consulted in the environmental agencies and agencies, either virtually or physically. In Minas Gerais the studies are published in http://www.vale.com/brasil/PT/aboutvale/servicos-para-comunidade/minas-gerais/Paginas/Projetos.aspx

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Mining project ID
Project 4

Type of assessment
Full-scale environmental and social impact assessment

Impacts considered
Direct impacts
Indirect impacts

Scope defined by
Governmental agency requirements
Company own standards and/or policies

Methods and tools
Desk-based research
Field surveys
Landscape-scale field surveys
Expert consultation
Stakeholder consultation/analysis
IBAT for Business
National specific tools and databases

Aspects considered
Locational alternatives
Threatened species
Migratory species
Endemic species
Protected areas
Critical habitats
Natural habitats
Ecosystem services

Baseline biodiversity data available?
Yes

Is the Environmental Impact Statement publicly available?
Yes

Please explain
Vale adopts this risk procedure through its internal policy entitled "Guidelines and Processes for Biodiversity Management". This policy covers all of Vale's operations in Brazilian territory. These guidelines are used because they are based on legal requirements and international good practices that govern performance standards for investments, in line with the Sustainability Policy and Vale's long-term strategic objective of achieving a neutral impact on biodiversity. In addition, all Vale mining projects have environmental impact studies. For the analysis of risks and impacts related to biodiversity, Vale has the following procedures: I) Expert consultation - Vale hires a company that has the necessary experience to carry out the environmental impact study. Through this expertise, a very detailed study of the region is carried out. II) National specific tools and databases - All available databases related to the region's biodiversity are checked. Important step for crossing data with field research. III) Desk-based research - A bibliographic survey is carried out regarding local biodiversity to understand records and descriptions of fauna and flora. IV) Field surveys - Field expeditions are scheduled before (baseline) and during the implementation and operation (monitoring) of the project to ascertain abiotic and mainly biotic aspects. V) Stakeholder consultation/analysis - From the beginning of the project until the end, the competent environmental agencies are consulted, as well as the company contracted for the study. Essential procedure to check if the environmental conditions are being fulfilled. Data on the main stakeholders are collected with the community relations teams in the territories, and for some studies, interviews are included with those considered a priority, within the socioeconomic studies. Vale joined IBAT between July 2020 and July 2021 which was used in the following projects and expansions but also to keep risk analysis updated in the territories in which we operate. The environmental impact studies are public documents that can be consulted by the environmental agencies and agencies, either virtually or physically. In Minas Gerais, the studies are published in http://www.vale.com/brasil/PT/aboutvale/servicos-para-comunidade/minas-gerais/Paginas/Projetos.aspx.

Mining project ID
Project 5

Type of assessment
Full-scale environmental and social impact assessment

Impacts considered
Direct impacts

Indirect impacts

Scope defined by
Governmental agency requirements
Company own standards and/or policies

Methods and tools
Desk-based research
Field surveys
Landscape-scale field surveys
Expert consultation
Stakeholder consultation/analysis
IBAT for Business
National specific tools and databases

Aspects considered
Locational alternatives
Threatened species
Migratory species
Endemic species
Protected areas
Critical habitats
Natural habitats
Ecosystem services

Baseline biodiversity data available?
Yes

Is the Environmental Impact Statement publicly available?
Yes

Please explain
Vale adopts this risk procedure through its internal policy entitled "Guidelines and Processes for Biodiversity Management". This policy covers all of Vale's operations in Brazilian territory. These guidelines are used because they are based on legal requirements and international good practices that govern performance standards for investments, in line with the Sustainability Policy and Vale's long-term strategic objective of achieving a neutral impact on biodiversity. In addition, all Vale mining projects have environmental impact studies. For the analysis of risks and impacts related to biodiversity, Vale has the following procedures: I) Expert consultation - Vale hires a company that has the necessary experience to carry out the environmental impact study. Through this expertise, a very detailed study of the region is carried out. II) National specific tools and databases - All available databases related to the region's biodiversity are checked. An important step for crossing data with field research. III) Desk-based research - A bibliographic survey is carried out regarding local biodiversity to understand records and descriptions of fauna and flora. IV) Field surveys - Field expeditions are scheduled before (baseline) and during the implementation and operation (monitoring) of the project to ascertain abiotic and mainly biotic aspects. V) Stakeholder consultation/analysis - From the beginning of the project until the end, the competent environmental agencies are consulted, as well as the company contracted for the study. Essential procedure to check if the environmental conditions are being fulfilled. Data on the main stakeholders are collected with the community relations teams in the territories, and for some studies, interviews are included with those considered a priority, within the socioeconomic studies. Vale joined IBAT between July 2020 and July 2021 which was used in the following projects and expansions but also to keep risk analysis updated in the territories in which we operate. The environmental impact studies are public documents that can be consulted in the environmental agencies and agencies, either virtually or physically. In Minas Gerais, the studies are published in http://www.vale.com/brasil/PT/aboutvale/servicos-para-comunidade/minas-gerais/Paginas/Projetos.aspx

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Mining project ID
Project 6

Type of assessment
Full-scale environmental and social impact assessment

Impacts considered
Direct impacts
Indirect impacts

Scope defined by
Governmental agency requirements
Company own standards and/or policies

Methods and tools
Desk-based research
Field surveys
Landscape-scale field surveys
Expert consultation
Stakeholder consultation/analysis
IBAT for Business
National specific tools and databases

Aspects considered
Locational alternatives
Threatened species
Migratory species
Endemic species
Protected areas
Critical habitats
Natural habitats
Ecosystem services

Baseline biodiversity data available?
Yes

Is the Environmental Impact Statement publicly available?
Yes

Please explain
Vale adopts this risk procedure through its internal policy entitled "Guidelines and Processes for Biodiversity Management". This policy covers all of Vale's operations in Brazilian territory. These guidelines are used because they are based on legal requirements and international good practices that govern performance standards for investments, in line with the Sustainability Policy and Vale's long-term strategic objective of achieving a neutral impact on biodiversity. In addition, all Vale mining projects have environmental impact studies. For the analysis of risks and impacts related to biodiversity, Vale has the following procedures: I) Expert consultation - Vale hires a company that has the necessary experience to carry out the environmental impact study. Through this expertise, a very detailed study of the region is carried out. II) National specific tools and databases - All available databases related to the region's biodiversity are checked. An important step for crossing data with field research. III) Desk-based research - A bibliographic survey is carried out regarding local biodiversity to understand records and descriptions of fauna and flora. IV) Field surveys - Field expeditions are scheduled before (base line) and during the implementation and operation (monitoring) of the project to ascertain abiotic and mainly biotic aspects. V) Stakeholder consultation / analysis - From the beginning of the project until the end, the competent environmental agencies are consulted, as well as the company contracted for the study. Essential procedure to check if the environmental conditions are being fulfilled. Data on the main stakeholders are collected with the community relations teams in the territories, and for some studies interviews are included with those considered a priority, within the socioeconomic studies. Vale joined IBAT between July 2020 and July 2021 which was used in the following projects and expansions but also to keep risk analysis updated in the territories in which we operate. The environmental impact studies are public documents that can be consulted in the environmental agencies and agencies, either virtually or physically. In Minas Gerais the studies are published in http://www.vale.com/brasil/PT/aboutvale/servicos-para-comunidade/minas-gerais/Paginas/Projetos.aspx

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Mining project ID
Project 7

Type of assessment
Full-scale environmental and social impact assessment

Impacts considered
Direct impacts
Indirect impacts

Scope defined by
Governmental agency requirements
Company own standards and/or policies

Methods and tools
Desk-based research
Field surveys
Expert consultation
Stakeholder consultation/analysis
National specific tools and databases

Aspects considered
Locational alternatives
Threatened species
Endemic species
Protected areas
Natural habitats
Ecosystem services

Baseline biodiversity data available?
Yes

Is the Environmental Impact Statement publicly available?
Yes

Please explain
The definition of the important environmental attributes for management was made based on the analysis of environmental studies and conditions of projects implemented and operations in the territory, considering relevant issues raised by internal and external stakeholders. The information was analyzed by the Local Working Group, prioritizing environmental attributes that are sensitive, affected and/or influenced directly or indirectly by the implementation of projects and by PTVI operations. The biodiversity management strategy of the PTVI project is materialized in the Environment Aspect & Impact Assessment (AMDAL) which is available at the Ministry of Environment and Forestry, Provincial Environment Agency and Local Environment Agency. The content of AMDAL documents covers all the information, guidelines and actions planned and executed required by the operations that contribute to mitigating adverse environmental impact, including the conservation of biodiversity and ecosystem services measures. For more accurate identification of the species surveyed, PTVI had the help of specialists mainly botanists, mammals, herpetofauna and avifauna expert for species identification. The field research took place both for fauna and flora. This method makes it possible to know the species of the region and to identify their respective conservation status. In 2021, PTVI continues the partnership with a local university named Hasanuddin University to update the baseline study and monitor biodiversity. Research on endangered flora and fauna species developed between 2018-2020 began to ground the actions in the nursery and arboretum, focused on the restoration and conservation of these species.

F-MM10.2/F-CO10.2

(F-MM10.2/F-CO10.2) Does your organization undertake a corporate-level procedure to assess biodiversity-related risks to your business?

	Is there a procedure to assess biodiversity-related risks?	Comment
Row 1	Yes	All activities planned and carried out at Vale are supported by specific procedures to identify hazards and associated risks and to define critical controls to eliminate, control and/or mitigate risks. Vale has a Risk Management Policy (POL-0009-G) and a Risk Management Standard (NOR03), as well as an internal normative procedure focused on the definition of criteria and processes for the identification, analysis, and classification of environmental risks aiming at the prevention of accidents that may generate environmental impacts, besides specific tools for management and monitoring. All these are part of an integrated Risk Management Governance flow, based on the concept of Lines of Defense, in the scope of which periodical reviews are carried out to ensure alignment between strategic decisions, performance, definition and monitoring of risk tolerance limits approved by the Company's Board of Directors upon recommendation of the Executive Board. The risks are classified according to the risk matrix, considering the severity and probability of each event. Risk management is based on the implementation of critical controls - preventive and mitigating - in the establishment of systematic and periodic inspection and maintenance procedures that guarantee the reliability of the process. The risks are periodically monitored, as well as the effectiveness of their main prevention/mitigation controls and the implementation of their treatment strategies. Risk scenarios related to biodiversity have been mapped and are monitored by specific panels in all lines of defense. These scenarios are related to the occurrence of forest fires and changes that may affect protected areas, as well as interference in critical biodiversity features. The internal regulatory procedure that sets guidelines and processes for biodiversity management presents guidelines for risk assessment based on prioritizing important biodiversity features in an area and categorizing them according to the risk level, based on a preliminary assessment of the probability and the consequence of impacts on them, and action priority. This norm considers that assessing and neutralizing risks and impacts on biodiversity means to neutralize risks to the company's business and projects.

F-MM10.2a/F-CO10.2a

(F-MM10.2a/F-CO10.2a) Select the options that best describe your procedure for identifying and assessing biodiversity-related risks.

Row 1

Risk assessment procedure

Assessed as part of an established enterprise risk management framework

Frequency of assessment

Annually

How far into the future are risks considered?

> 6 years

Tools and methods used to identify and assess risks

Internal company methods
External consultants
IBAT for Business
National specific tools and databases

Please explain

Vale conducts risk analysis specifically for biodiversity on site and at the company level, which is prepared by the planning of new projects and expansions. The potential impacts of project implementation and operation are considered. Specifically for the risk analysis of new projects and expansions, specific diagnoses are developed from the planning phase, aiming to evaluate possible interferences in areas of high value, protected areas, as well as sensitive habitats and species. In 2015, a risk assessment was prepared for 33 of the company's operational units, to map those with the greatest sensitivity and potential risk to biodiversity. Based on this analysis, the territories to be monitored for risks were listed. The risk assessment at the company level is updated annually. Since the publication, in early 2020, of its internal policy entitled "Guidelines and Processes for Biodiversity Management", Vale has adopted risk analysis procedures through mapping and prioritization of biodiversity attributes. This norm covers all Vale operations in Brazil. The timeframe for revision of this analysis is linked to the evolution of project/expansion maturity throughout the life cycle stages, as new information is obtained. These guidelines are based on legal requirements and international best practices that govern performance standards for investments, by the Sustainability Policy and Vale's long-term strategic objective of achieving a neutral impact on biodiversity. From July 2020 to July 2021, Vale joined the Integrated Biodiversity Assessment Tool (IBAT), to keep risk analyses up-to-date in the territories where we operate and to support assessments under new projects and expansions. For the preparation of the analyses, we also rely on other publicly available databases, as well as national and local lists of threatened species. The teams responsible for the analyses are composed of internal and/or external experts. Also, the Impact Mitigation Hierarchy is an important tool that Vale has taken into account to help identify and manage risks and impacts related to biodiversity, and to make up the actions of the management of the company.

F-MM10.2b/F-CO10.2b

(F-MM10.2b/F-CO10.2b) Which of the following issues are considered in your organization's biodiversity-related risk assessment(s)?

	Relevance & inclusion	Please explain
Deforestation	Relevant, always included	Although we work to reduce as much as possible the pressures of our projects and operations on the environment, our activities have direct and indirect impacts related to the need for vegetation suppression. Vale adopts an integrated management approach in the territory, incorporating and applying concepts related to the Hierarchy of Impact Mitigation (HMI) focusing on risks and impacts, whether potential or detected, considering important attributes of the territory and working to continuously improve our processes, and among its considerations, deforestation, legally protected areas, internationally recognized areas, endangered species, regulations and local communities, are directly linked to the company's commitments. In the risk and impact management, specific diagnoses are prepared, from planning entries into new territories up to the project's final completion, seeking to evaluate possible interferences in biodiversity high value areas, protected areas, as well as sensitive habitats and species. Project or expansion interventions in natural habitats and vegetation are assessed and measured to avoid and mitigate these interventions. All operational expansions and new projects are preceded by environmental impact studies according to the rules and regulations of each country and region in which they operate. In 2020 we published an internal policy entitled "Guidelines and Processes for Biodiversity Management", that adopted risk analysis procedures through mapping and prioritization of biodiversity attributes, basing the implementation of the Mitigation Hierarchy. This is focused on all stages of the project's life cycle, from project planning to post-closing. The document reflects the company's commitments focused on risk and impact management, aligned with Vale's long-term objective to neutralize impacts aiming to reduce significant biodiversity loss. Throughout the value chain, we evaluate our customers regarding the use and origin of forest-based raw materials by analyzing and auditing documents. In addition, in 2021, Vale Fund and Microsoft supported the Imazon in the PrevisIA development, a platform with the aim of anticipating information regions at risk of deforestation and fires in the Amazon through Artificial Intelligence (AI). PrevisIA analyzes various data to identify conversion trends of the forest by deforestation.

	Relevance & inclusion	Please explain
Legally protected areas	Relevant, always included	Vale adopts an integrated management approach in the territory, incorporating and applying concepts related to the Hierarchy of Impact Mitigation (HMI) focusing on risks and impacts, whether potential or detected, considering important attributes of the territory and working to continuously improve our processes, and among its considerations, deforestation, legally protected areas, internationally recognized areas, endangered species, regulations and local communities. In the risk and impact management, specific diagnoses are prepared, from planning entries into new territories up to the project completion, seeking to evaluate possible interferences in biodiversity high value areas, protected areas, as well as sensitive habitats and species. Project or expansion interventions in natural habitats and vegetation are assessed and measures to avoid and mitigate these interventions are discussed. All operational expansions and new projects are preceded by environmental impact studies according to the rules and regulations of each country and region in which they operate. In 2020 we published a internal policy entitled "Guidelines and Processes for Biodiversity Management", that adopted risk analysis procedures through mapping and prioritization of biodiversity attributes, basing the implementation of Mitigation Hierarchy. This is focused on all stages of the projects life cycle, from project planning to post-closing. The document reflects the company's commitments focused on risk and impact management, aligned with Vale's long-term objective to neutralize impacts aiming to reduce significant biodiversity loss. To integrate biodiversity into its global strategy, the company seeks continuous alignment with the commitments and goals established by the Convention on Biological Diversity (CBD) and the Global Strategic Plan for Biodiversity. As a member of ICMM, Vale is committed to the Council's established principles, specifically Principle 7, that are related to not operating in World Heritage areas, respect protected areas and biodiversity high value areas, and implementing and strengthening the mitigation hierarchy of impacts, with the aim of not having considerable biodiversity losses. At the company level, we track and report annually on indicators that reflect our interference and proximity to protected areas and areas of high biodiversity value.
Internationally recognized areas	Relevant, always included	Vale adopts an integrated management approach in the territory, incorporating and applying concepts related to the Hierarchy of Impact Mitigation (HMI) focusing on risks and impacts, whether potential or detected, considering important attributes of the territory and working to continuously improve our processes, and among its considerations, deforestation, legally protected areas, internationally recognized areas, endangered species, regulations and local communities. In the risk and impact management, specific diagnoses are prepared, from planning entries into new territories up to the project completion, seeking to evaluate possible interferences in biodiversity high value areas, protected areas, as well as sensitive habitats and species. Project or expansion interventions in natural habitats and vegetation are assessed and measures to avoid and mitigate these interventions are discussed. All operational expansions and new projects are preceded by environmental impact studies according to the rules and regulations of each country and region in which they operate. In 2020 we published an internal policy entitled "Guidelines and Processes for Biodiversity Management", that adopted risk analysis procedures through mapping and prioritization of biodiversity attributes, basing the implementation of Mitigation Hierarchy. The document reflects the company's commitments focused on risk and impact management, aligned with Vale's long-term objective to neutralize impacts aiming to reduce significant biodiversity loss. To integrate biodiversity into its global strategy, the company seeks continuous alignment with the commitments and goals established by the Convention on Biological Diversity (CBD) and the Global Strategic Plan for Biodiversity. As a member of ICMM, Vale is committed to the Council's established principles, specifically Principle 7, that are related to not operating in World Heritage areas, respect protected areas and biodiversity high value areas, and implementing and strengthening the mitigation hierarchy of impacts, with the aim of not having considerable biodiversity losses. In 2021, Vale made a public commitment to not operate in UNESCO Natural World Heritage Sites. At the company level, we track and report annually on indicators that reflect our interference and proximity to protected areas and areas of high biodiversity value.
Threatened, migratory and endemic species	Relevant, always included	Vale adopts an integrated management approach in the territory, incorporating and applying concepts related to the Hierarchy of Impact Mitigation (HMI) focusing on risks and impacts, whether potential or detected, considering important attributes of the territory and working to continuously improve our processes, and among its considerations, deforestation, legally protected areas, internationally recognized areas, endangered species, regulations and local communities, are directly linked to the company's commitments. In the risk and impact management, specific diagnoses are prepared, from planning entries into new territories up to the project completion, seeking to evaluate possible interferences in biodiversity high value areas, protected areas, as well as sensitive habitats and species (like threatened, migratory and endemic). Project or expansion interventions in natural habitats and vegetation are assessed and measures to avoid and mitigate these interventions are discussed. All operational expansions and new projects are preceded by environmental impact studies according to the rules and regulations of each country and region in which they operate. In 2020 we published a internal policy entitled "Guidelines and Processes for Biodiversity Management", that adopted risk analysis procedures through mapping and prioritization of biodiversity attributes, basing the implementation of Mitigation Hierarchy. This is focused on all stages of the projects life cycle, from project planning to post-closing. The document reflects the company's commitments focused on risk and impact management, aligned with Vale's long-term objective to neutralize impacts aiming to reduce significant biodiversity loss. At the company level, we track and report annually on indicators that reflect our interference in habitats of threatened species. We monitor this indicator at site level too.
Ecosystem services	Relevant, always included	In 2019, Vale prepared a normative standard containing guidelines and processes for biodiversity management, focused on all stages of the life cycle, from project planning to post-closing, published in early 2020. The document reflects the company's commitments focused on risk and impact management, aligned with Vale's long-term objective to neutralize impacts aiming to reduce significant biodiversity loss. To integrate biodiversity into its global strategy, the company seeks continuous alignment with the commitments and goals established by the Convention on Biological Diversity (CBD) and the Global Strategic Plan for Biodiversity. As a member of ICMM, Vale is committed to the Council's established principles, and in 2019 emphasized alignment with The Expectation of Performance 7. This expectation centers on not operating in World Heritage areas and implementing and strengthening the mitigation hierarchy of impacts, with the aim of not having considerable biodiversity losses. In the risk and impact management, specific diagnoses are prepared, from planning entries into new territories up to the project completion, seeking to evaluate possible interferences in natural heritage areas, protected areas, as well as sensitive habitats and species. All operational expansions and new projects are preceded by environmental impact studies according to the rules and regulations of each country and region in which they operate. Ecosystem services on which we depend and on which we have impacts, such as water supply and quality and emissions related to climate regulation, are studied within the physical aspects in environmental impact assessments. Ecosystem services related to the interests and practices of the surrounding communities are also mapped and studied. In addition, initiatives to protect and recover natural environments, maintain essential ecosystem services and reduce threats to species are aligned with the commitments and goals set by the Convention on Biological Diversity (CBD).
Regulation	Relevant, always included	Vale adopts an integrated management approach in the territory, incorporating and applying concepts related to the Hierarchy of Impact Mitigation (HMI) focusing on risks and impacts, whether potential or detected, considering important attributes of the territory and working to continuously improve our processes, and among its considerations, deforestation, legally protected areas, internationally recognized areas, endangered species, regulations and local communities, are directly linked to the company's commitments. In the risk and impact management, specific diagnoses are prepared, from planning entries into new territories up to the project completion, seeking to evaluate possible interferences in biodiversity high value areas, protected areas, as well as sensitive habitats and species (like threatened, migratory and endemic). Project or expansion interventions in natural habitats and vegetation are assessed and measures to avoid and mitigate these interventions are discussed. All operational expansions and new projects are preceded by environmental impact studies according to the rules and regulations of each country and region in which they operate. All applicable legal requirements are considered in the analysis of risks and impacts, including possible legal restrictions that may require specific changes in project layouts and support control and mitigation strategies. All operational expansions and new projects are preceded by environmental impact studies according to the rules and regulations of each country and region in which they operate. In 2020 we published an internal policy entitled "Guidelines and Processes for Biodiversity Management", that adopted risk analysis procedures through mapping and prioritization of biodiversity attributes, basing the implementation of the Mitigation Hierarchy. This is based on legal requirements and international best practices. Compliance with legal requirements is a specific and indispensable requirement in the evaluation of our supply chain. All documents are evaluated in the supplier registration and customer evaluation process, and audits are carried out periodically.
Indigenous peoples	Relevant, always included	In cases where indigenous people and traditional communities are situated in the area of influence of the company's activities, specific legislation should be checked and done, promoting engagement, free, prior and informed consultation. Vale incorporates respect for Indigenous and traditional communities in a transversal way in internal risk analysis and business feasibility processes, considering the community's interests in its decision-making. Vale has been working to improve its management strategy with intense training of its own and third-party employees, through constant reviews of processes and the development of planning and support tools. It has maintained, renewed and created agreements with Indigenous peoples and traditional communities to establish and maintain solid partnerships. Therefore, Vale maintains an open and transparent dialogue for conflict resolution and creates programs and projects that benefit communities with whom we interact. The Company has specific teams dedicated to social activities in the territories and to forging permanent relationships with communities, guided by policies and standards and supported by tools and specialists. Vale's relationships with its communities is one of the critical aspects of our business. As we are present across large, extended territories, we must have a broad and diverse connection with the communities in areas influenced by our projects. Vale's goal is to create value for Indigenous peoples and traditional communities; respect their culture, way of life and environment; and seek to create a positive legacy for these populations through actions that contribute to their ethnic development. Regardless of the local contexts where it operates, Vale follows the International Council on Mining and Metals (ICMM) position statements and principles and rejects any discrimination or disadvantage that may be related to culture, identity or vulnerability. Vale seeks to apply these principles to groups that have the characteristics commonly found in Indigenous peoples and traditional communities. In 2021, 100% of Vale's operations assessed the risk of human rights violations, periodically monitoring them with other business risks. In addition, the operations adopted prevention and mitigation control measures for these risks and conducted tests to ensure their effectiveness.
Local communities	Relevant, always included	Vale believes that it should manage the socio-economic implications of its activities through actions to control or mitigate risks, compensate for negative impacts, and enhance positive impacts. This is why it has created internal rules and guidelines with an emphasis on the Sustainability Policy and the Social Action Guide. Vale's operational areas conduct the management of socioeconomic impacts in their respective contexts and through mapping, assessment and program implementation according to legal requirements and corporate guidelines. We perform specific studies to define appropriate ways to mitigate negative impacts and potentialize positive impacts in line with local public policies. They also consider the expectations of stakeholders through their social performance, which is based on three main dimensions: risk and impact management, stakeholder management and the generation of benefits and a positive legacy in the territories. Another aspect considered is the potential synergy between enterprises within regional scope. Vale relates to local communities in the territories where it operates, and in this perspective maintains channels to listen and respond through an open and continuous dialogue with them. Based on its policies, external references and internal orientations, Vale develops plans for its relationship with and social investment in communities, executing in a participatory way the initiatives of engagement, communication, relationship, and social investments aimed at territorial development, especially in the areas of health, education and income generation. Vale's relationship with its communities is guided by Vale's Social Performance model, which was built and implemented by managing human rights processes, social and environmental risks and impacts, the health and safety of communities, resettlements, relationships with local communities, relationships with Indigenous peoples and traditional communities, actions to support local development, social and environmental investments and management conflicts with communities. The Relationship Plans are monitored by the relationship teams with communities that have a systematic routine of participatory meetings to monitor the execution of actions, evaluating the adherence and effectiveness of the results. This follow-up is recorded in the Stakeholder, Demands and Issues System (SDI).
Other, please specify	Not considered	

F-MM10.2c/F-CO10.2c

(F-MM10.2c/F-CO10.2c) Which of the following stakeholders are considered in your organization's biodiversity-related risk assessments?

	Relevance & inclusion	Please explain
Customers	Relevant, always included	Our customers are important stakeholders in our environmental management process. We analyze our customers' expectations of our biodiversity management performance, as well as legal requirements and international best practices, and use these as the basis for our continuous improvement process and risk assessment. Our engagement is through specific meetings and specific questionnaire requirements. In addition, we project our environmental commitments against our customers' performance and strive to be a catalyst for improvement in our supply chain, monitoring their performance on environmental issues. Vale understands the challenge of integrating biodiversity management into the value chain. In this sense, has addressed initiatives to support to the supply and commercial areas for the adoption of medium requirements environment, also covering biodiversity, in engagement with customers and suppliers. For instance, customers who consume raw material of forest origin are requested documents to attest socio-environmental compliance in regarding the supply of your production process and auditing documents.
Employees	Relevant, always included	Vale's management is based on respect, awareness and promotion of Human Rights, as well as on risk prevention and management of adverse impacts, including their mitigation and remediation in Vale's activities. The company values the involvement with stakeholders, aware that there is still room for improvement in this process. Vale employees (own and outsourced) have a dual role in biodiversity management: they are subjects and agents. They are trained in different spheres (basic knowledge about biodiversity and its importance, risk analyses and biodiversity management processes), and they also participate in the construction and elaboration of risk analyses as specialists in biodiversity-related topics or as suppliers of information on projects and related areas. In addition, they are active agents in monitoring risks and implementing risk prevention and mitigation strategies (some examples in Vale&Biodiversidade 2021).
Investors	Relevant, always included	Vale has a Risk Management Policy that seeks to establish guidelines for the global management of potential risks to which Vale and its subsidiaries are exposed. Business risk management focuses on potential relevant risks that, in the event of an occurrence, may impact people, communities, the environment, operational continuity, reputation and the achievement of the Company's general business objectives. So, Vale maintains dialogue and alignment with different national and international stakeholders that contribute to effective management of biodiversity through collaboration in building positive agendas which brings a legacy of positive reputation, attracting more investments and contributing to expansion in the Marketplace. Investors are considered when assessing risks related to biodiversity, as well as your demands, expectations and concern regarding our biodiversity management performance. Putting in place an efficient biodiversity management process not only minimizes our operational risks but also brings confidence in a secure investment. Engagement with investors is done through response to questionnaires, disclosure of results, and specific scheduled meetings.
Local communities	Relevant, always included	Vale's Social Performance model is effective through risk management, which aims to identify and prevent risks to communities and the company; manage negative impacts and promote a social legacy, which generates benefits and contributes to territorial development. This model is supported by the relationship with communities that is based on gaining trust, active listening, transparent posture, engagement in decision making and is guided by respect for Human Rights. Vale's social activities are based on the principles and guidelines of the Code of Conduct, the Anti-Corruption, Human Rights and Sustainability policies, as well as the Sustainability Guidelines. According to our guidelines, Vale leaders must contribute to the local stakeholder's management process, ensuring the identification, engagement and monitoring of relationships with the public. All environmental impact assessments involve socioeconomic and local community studies and listening to these stakeholders in meetings and public consultations. In biodiversity risk and impact assessment and management, specific features and ecosystem services related to the interests and practices of the local communities, indigenous people and traditional communities are also mapped and assessed. The process of prioritizing biodiversity features takes into consideration social aspects according to each region, economy and culture. For example, in Carajás the leaves of Jaborandi, a plant species whose leaves are the source of pilocarpine (an active ingredient in medicines), represent the livelihood of several families. This species is considered a priority for impact avoidance and mitigation strategies, as well as research, recovery and conservation. In 2021, 100% of Vale's operations assessed the risk of human rights violations, periodically monitoring them with other business risks. In addition, the operations adopted prevention and mitigation control measures for these risks and conducted tests to ensure their effectiveness. Also, in 2021, 410 Brazilian communities attended by Relationship Plans from 1304 total Brazilian local communities.
Indigenous peoples	Relevant, always included	Vale works with a focus on constructive relationships, of mutual benefits, based on respect for cultural diversity and the rights of these populations, recognizing the differentiated relationship they have with the territory, which involves not only physical and socioeconomic aspects but also cultural and spiritual. Our relationship with Indigenous Peoples and Traditional Communities is guided by Vale's Global Human Rights Policy, which is aligned with the main international benchmarks related to the theme, such as the UN Guiding Principles for Business and Human Rights, the Equator Principles and the Positioning of the International Council on Mining and Metals on Mining and Indigenous Peoples, Convention No. 169 of the International Labor Organization, the UN Global Compact, the Global Reporting Initiative, IFC Performance Standard No. 07, and the United Nations Declaration on the Rights of Indigenous Peoples, as well as the laws provided for in the countries where Vale operates. These international principles and standards are deployed in guidelines that guide the work of the professionals responsible for the relationship with these populations, such as the application of participatory methodologies (formation of forums and/or community committees) for the process of consultation and free, prior and informed consent. In addition to the risk and impact management processes, voluntary programs and agreements are implemented, built in a participatory manner with these populations, considering their cultural and territorial specificities, favoring a solid relationship of partnership and trust. In biodiversity risk and impact assessment and management, specific features and ecosystem services related to the interests and practices of the local communities, indigenous people and traditional communities are also mapped and assessed. The process of prioritizing biodiversity features takes into consideration social aspects according to each region, economy and culture.
NGOs	Relevant, sometimes included	Non-governmental organizations are important players in the conservation of biodiversity in the different territories where Vale operates. Their positions and expectations at different moments point to the main pressures and attributes that are threatened, providing an important basis that is considered in the analysis of risks in the territories. Several nongovernmental organizations are also active players in the partnerships established by Vale in the territories in projects aimed at restoration and conservation. As an example, we can cite the partnership in Minas Gerais with AMDA for fire prevention and combat in protected areas of Vale and third parties. The Vale Fund works with various organizations in partnerships to promote impact businesses and support conservation. More information about engagement with this organizations will be in Engagement item.
Regulators	Relevant, always included	Vale has a Risk Management Policy that seeks to establish guidelines and guidelines for the global management of potential risks to which Vale and its subsidiaries are exposed. Business risk management focuses on potential relevant risks that, in the event of an occurrence, may impact people, communities, the environment, operational continuity, reputation and the achievement of the Company's general business objectives. Vale maintains dialogue and alignment with different national and international stakeholders that contribute to effective management of biodiversity through collaboration in building positive agendas which brings a legacy of positive reputation, attracting more investments and contributing to expansion in the Marketplace. Regulators are considered in the assessment of risks related to biodiversity, since if biodiversity impacts occur, Vale may lose licenses, delay in receiving other environmental licenses, as well as paralyze the operation. Vale maintains an open dialogue with various regulatory bodies, both in the processes of licensing and maintaining the licenses for our operations, and for establishing partnerships in the territories where we operate. This dialogue brings improvements to our processes and projects, and also strengthens our mitigation strategy and the pathways followed for scientific research. For example, in Carajás we maintain dialogue and partnership with the Chico Mendes Institute for Biodiversity Conservation - ICMBio, that is the manager of Carajas National Forest, and with Brazilian Institute of Environment and Renewable Natural Resources (IBAMA) in the licensing processes of all our projects, discussing the projects, the impacts, risks and the measures proposed in the mitigation strategy of each project; and also in the scope of research and conservation projects.
Suppliers	Relevant, always included	Vale's suppliers are managed according to the same compliance standards that are upheld within the Company concerning social and environmental safety and ethics and integrity aspects. During this process, Vale verifies the history of third-party supplier companies and their partners early in the registration phase, analyzing their compliance with the requirements of Vale's Global Anti-Corruption Program. We also verify public information regarding slave labor sanctions and public data published by the Brazilian Federal Government (CEIS, CEPIM and CNEP), among other criteria. If any irregularity is found, the supplier is not registered and may be deemed disqualified to serve us and, consequently, will not be registered. Vale's suppliers considered key in terms of GHG emissions in the supply chain are annually invited to participate in the CDP Supply Chain program. All Vale's suppliers are assessed for environmental licenses, records, history of environmental non-conformities, among others, including subcontractors, and this procedure is consolidated in specific internal standards that assess supplier performance in relation to health, safety and the environment. Among Vale registered suppliers with active contracts we have specific consultancies that support the risk assessments and impacts with specialists and tools. For active suppliers, Vale also carries out periodic monitoring on social, environmental, human rights, health and social performance and government relationship. Local labor obligations, dirty list are monitored employers who use work analogous to slave, list of government public sanctions with monthly periodicity. Quarterly, there is the monitoring of public sanctions (by the Compliance with Sanctions) and, every six months, is the Supplier Performance Index (IDF). This is a supplier performance assessment on five criteria — technical quality, environmental protection, health and safety, respect for employees and continuous improvement.
Other stakeholders, please specify	Relevant, always included	Research institutes and universities, represented by their researchers, are important partners in the development of research projects and the expansion of knowledge whose results are directly applied in the analysis of biodiversity risks and impacts, as well as integrating partnerships for restoration and conservation in our territories of operation. Vale maintains the Vale Technological Institute, an independent research institution that focuses specifically on genetic diversity and biodiversity in the Amazon. The knowledge generated by our research is used to support mitigation, recovery and conservation strategies.

F-MM10.3/F-CO10.3

(F-MM10.3/F-CO10.3) Do you adopt biodiversity action plans to manage your impacts on biodiversity?

Yes

F-MM10.3a/F-CO10.3a

(F-MM10.3a/F-CO10.3a) Describe your criteria for defining which sites are required to produce biodiversity action plans.

The main requirements for the preparation of management plans or biodiversity action plans are the existence of associated legal requirements, the location in areas of high biodiversity value and the presence of sensitive and/or threatened species. Most of Vale's operational units have biodiversity management plans or programs associated with legal requirements within the licensing processes, covering actions to control and mitigate impacts, as well as recovery/restoration, compensation and impact monitoring actions. In order to assess the sensitivity and/or value of biodiversity, in 2015 a biodiversity risk assessment was carried out, covering 33 operational units worldwide, using analyzes and overlapping of layers in a GIS tool, including information on protected areas, registration and concentration of biodiversity, occurrence of endangered species, Key Biodiversity Areas, Ramsar Sites, Hotspots, Wilderness Areas, among others. From the classification of areas with high and very high risks to biodiversity, we seek to implement improvements in management and action plans.

In 2017 we established a partnership with The Biodiversity Consultancy to develop Guidelines for the Development of Biodiversity Action Plans, with a focus on establishing improvements in our processes, in addition to the application in a pilot project that culminated in the development of internal policy establishing guidelines and processes for biodiversity management in new projects/expansions and operations. This document was published in early 2020. From July 2020 to July 2021, we joined IBAT to support and improve risk assessments for our territories where we operate and new projects/expansions. Some examples in http://www.vale.com/brasil/PT/Documents/arquivos_links/book_vale_biodiversidade_EN.pdf

Among the 61 operating units evaluated in 2021, 54 (88.5%) needed the preparation of management programs, for these units, 51 programs have already been deployed, seven are under preparation and one is in proposal future, some of which include more than one project and therefore have more than one associated program. The Carajás Biodiversity Management Plan (PGBio Carajás), published in 2021, is a living document that integrates and consolidates all initiatives related to risk and impact management on habitats and susceptible species in operations and Vale's projects in the region.

F11 Impacts, risks and opportunities

F-MM11.1/F-CO11.1

(F-MM11.1/F-CO11.1) Have any of your projects caused, or have the potential to cause, significant adverse impact(s) on biodiversity?

	Any projects caused, or have the potential to cause, significant adverse impact(s) on biodiversity?	Comment
Row 1	Yes	In 2021, the area impacted by our operations totaled 814.57 sq km. New suppressed areas totaled 10.13 sq km and areas of permanent recovery totaled 18.2 sq km. The impacted area is subject to the main risks and direct and indirect impacts on biodiversity being associated with changes in natural environments and changes in land use, which alter the components of the physical environment, which in turn instead function as support for the elements of the biotic environment (flora and fauna). For example, in the Carajás Complex, possible impacts on biodiversity were raised in its environmental impact study. Among them: Area fragmentation, edge effect, alteration in the biotic communities, loss of plant specimens and reduction in plant populations, wildlife afugentment and others. The removal of native vegetation cover is an aspect inherent to the mining activity, and, therefore, some of its direct impacts on flora and fauna that cannot be mitigated, are treated with recovery and restoration measures, and with compensatory measures. The impacted area may support populations of threatened and endemic species that may suffer the loss of individuals and even populations from the reduction and/or alteration of their habitats. In 2021, we recorded 5,442 species as occurring in habitats impacted by Vale's operations in the world or located near its operations. Of these, 135 are classified according to the International Union for Conservation of Nature (IUCN) as threatened species.

F-MM11.1a/F-CO11.1a

(F-MM11.1a/F-CO11.1a) For your disclosed mining projects, provide details of the significant adverse impacts on biodiversity, with the respective response.

Mining project ID
Project 1

Type of impact
Direct

Impact
Conversion and/or degradation of natural habitats (other than forests)

Description of the impact
The implementation of mining project structures, highlighting the pits that have no alternative locations, and eventual expansions lead to the suppression of native vegetation and reduction of natural habitats, grassland habitats such as the ferruginous fields. The conversion of natural habitats into modified habitats leads to the loss of individuals of flora species and can also lead to the loss of fauna specimens. Among the species that may be affected are those that are rare, endemic, and threatened. Among the species that are impacted, we can mention those endemic to the rupestrian ferruginous fields, as well as typically birds, frogs and snacks that depend on these habitats.

Consequence
Serious

Likelihood
Likely

Describe response
In response to the impact of vegetation suppression, it became necessary to apply mitigating actions and measures, such as the rescue of the flora, prioritizing its reintroduction in recovery and restoration areas and compensatory measures such as the reforestation of other areas or other actions agreed between the applicant and the competent environmental agency. The flora rescue provides the removal of specimens and seeds of different species present in the area to be suppressed. The seedlings are used in recovery and restoration processes, with a view to the conservation of genetic variability, prioritizing those that are threatened with extinction and endemic species. This is a mitigation measure, carried out during the implementation phase of the project and related to the biotic environment, with its application period considered to be short-term, but which will reflect long-term benefits. The West waste rock pile is an area under recovery in Carajás. In this area in 2021, 3,388 individuals of 19 species were translocated, including Ipomoea cavalcantei, Pilocarpus microphyllus, Monogereion carajensis, Erythroxyllum nelson-rosae, Mimosa acutistipula var. ferrea and Daphnopsis filipedunculata. Also in 2021, 10,583 individuals were monitored and a 73.13% survival rate was observed. The pilot project Biocimentação is also being developed in this area, which brings innovation for the recovery of the ferruginous canga, an important substrate for the establishment of endemic species of the ferruginous fields. Fauna rescue programs aim to rescue individuals from the fauna present in the area affected during the suppression of forest vegetation accompanying the deforestation fronts to capture fauna individuals found in transit or displaced. Throughout this process, the projects also rely on the participation of various stakeholders, whether in the implementation of the programs, in the licensing process, or in meetings with the communities. The Carajás Biodiversity Management Plan, published in 2021, aims to integrate sustainability into Vale's operations in the Caraja's protected area mosaic and in surrounding areas, proving guidance on biodiversity management throughout a mine project's lifecycle and reconciling conservation with local development priorities, with focus on risks from the Company's operations on biological diversity.

Mining project ID
Project 1

Type of impact
Indirect

Impact
Other, please specify (Wildlife afugentment)

Description of the impact
Forced dispersal of fauna is associated with three main aspects: removal of vegetation cover, which causes habitat reduction/loss; mobilization of labor; and increased levels of local noise. Although the removal, in itself, does not cause deleterious effects on animal populations, this dispersion generates indirect impacts with more potential undesirable effects, such as the unbalance of faunal communities in the receiving areas and the increase in the trampling rate. At the sites where the structures are installed, on access roads and in their surroundings, the noise generated by the plant suppression task, the movement of people and the installation processes of the project's structures cause environmental disturbances, inducing the escape of various fauna representatives. This dispersal of individuals can alter the site's ecological interactions. Species that are unable to disperse will suffer from stress due to the sudden loss of their habitats and the loud noises from suppression and the presence of workers and machinery on the site. Those dispersing specimens will be more susceptible to trampling, in addition to inducing imbalance in the receiving fauna communities due to competition among the migrating fauna for new ecological niches. In the long term, this impact is understood to be temporary and reversible. Although certain species avoid the surroundings, others may establish themselves there.

Consequence
Moderate

Likelihood
Likely

Describe response
Possible mitigating measures for this impact are the Noise and Vibration Control and Monitoring Plan, the Plan of Recovery of Degraded Areas (PRDA). Another important program also carried out was the rescue of wild fauna. This action is essential to minimize the effects of the impact on fauna. Rescued specimens are released referentially in areas adjacent to the affected forest remnants or sent to release areas of the same vegetation type. The captured animals are carefully packed in transport boxes specific to the different species, sizes and distance of the route to be transported. The stakeholders involved in this process were a contracted company that carried out the afugentment and rescue of fauna and the competent environmental agencies. According to the PRDA, in 2021, 11 priority areas for recovery were established with the use of 19 species, where 11 of them are classified as Serra Sul. Briefly, in 2021, the following activities were carried out: -Revegetation of new areas in 7.68 ha in plant areas, a pile of sterile and mine -Maintenance in areas already revegetated at 159,495 m2 in flat areas (landfill) and Slopes -Provision of 39,074m3 of topsoil and 16.730m3 forest waste in 16.2 ha in Area 3 of Santa Rita Farm -Structural improvements in the system in some areas, such as the reforming of vegetation, revegetation of exposed areas, the implantation of bioblankets, microterraces and fibrors. -Inclusion of 02 new (native) species in the seed mix for revegetation.

Mining project ID
Project 2

Type of impact
Direct

Impact
Conversion and/or degradation of natural habitats (other than forests)

Description of the impact
The remnants of Seasonal Semideciduous Forest present in the area of the enterprise were in two different stages of regeneration: initial and medium, derived from Vale's reforestation in 1992. The suppression of vegetation in these formations had as main impact the reduction of biological diversity, through the loss of individuals, reduction of populations and the loss in production and dispersion of propagules. In addition to these, other effects associated with suppression were considered, such as the decrease in specific fauna sites. This impact was considered negative, relevant and, therefore, of moderate magnitude. Its manifestation was considered both in the short term (immediately due to the elimination of individuals) and in the medium to long term (due to the effects of population reduction, fragmentation and consequent progressive loss of genetic variability in the population).

Consequence
Moderate

Likelihood
Almost certain

Describe response
When the suppression of species of native flora is an inevitable impact, when we talk about mining projects such as pit expansion, which has locational rigidity for example, for the implementation of the enterprise, it became necessary to apply mitigating actions and measures, such as the rescue of the flora, prioritizing its reintroduction in the strip located between the pit and the access road to Itabira, and compensatory measures such as the reforestation of other areas or other action agreed between the applicant and the competent environmental agency. The rescue of flora provided for the removal of specimens of different species present in the forest area to be suppressed, through the collection of seeds, seedlings and seedlings for use in the processes of plant restoration, with a view to the conservation of genetic variability, prioritizing those that are threatened with extinction. This was a preventive measure, carried out during the implementation phase of the project and related to the biotic environment, with its application period considered to be short-term, but which will reflect long-term benefits. The recomposition of flora has as its main goal the

implantation of native plant species, that will compose a harmonious scenario and conjugated with the adjacent landscape, aiming at the reduction of the visual impact and improving the conditions of the environment in the area. Native species should be purchased preferably from the Flora Rescue Project. It comprises the restoration of flora in an area equivalent to the area suppressed as provided for in the legislation, preferably in areas that are degraded and subject to recovery. Through the implantation of pioneer native species, it is expected to create an environment conducive to the development of secondary species through natural succession. The main stakeholders involved are Vale employees, specialists from consultancies and universities involved in conducting environmental studies and programs, the environmental agencies that monitor all the processes, as well as the surrounding communities.

Mining project ID
Project 2

Type of impact
Direct

Impact
Fragmentation of ecosystems

Description of the impact
Although the operational area of the Complex is already consolidated, eventual expansions may require suppression of new areas that may still have native vegetation cover. As a result of suppression, natural areas that remain continuous may suffer from the process of habitat fragmentation. This impact is reduced by the fact that most of the environmental matrix that characterizes the region is modified, with native habitats already presenting low quality. The environmental impact can be classified as negative and relevant.

Consequence
Moderate

Likelihood
Likely

Describe response
To reduce the impact of habitat fragmentation, the suppression of vegetation is monitored, with the rescue of flora before the actions and the eventual rescue of fauna when necessary. The fauna rescue and relocation actions are pertinent for some groups of fauna species, especially for those that have difficulty moving from the area to be deforested. It should be noted that the actions of rescue, translocation, relocation or destination, during deforestation, occurred only in case of need, in other words, when the conditions verified did not allow the animal to move by its own means. This program was licensed by IBAMA (federal environmental agency), in compliance with the guidelines of Normative Instruction No. 146, of January 10, 2007, which establishes the criteria and standards for the request for granting authorization for capturing, collecting and transporting fauna in the country, while specific legislation for mining projects is not being prepared. The main stakeholders involved are Vale employees, specialists from consultancies and universities involved in conducting environmental studies and programs, the environmental agencies that monitor all the processes, as well as the surrounding communities.

Mining project ID
Project 2

Type of impact
Indirect

Impact
Other, please specify (Fauna afugentment)

Description of the impact
The impacts caused by the increase in noise, dust and the traffic of vehicles and people, are similar to those described and evaluated as a consequence of the vegetation suppression actions, that is, they cause evasion of individuals from the areas surrounding the enterprise and loss of biodiversity. But is classified as reversible, as it was intense only during the implementation phase; local, as it reached the limits of the indirectly affected area; moderately relevant as it reached a small portion of the mammal community and expected to the situation return to previous levels. The classification in these valuation criteria makes this impact of moderate magnitude.

Consequence
Moderate

Likelihood
Likely

Describe response
The program in response to this impact was the Program for Monitoring Suppression and Fauna Rescue. This program aims to accompany all suppression actions and guarantee that they extend only to the area strictly necessary, minimizing as much as possible the impact on the vegetation. These actions are accompanied by programs for scaring and rescuing fauna, which aim to reduce the impacts of suppression on fauna species, as well as flora rescue programs, which have as their objective the rescue of individuals, seeds, and seedlings of species that will be used to produce seedlings and reestablish populations within the recovery/restoration actions, conserving genetic material. This program was licensed by IBAMA (federal environmental agency), in compliance with the guidelines of Normative Instruction No. 146, of January 10, 2007, which establishes the criteria and standards for the request for granting authorization for capturing, collecting and transporting fauna in the country, while specific legislation for mining projects is not being prepared.

Mining project ID
Project 2

Type of impact
Direct

Impact
Loss of rare and threatened species

Description of the impact
The implementation of mining project structures and eventual expansions lead to the suppression of native vegetation and the reduction of natural habitats. This affects directly some plant species, among them rare, endemic, and threatened species. Among the species that may be affected are those that are rare, endemic, and threatened, which may suffer both direct impacts, with the loss of individuals.

Consequence
Extreme

Likelihood

Likely

Describe response
In response to the impact of vegetation suppression, there are mitigation actions and environmental compensation programs related to habitat restoration and investment in protected areas. The Vegetation Suppression Program, since the elimination of vegetation cover, is an unavoidable activity for the operation of some project's structures, such as the pit, which has locational rigidity. This program aims to accompany all suppression actions and guarantee that they extend only to the area strictly necessary, minimizing as much as possible the impact on the vegetation. The Flora rescue program has its objective to rescue individuals, seeds, and seedlings of species that will be used to produce seedlings and reestablish populations within the recovery/restoration actions, conserving genetic material. Compensation actions based on investments in conservation units and the creation of new protected areas are also carried out. In the Itabira Complex, we have one RPPN created and others in the process, totaling more than 700 hectares of forest formations. The different conservation units in the municipality as well as the protected areas maintained by Vale and habitat restoration areas are of fundamental importance to maintain endemic, rare and threatened species in the Itabira region. Throughout this process, the projects also count on the participation of several stakeholders, whether in the implementation of the programs, in the licensing process, or in meetings with the communities. Among them are universities, research institutions, consulting companies, members of associations, and members of communities.

Mining project ID
Project 3

Type of impact
Direct

Impact
Conversion and/or degradation of natural habitats (other than forests)

Description of the impact
The semideciduous seasonal forest and the rupestrian fields are the main natural environments that occur in the Complex. The suppression of vegetation in these formations will have as its main direct impact the loss and/or reduction of habitats for flora and fauna species, with a reduction of populations and the production and dispersal of propagules. This reduction implies a decrease in genetic variability in areas of direct influence. This impact is considered negative, relevant and of high magnitude. As the suppression of native vegetation is an unavoidable impact on the implementation and operation of the mines, it is necessary to apply mitigating measures, such as monitoring of suppression, with the rescue of flora and fauna, and recovery and compensatory measures, such as the creation of a forest nursery, reforestation or other action agreed between the applicant and the competent environmental authority focused on the compensation of impacts.

Consequence
Extreme

Likelihood
Likely

Describe response
To minimize this impact, the locational alternatives with the smallest suppression area are selected. For the implementation of the project, the suppression areas are demarcated to avoid additional impacts. Before the suppression action, the rescue of seeds, plantlets and specimens is conducted, aiming at the production of seedlings and germplasm conservation. The production of seedlings in nurseries favors the production of those rescued, focusing on the restoration of degraded areas and conservation of genetic variability. During suppression, fauna specimens that have difficulty moving are rescued and relocated. The Complex has been conducting integrated fauna monitoring for more than 10 years, which accompanies the communities in the face of the different environmental alterations resulting from the implantation and operation of the projects. The main stakeholders involved are Vale employees, specialists from consultancies and universities involved in conducting environmental studies and programs, the environmental agencies that monitor all the processes, as well as the surrounding communities.

Mining project ID
Project 3

Type of impact
Direct

Impact
Fragmentation of ecosystems

Description of the impact
The reduction in connectivity between fragments is a significant impact on the habitat. Fragmentation introduces several new factors in the evolutionary history of natural populations of plants and animals. These changes affect differently the demographic parameters of mortality and birth rates of different species and, therefore, the structure and dynamics of ecosystems. In the case of arboreal species, the change in the abundance of pollinators, dispersers, predators and pathogens alters seedling recruitment rates; and fires and microclimate changes, which affect the edges of the fragments more intensely, alter the mortality rates of trees. These factors are related to biological phenomena that affect plant birth and mortality, such as the edge effect, genetic drift and interactions between plants and animals. In the area where the enterprise is located, in addition to the decrease in biodiversity in forest formations, the suppression of vegetation will cause a reduction in connectivity between the remaining fragments in the area of influence, which will become less protected and will suffer greater edge effects. This impact is considered to be negative, relevant and, consequently, of high magnitude.

Consequence
Extreme

Likelihood
Likely

Describe response
To minimize this impact, the locational alternatives with the smallest suppression area are selected. The Complex conduct recovering of flora and habitats for fauna species. The rescue of flora includes the removal of specimens and seeds of different species belonging to the vegetation present in the area of the enterprise. Its general objective is to collect seeds and seedlings for plant recomposition, with a view to conserving genetic variability. It will be prioritized in this project, the rescue of species that are threatened with extinction. This will be a preventive measure, carried out during the implementation phase of the project and is related to the biotic environment, with the application term considered to be short-term, but which will reflect long-term benefits and the entrepreneur's responsibility for realization. The flora restoration project is a compensatory measure, which aims to reintroduce the species rescued during the implementation of the enterprise and others produced in the seedling nursery, aiming to contribute to the improvement of the environmental conditions of areas close to the enterprise that is altered. In this project, the main goal will be the implantation of native plant species, which will form fragments, aiming at decreasing the impact and improving the conditions of the environment in the area and offering the formation of a habitat that can shelter the fauna local. It will be a compensatory measure, with the term of application remaining considered as long term, and which will reflect long-term benefits. In addition, investment in existing protected areas or the creation of new protected areas as compensatory measures is planned with the objective of maintaining and protecting habitat and species, besides creating ecological corridors. The main stakeholders involved are Vale employees, specialists from consultancies and universities involved in conducting environmental studies and programs, the environmental agencies that monitor all the processes, as well as the surrounding communities.

Mining project ID
Project 3

Type of impact
Indirect

Impact
Other, please specify (Fauna afugentment)

Description of the impact
The impacts caused by the increase in noise, dust and the traffic of vehicles and people, are similar to those described and evaluated as a consequence of the vegetation suppression actions, that is, they cause evasion of individuals from the areas surrounding the enterprise and loss of biodiversity. But is classified as reversible, as it was intense only during the implementation phase; local, as it reached the limits of the indirectly affected area; moderately relevant as it reached a small portion of the community and expected to the situation return to previous levels. The classification in these valuation criteria makes this impact of moderate magnitude. As for the environmental assessment parameters, the increase in traffic, noise and dust had a temporary duration; discontinuous; real; direct; occurring in the short term and of a negative nature.

Consequence
Serious

Likelihood
Likely

Describe response
The program in response to this impact was the Program for Monitoring Plant Suppression and Fauna Rescue. This program was licensed by IBAMA (federal environmental agency), in compliance with the guidelines of Normative Instruction No. 146, of January 10, 2007, which establishes the criteria and standards for the request for granting authorization for capturing, collecting and transporting fauna in the country, while specific legislation for mining projects is not being prepared.

Mining project ID
Project 3

Type of impact
Direct

Impact
Loss of rare and threatened species

Description of the impact
The implementation of mining project structures and eventual expansions lead to the suppression of native vegetation and the reduction of natural habitats. The fragmentation generated by the suppression of vegetation in mining projects is reinforced by external pressure, with the presence of deforested areas and urban areas. The creation of borders and anthropized areas can affect the movement of fauna between fragments, also limiting gene flow and contributing to the reduction of their genetic variability. The edge effect can also compromise the survival of some animals, and according to literature the effects of exposure to wind, light and dust can be seen at a distance of about 300 m from the edge. The conversion of natural habitats into modified habitats leads to the loss of individuals or fauna specimens. Among the species that may be affected are those that are rare, endemic, and threatened, which may suffer indirect impacts from the effects of fragmentation. Among the species that are impacted we can mention those endemic to the Atlantic Forest (Manacus manacus, rendeira), and threatned (Leopardus pardalis, jaguatirica; Tapirus terrestris, anta).

Consequence
Extreme

Likelihood
Likely

Describe response
In response to the impact of vegetation suppression, there are mitigation actions and environmental compensation programs related to habitat restoration and investment in protected areas. The Vegetation Suppression Program, since the elimination of vegetation cover, is an unavoidable activity for the operation of some project's structures, such as the pit, which has locational rigidity. This program aims to accompany all suppression actions and guarantee that they extend only to the area strictly necessary, minimizing as much as possible the impact on the vegetation. Flora rescue programs have their objective to rescue of individuals, seeds, and seedlings of species that will be used to produce seedlings and reestablish populations within the recovery/restoration actions, conserving genetic material. Compensation actions based on investments in conservation units and the creation of new protected areas are also carried out. In the Itabira Complex, we have one RPPN created and another in the process, totaling more than 700 hectares of forest formations. The different conservation units in the municipality as well as the protected areas maintained by Vale and habitat restoration areas are of fundamental importance to maintain endemic, rare and threatened species in the Itabira region. Throughout this process, the projects also count on the participation of several stakeholders, whether in the implementation of the programs, in the licensing process, or in meetings with the communities. Among them are universities, research institutions, consulting companies, members of associations, and members of communities.

Mining project ID
Project 4

Type of impact
Direct

Impact
Conversion and/or degradation of natural habitats (other than forests)

Description of the impact
The suppression of native vegetation cover for the implementation of mines and their associated structures, such as power plants, workshops, stockpiles and dams, implies the suppression of native forest and grassland vegetation, leading to the loss and/or reduction of habitats for fauna species, as well as the loss of individuals of flora species. The fragmentation of natural habitats can affect the ability of flora and fauna specimens to disperse, and the conversion of habitats can lead to the migration of specimens to the surrounding natural environments, which can cause an imbalance in the receiving communities. This movement associated with the increased traffic of vehicles and machinery can lead to an increase in cases of accidents with animals. These direct and indirect impacts resulting from the removal of vegetation are evaluated for all mines in the Vargem Grande Complex, and specific actions are implemented to minimize, recover and compensate for them.

Consequence
Serious

Likelihood
Likely

Describe response
For the execution of vegetation removal and material removal services activities of: ● Field demarcation of areas to be deforested; ● Selection and hiring of a specialized company (ies); ● Definition of accesses and location of areas to be used for storage and/or transformation of the woody material; ● Definition of the destination of the woody material; ● Definition of procedures for removing vegetation. In addition, the other programs are implemented focused in reducing impacts to animal and plant species: ● Flora Rescue Program: The specific objectives of this program are: Contribute to the preservation of the genetic heritage of the local flora; Contribute to the conservation of rare and regionally threatened species; Contribute to the acquisition of scientific knowledge about environments to be affected, rescue practices and proper use of forms of propagation to different species of local flora; Provide opportunities to use the knowledge acquired in environmental education programs and rehabilitation practices in areas degraded; Test the use of propagules in the rehabilitation processes of areas degraded. ● Fauna Rescue Program: This program aims to accompany the deforestation fronts and rescue animals with difficulties in transit or displaced ● Recovery of Degraded Areas - this rehabilitation program has as its main objectives the rehabilitation of areas degraded by the project, aiming at soil protection, erosion control, recovery of the local flora, and minimization of the visual impact caused by modifications in the relief and landscape of the region. ● Environmental Compensation Actions: actions aimed at restoring areas and planting endangered and/or legally protected species, called compensatory planting, are carried out, in addition to evaluating and creating a protected area containing environments of native vegetation, with the aim of preserving remnants of the flora and fauna affected by the project. By 2021, compensatory planting resulted in 56,825 seedlings planted in an area of 105,772 hectares, which corresponds to approximately 34% of the total compensation areas of the Maravilhas dam III.

Mining project ID
Project 4

Type of impact
Direct

Impact
Loss of rare and threatened species

Description of the impact
The suppression of native vegetation cover can lead to the loss and/or reduction of habitats for fauna species, as well as the loss of individuals of flora species, including species considered rare, endemic or threatened with extinction. These include species such Ocotea odorifera (plant), Drymophila ochropyga, Manacus manacus and Haplospiza unicolor (birds), Tamandua tetradactyla, Leopardus pardalis and Chrysocyon brachyurus (mammals).

Consequence
Serious

Likelihood
Likely

Describe response
Specifically to reduce impacts on animal and plant species: ● Flora Rescue Program: The specific objectives of this program are: Contribute to the preservation of the genetic heritage of the local flora; Contribute to the conservation of rare and regionally threatened species; Contribute to the acquisition of scientific knowledge about environments to be affected, rescue practices and proper use of forms of propagation to different species of local flora; Provide opportunities to use the knowledge acquired in environmental education programs and rehabilitation practices in areas degraded; Test the use of propagules in the rehabilitation processes of areas degraded. Example: In 2021, the Tamanduá Mine underwent a geometry adjustment intervention. The area of vegetation to be suppressed had the rescue of 1,797 individuals, belonging to 22 species and twelve distinct families during flora rescue activities. The rescued individuals were replanted and are in acclimatization in the Vale's Native Seedling Production Center, in Nova Lima (MG). ● Recovery of Degraded Areas - this rehabilitation program has as its main objectives the rehabilitation of areas degraded by the project, aiming at soil protection, erosion control, recovery of the local flora, and minimization of the visual impact caused by modifications in the relief and landscape of the region. ● Environmental Compensation Actions: actions aimed at restoring areas and planting endangered and/or legally protected species, called compensatory planting, are carried out, in addition to evaluating and creating a protected area containing environments of native vegetation, with the aim of preserving remnants of the flora and fauna affected by the project. Since 2015, Vale has maintained the Biofactory in the Quadrilátero Ferrífero in Minas Gerais, with the aim of multiplying specimens of native flora using biotechnology. Focusing on the reproduction of threatened, endemic and rare species directly impacted by Vale's operations the biofactory produces plantlets and seedlings of various Atlantic Forest and Cerrado species that are used in the recovery of degraded areas and compensatory measures. In 2021, the biofactory produced more than 28,000 seedlings that were used in actions to recover areas and restore habitats and populations.

Mining project ID
Project 5

Type of impact
Direct

Impact
Conversion and/or degradation of natural habitats (other than forests)

Description of the impact
The suppression of native vegetation cover for the implementation of mines and their associated structures may imply the suppression of native forest vegetation and grassland areas, leading to the loss and/or reduction of habitats for fauna species, as well as the loss of individuals of flora species. The fragmentation of natural habitats can affect the ability of flora and fauna specimens to disperse, and the conversion of habitats can lead to the migration of specimens to the surrounding natural environments, which can cause an imbalance in the receiving communities. This movement associated with the increased traffic of vehicles and machinery can lead to an increase in cases of accidents with animals. These direct and indirect impacts resulting from the removal of vegetation are evaluated for all mines in the Paraopeba Complex, and specific actions are implemented to minimize, recover and compensate for them.

Consequence
Serious

Likelihood
Likely

Describe response
For the execution of vegetation removal and material removal services activities of: ● Field demarcation of areas to be deforested; ● Selection and hiring of the specialized company (ies); ● Definition of accesses and location of areas to be used for storage and/or transformation of the woody material; ● Definition of the destination of the woody material; ● Definition of procedures for removing vegetation. In addition, the other programs are implemented focused on reducing impacts on animal and plant species: ● Flora Rescue Program: The specific objectives of this program are: Contribute to the preservation of the genetic heritage of the local flora; Contribute to the conservation of rare and regionally threatened species; Contribute to the acquisition of scientific knowledge about environments to be affected, rescue practices and proper use of forms of propagation to different species of local flora; Provide opportunities to use the knowledge acquired in environmental education programs and rehabilitation practices in areas degraded; Test the use of propagules in the rehabilitation processes of areas degraded. ● Fauna Rescue Program: This program aims to rescue previously the largest possible number of individuals from the fauna present in the area affected before the suppression of forest vegetation, and subsequently accompany the deforestation fronts to capture, fauna individuals found in transit or displaced ● Recovery of Degraded Areas - this rehabilitation program has as its main objectives the rehabilitation of areas degraded by the project, aiming at soil protection, erosion control, recovery of the local flora, and minimization of the visual impact caused by

modifications in the relief and landscape of the region. ● Environmental Compensation Actions: actions aimed at restoring areas and planting endangered and/or legally protected species, called compensatory planting, are carried out, in addition to evaluating and creating a protected area containing environments of native vegetation, with the aim of preserving remnants of the flora and fauna affected by the project.

Mining project ID
Project 5

Type of impact
Direct

Impact
Loss of rare and threatened species

Description of the impact
The suppression of native vegetation cover can lead to the loss and/or reduction of habitats for fauna species, and this can lead to a reduction in populations size or loss of individuals of flora and fauna species, including species considered rare, endemic or threatened with extinction. In the Paraopeba Complex examples of this species include Ocotea odorifera (plant), Drymophila ochropyga, Manacus manacus and Haplospiza unicolor (birds), Tamandua tetradactyla, Leopardus pardalis and Chrysocyon brachyurus (mammals)

Consequence
Serious

Likelihood
Likely

Describe response
Specifically to reduce impacts to plant species: ● Flora Rescue Program: The specific objectives of this program are: Contribute to the preservation of the genetic heritage of the local flora; Contribute to the conservation of rare and regionally threatened species; Contribute to the acquisition of scientific knowledge about environments to be affected, rescue practices and proper use of forms of propagation to different species of local flora; Provide opportunities to use the knowledge acquired in environmental education programs and rehabilitation practices in areas degraded; Test the use of propagules in the rehabilitation processes of areas degraded. Example: Due to emergency work in the Paraopeba Complex, in 2021, the monitoring of plant suppression was carried out to scare away the fauna or carry out its eventual rescue. The driving away was carried out without the need to rescue any individual during the suppression process. ● Recovery of Degraded Areas - this rehabilitation program has as its main objectives the rehabilitation of areas degraded by the project, aiming at soil protection, erosion control, recovery of the local flora, and minimization of the visual impact caused by modifications in the relief and landscape of the region. ● Environmental Compensation Actions: actions aimed at restoring areas and planting endangered and/or legally protected species, called compensatory planting, are carried out, in addition to evaluating and creating a protected area containing environments of native vegetation, with the aim of preserving remnants of the flora and fauna affected by the project. Since 2015, Vale has maintained the Biofactory in the Quadrilátero Ferrífero in Minas Gerais, with the aim of multiplying specimens of native flora using biotechnology. Focusing on the reproduction of threatened, endemic and rare species directly impacted by Vale's operations the biofactory produces plantlets and seedlings of various Atlantic Forest and Cerrado species that are used in the recovery of degraded areas and compensatory measures. In 2021, the biofactory produced more than 28,000 seedlings that were used in actions to recover areas and restore habitats and populations.

Mining project ID
Project 6

Type of impact
Direct

Impact
Deforestation and/or forest degradation

Description of the impact
The natural habitat in the complex is forest formations and rupestrian fields. The suppression of vegetation in these formations will have as its main direct impact the loss and/or reduction of habitats for flora and fauna, with a reduction of populations and of the production and dispersal of propagules. This reduction implies a decrease in genetic variability in areas of direct influence. This impact is considered negative, relevant and of high magnitude. As the suppression of native vegetation is sometimes an unavoidable impact on the implementation and operation of the mines, since we have structures with locational rigidity it is necessary to apply mitigating measures, such as monitoring of suppression, with the rescue of flora and fauna, and recovery and compensatory measures, such as the creation of a forest nursery, reforestation or other action agreed between the applicant and the competent environmental authority focused on the compensation of impacts.

Consequence
Serious

Likelihood
Likely

Describe response
The Flora Rescue Project aims to minimize the resulting acts of the suppression of natural habitats. As flora recovery activities in areas of natural suppression environments are important, in the sense of safeguarding a portion of the genetic heritage of the plant species occurring there. It is noteworthy that the intrinsic carrying out a complete flora rescue program conducted to the establishment of priority actions, based on a selection of plant species to be covered by the program so that the effort be directed towards the rescue and conservation of these. The actions undertaken in this program are carried out in order to preserve genetic resources and can subsidize flora restoration projects, through the availability of seeds and propagules of some plant species. These species were selected based on the proposed indications, in addition to those of occurrence regional, arising from the rescue of flora, carried out by Vale, in the region. In 2021 at Brucutu, the native species seedlings rescued were also used for the implementation of green curtains, formed by planting forest species of different sizes. In addition to providing a visual barrier to the mine area, these curtains limit the access of people to the risk areas, soften the visual impact of the landscape reduce the propagation of dust to neighboring communities and public roads, reduce the impact of noise, as well as being a shelter for native fauna.

Mining project ID
Project 6

Type of impact
Direct

Impact
Fragmentation of ecosystems

Description of the impact

The main impact of the implementation and operation of the complex is related to the suppression of vegetation for the implementation and maintenance of structures. Reduced connectivity between fragments is a significant impact on habitat. Fragmentation introduces a number of new factors into the evolutionary history of natural populations of plants and animals. These changes differently affect the demographic parameters of mortality and birth rates of different species, and thus the structure and dynamics of ecosystems. However, the region where the complex is located is characterized by a long history of anthropic intervention in its ecosystems, with the remaining forests currently fragmented and at various stages of succession. Thus, the removal of vegetation will lead to a reduction in connectivity between the remaining fragments in the area of influence, and the negative impact is significant, but of moderate magnitude when considered in the current context.

Consequence
Serious

Likelihood
Likely

Describe response
To reduce the impact of habitat fragmentation, the suppression of vegetation is monitored, with the rescue of flora before the actions and the eventual rescue of fauna when necessary. The fauna rescue and relocation actions are pertinent for some groups of fauna species, especially for those that have difficulty moving from the area to be deforested. It should be noted that the actions of rescue, translocation, relocation or destination, during deforestation, occurred only in case of need, in other words, when the conditions verified did not allow the animal to move by its own means. This program, executed both in Brucutu and Água Limpa mines, has as its main objectives the proposal of construction planning in relation to the monitoring of deforestation activities and the execution of eventual actions for the rescue, sorting and destination of captured fauna. In Brucutu the Program for Monitoring Threatened Fauna Species is being carried out in the mine's areas of influence, with the objective of monitoring the species against the changes caused by the operation and expansions of the mine. In addition, in the Complex the monitoring of invertebrates, fish, reptiles, amphibians, birds and mammals has been going on for almost 10 years. In 2021 results, five mammal species considered to be in threat categories were recorded: collared peccaries (Pecari tajacu), jaguars (Puma concolor), and maned wolves (Chrysocyon brachyurus), ocelots (Leopardus pardalis), and tamarins (Callicebus nigrifrons). For the Herpetofauna, two new species of amphibians were recorded for the area, Thoropa miliaris and Vitreorana uranoscopa, adding 58 species in total. In addition, the Maximilian's Snake-headed Turtle (Hydromedusa maximiliani) was recorded. For the avifauna, two new species were recorded: Melanopareia torquata and Anabazenops fuscus.

Mining project ID
Project 6

Type of impact
Indirect

Impact
Other, please specify (Fauna afugentment)

Description of the impact
The impacts caused by the increase in noise, dust and the traffic of vehicles and people, are similar to those described and evaluated as a consequence of the vegetation suppression actions, that is, they cause evasion of individuals from the areas surrounding the enterprise and loss of biodiversity. But is classified as reversible, as it will be intense only during the implementation phase; local, as it reaches the limits of the indirectly affected area; moderately relevant as it is expected to reach the fauna community and the situation will return to previous levels. The classification in these valuation criteria makes this impact of moderate magnitude. As for the environmental assessment parameters, the increase in traffic, noise and dust will have a temporary duration; discontinuous; real; direct; occurring in the short term and of a negative nature.

Consequence
Moderate

Likelihood
Likely

Describe response
In response to the impact of vegetation suppression, during the planning of the project and its expansions, analyses of locational and technological alternatives were carried out, with the objective of avoiding impacts in areas or fragments of natural vegetation with greater relevance to biodiversity. In addition, there are mitigation actions and environmental compensation programs in execution related to the monitoring of suppression, flora rescue, fauna scaring and rescue, habitat restoration and investment in protected areas. The Vegetation Suppression Program, since the elimination of vegetation cover, is an unavoidable activity for the operation of some project's structures, such as the pit, which has locational rigidity. This program aims to accompany all suppression actions and ensure that they extend only to the area strictly necessary, minimizing as much as possible the impact on the vegetation. Prior to the suppression, flora rescue actions are implemented, with the objective of rescuing individuals, seeds and seedlings of species that will be used to produce seedlings and reestablish populations within the recovery/restoration actions, conserving genetic material. The suppression is accompanied by programs for scaring and rescuing fauna. The Fauna Monitoring Program has been in place at the Complex for more than 10 years, monitoring invertebrates, fish, amphibians, reptiles, birds, and mammals. Specific monitoring of endangered species is also carried out at the Brucutu mine.

Mining project ID
Project 6

Type of impact
Direct

Impact
Loss of rare and threatened species

Description of the impact
The implementation of mining project structures and eventual expansions lead to the suppression of native vegetation and the reduction of natural habitats. The suppression of native vegetation leads to the reduction or loss of flora individuals, which can affect rare, endemic and threatened species. The edge effect can also compromise the survival of some species of plants, and according to the literature, the effects of exposure to wind, light and dust can be seen at a distance of about 300 m from the edge. Among the species that occur in the region that may be affected are threatened species (Dalbergia nigra, jacarandá)

Consequence
Serious

Likelihood
Likely

Describe response
In response to the impact of vegetation suppression, during the planning of the project and its expansions, analyses of locational and technological alternatives were carried out, with the objective of avoiding impacts in areas or fragments of natural vegetation with greater relevance to biodiversity. In addition, there are mitigation actions and environmental compensation programs in execution related to the monitoring of suppression, flora rescue and investment in protected areas. The Vegetation Suppression

Program, since the elimination of vegetation cover, is an unavoidable activity for the operation of the project's structures. This program aims to accompany all suppression actions and ensure that they extend only to the area strictly necessary, minimizing as much as possible the impact on the vegetation. Prior to the suppression, flora rescue actions are implemented, with the objective of rescuing individuals, seeds and seedlings of species that will be used to produce seedlings and reestablish populations within the recovery/restoration actions, conserving genetic material. The suppression is accompanied by programs for scaring and rescuing fauna,. Rescued seeds and plantlets are used in the production of seedlings, used in the recovery of degraded areas and in compensatory plantings. In addition, compensation actions based on investments in conservation units and the creation of new protected areas are also carried out. Throughout this process, the projects also count on the participation of several stakeholders, whether in the implementation of the programs, in the licensing process, or in meetings with the communities. Among them are universities, research institutions, consulting companies, members of associations, and members of communities.

Mining project ID
Project 7

Type of impact
Indirect

Impact
Fragmentation of ecosystems

Description of the impact
PTVI mining activities are mostly located in protected forest areas. The forest area is categorized as tropical forest which is majority covered by various tree species. The forest is also a habitat for endemic threatened species. Due to the natural distribution of ore chemistry, PTVI applies compatmenized mining method to allow ore blending to get the right chemistry to feed smelters. This method created a fragmentation of forest area which affects the natural habitats, which are habitats for various flora and fauna species, including endemic and threatened species. A survey was conducted of the diversity of flora and fauna at the site to be impacted. The survey results were used as a baseline for assessing impacts and planning reclamation actions. Significant impacts are expected to occur during the implementation and operational phases of mining activities, mainly related to the removal of vegetation cover, acting directly and indirectly on flora and fauna, including the loss of modified and natural habitats, disturbance of existing flora populations, with structural changes and changes in the composition of flora and fauna communities, including aquatic communities and priority and threatened species. The removal of vegetation cover also causes changes in the landscape. The suppression of habitats leads to the loss of flora and fauna specimens, among them endangered and endemic species. In addition, the generation of dust and noise can generate indirect impacts on habitats, flora and fauna. Runoff containing suspended sediments can result in sediments in downstream streams, which can impact aquatic communities. However, with the construction of various sediment control structures, such as sediment ponds, control dams, and pocket ponds gradually, suspended particles drifting downstream can be controlled to a minimum, so that the impact on the downstream ecosystem is minimal and manageable.

Consequence
Serious

Likelihood
Likely

Describe response
The entire area of interest has baseline studies for flora and fauna as a basis for impact assessments. Before the vegetation suppression actions are carried out, seeds are collected and taken to the nursery to produce seedlings for the subsequent recovery process of the mined areas. Seedlings of various species are produced, including endemic and endangered species. The entire mined area goes through a recovery process, which also considers the reestablishment of the populations of endemic and endangered species, as well as the return of fauna. The recovered areas, as well as the surroundings of the mined areas, are monitored. Research is also conducted for this monitoring. In 2021 we handed over 90 Ha of rehabilitated critical land and watersheds (DAS) to the Ministry of Environment and Forestry as a compensation area. PT Vale has taken corrective action to encourage continuous improvements, such as environmental monitoring activities, reporting, evaluation, implementation of environmental management systems, environmental audits, monitoring of compliance with laws and regulations, and reclamation of post-mining land for environmental management.

Mining project ID
Project 2

Type of impact
Indirect

Impact
Loss of rare and threatened species

Description of the impact
The implementation of mining project structures and eventual expansions lead to the reduction of natural habitats. The fragmentation generated by the suppression of vegetation in mining projects is reinforced by external pressure, with the presence of deforested areas and urban areas. The conversion of natural habitats into modified habitats leads to the loss of individuals of flora species and can also lead to the loss of fauna specimens. Among the species that may be affected are those that are rare, endemic, and threatened, which may suffer indirect impacts from the effects of fragmentation. Among the species that could be impacted, we can mention those threatened, such Dalbergia nigra (jacarandá) and another animal species. The presence carnivore species such as Chrysocyon brachyurus (loboguará) and leopards pardalis (ocelot) and Lontra longicaudis (otter), indicates that mammals still find places to establish home ranges and reproduce within the fragmented landscape of the Itabira region. For these species, the loss of habitat is a negative impact that can lead to a reduction of populations in the region.

Consequence
Extreme

Likelihood
Likely

Describe response
In response to the impact of fragmentation, the Flora rescue programs actions are accompanied by programs for scaring and rescuing fauna, which aim to reduce the impacts of suppression on fauna species, as well as flora rescue programs. Compensation actions based on investments in conservation units and the creation of new protected areas are also carried out. In the Itabira Complex we have one RPPN created and other in process, totaling more than 700 hectares of forest formations. The different conservation units in the municipality as well as the protected areas maintained by Vale and habitat restoration areas are of fundamental importance to maintain endemic, rare and threatened species in Itabira region. Throughout this process, the projects also count on the participation of several stakeholders, whether in the implementation of the programs, in the licensing process, or in meetings with the communities. Among them are universities, research institutions, consulting companies, members of associations, and members of the communities.

Mining project ID
Project 3

Type of impact

Indirect

Impact
Loss of rare and threatened species

Description of the impact
The implementation of mining project structures and eventual expansions lead to the suppression of native vegetation and reduction of natural habitats. The fragmentation generated by the suppression of vegetation in mining projects is reinforced by external pressure, with the presence of deforested areas and urban areas. The creation of borders and anthropized areas can affect the movement of fauna between fragments, also limiting gene flow and contributing to the reduction of their genetic variability. The edge effect can also compromise the survival of some animals, and according to literature the effects of exposure to wind, light and dust can be seen at a distance of about 300 m from the edge. The conversion of natural habitats into modified habitats leads to the loss of individuals of fauna specimens. Among the species that may be affected are those that are rare, endemic, and threatened, which may suffer indirect impacts from the effects of fragmentation. Among the species that are impacted we can mention those endemic to the Atlantic Forest (Manacus manacus, rendeira), and threatned (Leopardus pardalis, jaguatirica; Tapirus terrestris, anta).

Consequence
Extreme

Likelihood
Likely

Describe response
In response to the impact of fragmentation, there are mitigation actions and environmental compensation programs related to habitat restoration and investment in protected areas. The Flora rescue programs actions are accompanied by programs for scaring and rescuing fauna, which aim to reduce the impacts of suppression on fauna species. Compensation actions based on investments in conservation units and the creation of new protected areas are also carried out. In the Itabira Complex we have one RPPN created and other in process, totaling more than 700 hectares of forest formations. The different conservation units in the municipality as well as the protected areas maintained by Vale and habitat restoration areas are of fundamental importance to mantain endemic, rare and threatened species in Itabira region. Throughout this process, the projects also count on the participation of several stakeholders, whether in the implementation of the programs, in the licensing process, or in meetings with the communities. Among them are universities, research institutions, consulting companies, members of associations, and members of the communities.

Mining project ID
Project 5

Type of impact
Indirect

Impact
Loss of rare and threatened species

Description of the impact
The fragmentation of natural habitats can affect the ability of flora and fauna specimens to disperse, and the conversion of habitats can lead to the migration of specimens to the surrounding natural environments, which can cause an imbalance in the receiving communities.

Consequence
Serious

Likelihood
Likely

Describe response
Specifically to reduce impacts on animal species: ● Fauna Rescue Program: This program aims to rescue previously the largest possible number of individuals from the fauna present in the area affected before the suppression of forest vegetation. ● Environmental Compensation Actions: actions aimed at restoring areas and planting endangered and/or legally protected species, called compensatory planting, are carried out, in addition to evaluating and creating a protected area containing environments of native vegetation, with the aim of preserving remnants of the flora and fauna affected by the project. Example: Due to emergency work in the Paraopeba Complex, in 2021, the monitoring of plant suppression was carried out to scare away the fauna or carry out its eventual rescue. The driving away was carried out without the need to rescue any individual during the suppression process.

Mining project ID
Project 6

Type of impact
Indirect

Impact
Loss of rare and threatened species

Description of the impact
The implementation of mining project structures and eventual expansions lead to the suppression of native vegetation and the reduction of natural habitats. The fragmentation in the areas surrounding the Brucutu Complex is already a reality, and the suppression of new areas for expansions and maintenance reinforces the existing situation. The suppression of native vegetation leads to the reduction or loss of flora individuals and fauna habitats, which can affect rare, endemic and threatened species. The creation of borders and anthropized areas can affect the movement of fauna between fragments, also limiting gene flow and contributing to the reduction of their genetic variability. The edge effect can also compromise the survival of some species of animals, and according to the literature, the effects of exposure to wind, light and dust can be seen at a distance of about 300 m from the edge. Among the species that occur in the region that may be affected are endemic Atlantic Forest species (Ilicura militaris, tangarazinho; Hemithraupis ruficapilla, saíra-da-mata), threatened species (Drymophila ochropyga, Choquinha; Chrysocyon brachyurus, Lobo Guará).

Consequence
Serious

Likelihood
Likely

Describe response
In response to the impact of fragmentation, during the planning of the project and its expansions, analyses of locational and technological alternatives were carried out, with the objective of avoiding impacts in areas or fragments of natural vegetation with greater relevance to biodiversity. In addition, there are mitigation actions and environmental compensation programs in execution related to fauna scaring and rescue, habitat restoration and investment in protected areas. The suppression is accompanied by programs for scaring and rescuing fauna. In addition, compensation actions based on investments in conservation units and the creation of new protected areas are also carried out. In Brucutu the Program for Monitoring Threatened Fauna Species is being carried out in the mine's areas of influence, with the objective of monitoring the species against the changes caused by the operation and expansions of the mine. In addition, the monitoring of invertebrates, fish, reptiles, amphibians,

birds and mammals has been going on for almost 10 years. Throughout this process, the projects also count on the participation of several stakeholders, whether in the implementation of the programs, in the licensing process, or in meetings with the communities. Among them are universities, research institutions, consulting companies, members of associations, and members of communities.

Mining project ID
Project 4

Type of impact
Indirect

Impact
Loss of rare and threatened species

Description of the impact
The fragmentation of natural habitats can affect the ability of flora and fauna specimens to disperse, and the conversion of habitats can lead to the migration of specimens to the surrounding natural environments, which can cause an imbalance in the receiving communities.

Consequence
Serious

Likelihood
Likely

Describe response
Specifically to reduce impacts on animals: ● Fauna Rescue Program: This program aims to accompany the deforestation fronts and rescue animals with difficulties in transit or displaced ● Recovery of Degraded Areas - this rehabilitation program has as its main objectives the rehabilitation of areas degraded by the project, aiming at soil protection, erosion control, recovery of the local flora, and minimization of the visual impact caused by modifications in the relief and landscape of the region. ● Environmental Compensation Actions: actions aimed at restoring areas and planting endangered and/or legally protected species, called compensatory planting, are carried out, in addition to evaluating and creating a protected area containing environments of native vegetation, with the aim of preserving remnants of the flora and fauna affected by the project. Example: In 2021, the Tamanduá Mine underwent a geometry adjustment intervention. The area of vegetation to be suppressed had the rescue of 1,797 individuals, belonging to 22 species and twelve distinct families during flora rescue activities. The rescued individuals were replanted and are in acclimatization in the Vale's Native Seedling Production Center, in Nova Lima (MG).

Mining project ID
Project 1

Type of impact
Direct

Impact
Conversion and/or degradation of natural habitats (other than forests)

Description of the impact
The implementation of mining project structures and eventual expansions lead to the suppression and/or reduction of forest habitats. The fragmentation generated by the suppression of vegetation in mining projects is reinforced by external pressure on the Carajás National Forest, with the presence of deforested areas. The creation of borders and anthropized areas can affect the movement of fauna between fragments, also limiting gene flow and contributing to the reduction of their genetic variability. The edge effect can also compromise the survival of some species of flora, and according to literature the effects of exposure to wind, light and dust can be seen at a distance of about 300 m from the edge. The conversion of natural habitats into modified habitats leads to the loss of individuals of flora species and can also lead to the loss of fauna specimens. Among the species that may be affected are those that are rare, endemic, and threatened, which may suffer both direct impacts, with the loss of individuals, and indirect impacts from the effects of fragmentation. Among the species that are impacted, we can typically forest species, such as primates and birds dependent on the forest understory.

Consequence
Serious

Likelihood
Likely

Describe response
In response to the impact of vegetation suppression, it became necessary to apply mitigating actions and measures, such as the rescue of the flora, prioritizing its reintroduction in recovery and restoration areas, and compensatory measures such as the reforestation of other areas or other action agreed between the applicant and the competent environmental agency. The flora rescue provides the removal of specimens and seeds of different species present in the area to be suppressed. The seedlings are used in recovery and restoration processes, with a view to the conservation of genetic variability, prioritizing those that are threatened with extinction. This was a preventive measure, carried out during the implementation phase of the project and related to the biotic environment, with its application period considered to be short-term, but which will reflect long-term benefits. By 2021, more than 5,000 hectares have been recovered in rural properties mostly located south of the Carajás National Forest within the Connectivity Project – Northern System Forest Corridor. This project goes beyond fulfilling legal requirements, aiming to increase the forest cover in areas previously occupied by agricultural activities and to promote connection in the landscape. In addition, we are fostering partnerships with a local cooperative to buy seeds of native species, generating alternatives for the sustainable use of the forest. Fauna rescue programs aim to rescue individuals from the fauna present in the area affected during the suppression of forest vegetation accompanying the deforestation fronts to capture fauna individuals found in transit or displaced. Throughout this process, the projects also rely on the participation of various stakeholders, whether in the implementation of the programs, in the licensing process, or in meetings with the communities. The Carajás Biodiversity Management Plan, published in 2021, aims to integrate sustainability into Vale's operations in the Caraja's protected area mosaic and in surrounding areas, proving guidance on biodiversity management throughout a mine project's lifecycle and reconciling conservation with local development priorities, with focus on risks from the Company's operations on biological diversity.

F-MM11.2/F-CO11.2

(F-MM11.2/F-CO11.2) Have you identified any biodiversity risks with the potential to have a substantive financial or strategic impact on your business?
Yes

F-MM11.2a/F-CO11.2a

(F-MM11.2a/F-CO11.2a) How does your organization define substantive impact on your business?

Vale has a Risk Management Policy that seeks to establish guidelines for the global management of potential risks to which Vale and its subsidiaries are exposed. Business risk management focuses on potential relevant risks that, in the event of an occurrence, may impact people, communities, the environment, operational continuity, reputation, and the achievement of the Company's general business objectives. By Vale's Risk Management Policy, a Severity matrix is defined to standardize the potential measurement of risks and compete for all types of impacts (People, Environment, Social and Human Rights, Reputational and Financial). Vale defines a strategy to divide its risks into categories such as very light, light, moderate, severe, critical, and very critical. Also, to support the responsibilities of the risk management process, the Executive Board uses 5 Executive Committees of Business Risks, with distinct scope of action, such as Operational Risks, Geotechnical Risks, Strategic, Financial and Cyber Risks, Risk of Compliance, and Risks of Sustainability, Institutional Relations and Reputation, whose responsibilities, competencies are defined in POL-0009-G - Risk Management Policy and/or the Rules of Procedure Internal Committees of Business Risks. For the definition of substantive financial and strategic impacts on the business, they are considered from a moderate to a very critical level, always representing amounts above US$ 100 MM.

In addition to the risks, opportunities with potential results were also identified. The substantial impact in the context of opportunity about Biodiversity for Vale is any action that generates a positive environmental or social impact and, consequently, has a positive impact on its reputation. These opportunities will be further addressed in question F-MM11.3a.

F-MM11.2b/F-CO11.2b

(F-MM11.2b/F-CO11.2b) For your disclosed mining projects, provide details of risks identified with the potential to have a substantive financial or strategic impact on your business, and your response to those risks.

Type of risk
Physical

Primary risk driver
Forest fires

Primary potential impact
Disruption to workforce management and planning

Magnitude of the potential impact
High

Likelihood
Likely

Where does the risk driver occur?
Company-wide

Mining project ID
<Not Applicable>

Company-specific description
Forest fires are unfortunately an accident that has potential occurrence in our areas, especially during the dry season. Vale complexes that are located adjacent to or within areas of forest vegetation have the highest chance of occurrence and may have more critical consequences when located adjacent to protected areas. For example, the Complexes that are located in the states of Pará and Minas Gerais in Brazil. The impact of greatest concern to Vale is the loss of affected biodiversity and impact in protected area in adjacent areas. In addition, other secondary impacts are cascaded, such as the reinforcement of local mine workers to fight the fire, and also the expenses to contain it.

Timeframe
Current - up to 1 year

Primary response to risk
Implementation of environmental best practices in direct operations

Description of response
All Vale mining projects have a fire brigade ready to act when necessary. If the fire is not contained even in partnership with environmental agencies and firefighters, a third party is contracted. This structure is already implemented in Vale's operations and over time it has been improved. The response to fires is believed to be rapid and well-coordinated, joining efforts to be able to contain the fire as soon as possible. In this way, not only will there be a reduction in the loss of biodiversity, but also less negative press coverage. What impacts relatively on Vale's business. The fire brigade AMDA/Vale acts directly in combat forest fires and it acts strongly in the prevention of these events and in the mitigation of fire damage. For example, in the Complexes of Paraopeba and Vargem Grande, in 2021 were made the following actions: -Plating seedlings of native trees in the Parque Estadual da Serra do Rola Moça; -Maintenance (crowning and cleaning of native tree seedlings that were planted in the former of the PESRM plantation. -Preventive monitoring -Construction and maintenance of firebreaks -Cleaning of waste in areas with recidivism of fires -Drawdown of vegetation (mechanical mowing).

Type of risk
Regulatory

Primary risk driver
Increased difficulty in obtaining operations permits

Primary potential impact
Increased compliance costs

Magnitude of the potential impact
High

Likelihood
Very likely

Where does the risk driver occur?
Selected mines, business units or geographies only

Mining project ID
Project 1
Project 2
Project 3
Project 4
Project 5
Project 6

Company-specific description
In response to the failure of Dam I, other environmental and health and safety laws and regulations have been passed, and others may arise, and authorities may impose stricter conditions in relation to the licensing process for the Company's projects and operations. Moreover, Vale may face stricter requirements and delays in receiving environmental licenses to operate other tailings dams. Social, environmental and health and safety regulations in many countries in which Vale operates have become stricter in recent years, and it is possible that more regulations or a stricter application of existing regulations may adversely affect it by imposing restrictions on its activities and products, creating new requirements for the issuance or renewal of environmental licenses and work permits, resulting in licensing and operating delays, increasing their costs or requiring the engagement in costly recovery efforts.

Timeframe
Current - up to 1 year

Primary response to risk
Greater compliance with regulatory requirements

Description of response
After the rupture of the Brumadinho dam, all risk management was reassessed and improved with extreme rigor. All lines of defense were restructured and training was intensified. All of these actions have already taken place and continue to be carried out for Vale to be in compliance with all laws and regulations and also ready for future projects. It is expected that the measures taken will result in future improvements, such as the non-occurrence of other dam ruptures that have a negative financial or strategic impact, and no negative impact on biodiversity. Since 2020, Vale has been implementing the Waste and Dam Management System (TDMS), which covers the Routine, Performance and Risks pillars, and all of the strategic aspects of dam safety and tailings storage structures (EARs). In 2021, the TDMS began to contemplate all de business units with a clear definition of roles and responsibilities. For 2022, it is planned the consolidation of the system, and the training for all geotechnical teams. At the S11D Complex mine, beneficiation is done at natural humidity, which reduces water consumption by 93%, reduces electricity consumption, and eliminates the need for tailings dams.

Type of risk
Regulatory

Primary risk driver
Exposure to sanctions and litigation

Primary potential impact
Fines, penalties or enforcement orders

Magnitude of the potential impact
Medium-high

Likelihood
Likely

Where does the risk driver occur?
Company-wide

Mining project ID
<Not Applicable>

Company-specific description
Nearly all aspects of Vale's activities, products and services associated with the company's capital projects and operations around the world are subject to social, environmental, health and safety regulations, which may expose it to increased liability or increased costs. Such regulations require Vale to have environmental licenses, permits and authorizations for its operations and projects, and to carry out environmental and social impact assessments in order to get approval for its projects and permission for initiating construction and continuing operations. Significant changes to existing operations are also subject to these requirements. Social, environmental and health and safety regulations also impose standards, procedures and controls on activities relating to mineral exploration, mining, processing, pelletizing activities, railway and marine services, ports, decommissioning, distribution and marketing of its products. Such regulation may give rise to significant costs and liabilities. Litigation regarding these and other related matters may adversely affect the Company's financial condition or otherwise harm its reputation.

Timeframe
1-3 years

Primary response to risk
Greater due diligence

Description of response
Vale is improving its entire ESG structure so that it permeates all its areas and operations. In addition, it is also investing in transparency through the creation of the ESG Portal. Where it shows all its commitments to the environment, social and governance issues. As such, it is aware of any penalties or fines that it may incur when violating critical ESG-related issues. Vale has a goal in the 2030 agenda related to eliminating major ESG gaps in best practices. Because of this, Vale has created an action plan that lists gaps and clarifies our activities to fill them. And this action plan is available in Vale's ESG Portal. Compliance with the environmental legislation in force at the scope of the activity or enterprise is assessed, the specific terms of each license and the respective conditions, and environmental compliance processes are conducted in all operations and projects, globally, to verify their regularity. Environmental conditions and the environmental compliance indicator are monitored monthly in the performance meetings attended by the President, Vice-Presidents, Directors and Managers.

Type of risk
Reputational and markets

Primary risk driver
Negative media coverage

Primary potential impact
Brand damage

Magnitude of the potential impact
High

Likelihood
Very likely

Where does the risk driver occur?
Company-wide

Mining project ID
<Not Applicable>

Company-specific description
The negative propagation of the media about the company is a great risk for its business, considering that the stakeholders are more attentive to the ESG practices of the companies. Therefore, any harmful information disclosed may impact Vale's reputation as well as the company's movement on the Brazilian stock exchange is noticeable when any negative information on the stock price falls. This was unfortunately observed in the rupture of the Brumadinho dam in 2019.

Timeframe
4-6 years

Primary response to risk
Engagement in multi-stakeholder initiatives

Description of response
Vale is improving its entire ESG structure so that it permeates all of its areas and operations. In addition, it is also investing in transparency through the creation of the ESG Portal. Where it shows all its commitments to the environment, social, and governance issues. The answer remains in a consistent course for the residual risk regarding Brumadinho. The actions for the repair of Brumadinho are addressed in all Vale's sustainability reports, including the ESG Portal itself. In addition, Vale signed the Comprehensive Reparation Agreement in early 2021 with the Government of Minas Gerais, the Federal Public Prosecutor's Office and the Public Defender's Office of Minas Gerais, this agreement is the most effective way of guaranteeing the rights of those affected. The agreement guarantees legal certainty and speed in the socio-environmental and socioeconomic reparation of diffuse and collective damages. Learn more at http://www.vale.com/esg/pt/Paginas/Brumadinho.aspx.

Type of risk
Physical

Primary risk driver
Forest fires

Primary potential impact
Brand damage

Magnitude of the potential impact
High

Likelihood
More likely than not

Where does the risk driver occur?
Selected mines, business units or geographies only

Mining project ID
Project 1

Company-specific description
One of the mapped risks is forest fires that result in the loss of biodiversity. Any fire adjacent to the Carajás National Forest is delicate, as the fire spreads quickly in a short time due to its dense and extensive forest. Unfortunately, in the year 2021, there was a fire followed by explosions caused by a storm in Canaã dos Carajás. There were no reports of injuries. In 2021, were recorded thirteen occurrences of fires in areas close to the Carajás Complex, which totaled 765.78 ha of impacted areas, an area much smaller than those impacted during 2020 (9,860.18 ha). Risks like this when they occur impact biodiversity in the region and also financially the company, through fines and penalties. Both major impacts result in other secondary impacts such as damage to the brand and disruption to workforce management and planning.

Timeframe
1-3 years

Primary response to risk
Promotion of sustainable forest management, including financial incentives

Description of response
Vale has a well-structured risk policy that is periodically revised called the "Risk Management Standard" which covers all of Vale's units globally. This standard determines lines of defense divided into layers so that it responds specifically to each risk. All of its operations have a fire-fighting system. Thus, if the risk materializes, the company is ready to act and control the fire. All fire risk management has been in place for years. The expected responses to this risk are fast and structured. If necessary, a third party is hired to control larger fires. It is expected that future impacts from fires will be less and less in view of the improvement of the fire fighting system. In 2021, two Airtractor-type aircraft performed daily monitoring in sensitive areas with a history of fires inside and around the Conservation Units. In addition, daily rounds were carried out by the two groups of Forest Fire Fighting (GCIF) aiming to promote a quick response in potential occurrences.

F-MM11.3/F-CO11.3

(F-MM11.3/F-CO11.3) Have you identified any biodiversity-related opportunities with the potential to have a substantive financial or strategic impact on your business?
Yes

F-MM11.3a/F-CO11.3a

(F-MM11.3a/F-CO11.3a) For your disclosed mining projects, provide details of the identified opportunities with the potential to have a substantive financial or strategic impact on your business.

Type of opportunity
Reputational and markets

Primary biodiversity-related opportunity
Improved community relations

Where does the opportunity occur?
Selected mines, business units or geographies only

Mining project ID
Project 1

Estimated timeframe for realization
>6 years

Company specific description & strategy to realize opportunity
The Horizons Project, established by the partnership between ICMBio and Vale, combines conservation with the generation of income and preservation of rivers, in addition to mitigating greenhouse gas emissions through carbon capture. The Project has been working on five interconnected subprojects related to enhancing the management of environmental licensing knowledge; expansion of the region's economic matrix with a focus on agroforestry and agricultural and extractive activities; conservation of water resources; land regularization and biodiversity monitoring. The Cooperation Agreement between ICMBio and Vale was signed (Process SEI ICMBio nº 02122.001002 / 2019-83) on April 22, 2020. One of the areas of action within the Project is the creation of ecological corridors to connect the PA mosaic to other forest landscapes—especially in the northeast, the Rio Negro PA, the Lindoeste area and the southeast of the mosaic—while advancing the social and economic development of the region through the implementation of agroforestry systems. Implementing these initiatives will benefit biodiversity conservation, climate and people. This project has as much positive impact on the biodiversity of Carajás as it does on Vale's reputation, adding more value to the company.

Type of opportunity
Other

Primary biodiversity-related opportunity
Contribution to biodiversity knowledge

Where does the opportunity occur?
Selected mines, business units or geographies only

Mining project ID
Project 1

Estimated timeframe for realization
>6 years

Company specific description & strategy to realize opportunity
The Institute Technological Vale – ITV Sustainable Development is a no-profit research institute supported by Vale. Since 2010, ITV has been developing research on Applied Computing, Meteorology and Climate Change, Environmental Recovery, Environmental Genomics, Environmental Geology, and Water Resources, Biodiversity and Ecosystem Services and Socioeconomics, focused on developing Sustainability solutions, building and sharing knowledge about Amazon. In the Carajás region, the Amazoomics project produced high-quality genomes for 29 endangered species of Brazilian fauna. Genomic information is currently an important knowledge base for understanding physiology and genetics. The data are also essential for studies on the evolution of species. The first stage of the project will be carried out in partnership with the Vale Zoobotanical Park, which is home to several species of fauna. This is currently the largest project of genomic studies of biodiversity in progress in the country and has the collaboration of researchers and entities that work in the conservation of threatened species. In the Jaborandi Bioeconomy survey, ITV sought to identify and understand the jaborandi species with the highest content of pilocarpine, a substance used in the treatment of glaucoma and in the fight against dry mouth. By mapping the genome and selecting matrices for reproduction, they gather the information that guides the best way to extract the leaves. They also seek to map new areas of natural occurrence that can be managed in an orderly manner, as well as to investigate environmental conditions that favor their growth. Threatened by deforestation and disorderly exploitation, jaborandi is restricted to the states of Pará, Maranhão and Piauí and represents an important source of income for the local population. Studies with jaborandi help to value non-timber forest products, keeping the forest standing and promoting the bioeconomy of the Amazon. This project has been developed in partnership with other research institutions and with the Carajás Extractivist Cooperative (COEX). This opportunity is in accordance with the definition given in question F-MM11.2a .

Type of opportunity
Other

Primary biodiversity-related opportunity
Contribution to biodiversity knowledge

Where does the opportunity occur?
Selected mines, business units or geographies only

Mining project ID
Project 1
Project 2
Project 5

Estimated timeframe for realization
>6 years

Company specific description & strategy to realize opportunity
The Carajás Nursery is located two kilometers from the Urban Center of Carajás, towards the industrial gate of N5. The purpose of the nursery is to produce and make seedlings of regional native species available for programs of ecosystem restoration of habitats and recovery of mined areas, as well as providing seedlings for environmental actions and donations to the local community. The planting of seedlings plays a fundamental role, as it contributes to the conservation of plant species, especially those threatened with extinction, improves air quality, protects springs, streams and rivers, promotes soil protection and facilitates agroecological balance. The production of seedlings of native species has mostly been achieved by the method of sexual propagation, that is, through seeds. Currently, all the seeds in the nursery

come from the Flora Rescue Projects or are bought from the Flona de Carajás Extractive Cooperative (COEX), as a way of generating income and development for members and their families. This initiative, which is currently implemented, brought not only social and environmental benefits but also significantly improved the company's relationship with the local community. Thus, this opportunity had a considerable positive social impact. The improvement in the relationship with the communities, in addition to benefiting the local economy where there is a Vale project, also enables a positive reputation of several stakeholders. This impact is in accordance with the definition given in question F-MM11.2a.

Type of opportunity
Other

Primary biodiversity-related opportunity
Contribution to biodiversity knowledge

Where does the opportunity occur?
Selected mines, business units or geographies only

Mining project ID
Project 2
Project 3
Project 4
Project 5
Project 6

Estimated timeframe for realization
Current - up to 1 year

Company specific description & strategy to realize opportunity
The Brazilian state of Minas Gerais harbors exceptional biodiversity. Serra do Espinhaco and the Iron Quadrangle, a north-south trending mountain range, form a unique geomorphological landscape found nowhere else in the world, home to the Espinhaço Biosphere Reserve designated by UNESCO in 2005, in the area recognized for its species richness and endemism. In addition to a diversity of geological characteristics, relief and a great variety of minerals, three types of Brazilian biomes are found within their limits and among them, two are considered biodiversity hotspots (Atlantic Forest and Cerrado). Many endemic, rare and endangered plants and animals are found in these ecosystems. A joint program was carried out with a network of Taxonomists (15 different research institutions, mainly universities) on endemic species of the Iron Quadrangle, with monthly surveys for endemic species present in prospects in total protected areas of the region. Six species called extinct were found, as well as 9 potentially new species to the literature or not before. 11 of 41 species equal as being endemic to the Iron Quadrangle. These studies have helped to improve knowledge about the distribution of special-concern species or species that are particularly vulnerable due to their restricted range. It is necessary for researchers to identify and map the potential parent plants from which to obtain species propagules for conservation purposes. expanded knowledge about the ecology of this group of special plants supports future research on their reproduction and reintroduction in different substrates. In addition, information on species distribution and survival on different types of substrates can be useful in developing protocols for the reproduction and rehabilitation of mined land. This opportunity was an essential action to increase knowledge of biodiversity, encourage scientific research and update data. And in this way, as result, provides a positive image of Vale's reputation as mentioned in question F-MM11.2a. In 2021 Vale published the third volume of the Plant Guide – Flores no Campo Rupestre, the result of part of this work,which brings together some of the species found in ten Conservation Units in 2019.

Type of opportunity
Other

Primary biodiversity-related opportunity
Contribution to biodiversity knowledge

Where does the opportunity occur?
Selected mines, business units or geographies only

Mining project ID
Project 2
Project 3
Project 4
Project 5
Project 6

Estimated timeframe for realization
>6 years

Company specific description & strategy to realize opportunity
Since 2015, Vale has maintained the Biofactory in the Quadrilátero Ferrífero in Minas Gerais, with the aim of multiplying specimens of native flora using biotechnology. At first, priority was given to rare and endangered species, especially of rupestrian fields, with a focus on orchids, bromeliads, vellozias and cacti. Today, seedlings of several rare, endemic, and endangered species from the Atlantic Forest and Cerrado are reproduced. Under the ideal conditions created in the lab, a single seed pod can turn into hundreds or even thousands of individuals. These are then grown in greenhouses and, after acclimatization under conditions approximating their natural habitat, are reintroduced in the wild. The species produced are used in rehabilitating mine sites or restoring habitats, and are monitored to ensure the different species, individuals and populations have been successfully established. The technology applied here allows the production of many seedlings of species with low germination capacity, allowing their reintroduction and dissemination back into the wild. The partnership with research institutions and universities allows us to increasingly improve the techniques and develop specific indicators for monitoring the restoration of areas and tracking the development of these species. This seed-growing opportunity not only allows a contribution to biodiversity but, consequently, positively impacts Vale's reputation as mentioned in question F-MM11.2a. In 2021 the biofactory produced 28,177 seedlings, including endemic and threatened species from the Atlantic Forest and Cerrado.

Type of opportunity
Efficiency

Primary biodiversity-related opportunity
Cost savings

Where does the opportunity occur?
Selected mines, business units or geographies only

Mining project ID
Project 7

Estimated timeframe for realization

Current - up to 1 year

Company specific description & strategy to realize opportunity
The Company follows a risk control approach to reduce potential losses due to volatility in nickel and fuel prices. At the same time, the Company also follows efficiency programs to reduce production costs to the lowest possible level, so that it remains competitive regardless of world nickel price movements.

Type of opportunity
Products and services

Primary biodiversity-related opportunity
Increased R&D and innovation opportunities

Where does the opportunity occur?
Selected mines, business units or geographies only

Mining project ID
Project 2
Project 3
Project 4
Project 5
Project 6

Estimated timeframe for realization
Unknown

Company specific description & strategy to realize opportunity
Vale invested around R$50 million in the development of sand produced from adjustments to the iron ore operation in the State of Minas Gerais. The sandy material, previously discarded in piles and dams, is processed and transformed into a product, following the same quality controls as for iron ore production. The Vale's sand reaches the construction industry as a 100% legal and efficient alternative for use in cement, precast concrete, interlocking blocks, paving, among others. As it is an essentially physical process, the sand is not toxic since it does not change the material's composition. Another positive point for civil construction is that the product has high chemical and granulometric uniformity. One of Vale's sand great differentials is to contribute to the circular economy, since the material that was destined for the dams in the form of tailings returns to society as an alternative to a product that suffers from predatory extraction. This also reduces the impact on the environment and biodiversity, since it reduces the need for new areas for disposal and, therefore, the need of new interventions in native vegetation, habitats and species. This sandy material opportunity not only allows a contribution to biodiversity but, consequently, positively impacts Vale's reputation as mentioned in question F-MM11.2a. In 2021, more than 250 thousand tons of the product have been processed and destined for sale to companies or donation to city halls for use in concrete, mortar, prefabricated, artifacts, cement and road paving.

F12 Governance

F-MM12.1/F-CO12.1

(F-MM12.1/F-CO12.1) Is there board-level oversight of biodiversity-related issues within your organization?
Yes

F-MM12.1a/F-CO12.1a

(F-MM12.1a/F-CO12.1a) Identify the position(s) of the individual(s) (do not include any names) on the board with responsibility for biodiversity-related issues.

Position of individual	Please explain
Chief Executive Officer (CEO)	The CEO is appointed by the Board of Directors. The Chief Executive Officer has the attribution to submit to the Board of Directors the names of candidates for the Executive Committee with renowned knowledge and specialization in the subject of the responsibility of the respective operational area and may also at any time submit to the Board of Directors a motion to remove. The Executive Board meets on an ordinary basis once every fifteen days and extraordinarily whenever called by the Chief Executive Officer or his substitute. The CEO together with the Executive Board has several duties among them: preparing and submitting to the Board of Directors, the Company's purpose, strategic guidelines and the strategic plan, in the case of the latter two, on an annual basis, considering socioenvironmental issues and executing the approved strategic plan; preparing and submitting the Company's annual and multi-annual budgets to the Board of Directors, and executing the approved budgets; planning and steering the Company's operations and reporting the Company's economic and financial performance, as well as Vale's performance in its sustainability initiatives, to the Board of Directors, and producing reports with specific performance indicators. In addition, Vale's CEO has prioritized people, safety and repair in Brumadinho. He introduced two new strategic pillars for the company: New Pact with Society and Safety and Operational Excellence. The New Pact with Society is consistent with making Vale's operations increasingly sustainable which is integral to our business model and to our sustainability and includes, among others, targets related to biodiversity, climate change and water management. As an example, Vale advanced in the forestry target of 62,248 hectares of protected forests and 5,125 hectares of recovered areas by 2021.
Chief Sustainability Officer (CSO)	In 2021 the Board of Directors decided to establish an exclusive executive board for the theme of Sustainability. The Executive Vice President of Sustainability (EVPS), a position equivalent to the CSO, is a company's legal representative and is responsible for day-to-day operations and the implementation of the general policies and guidelines set forth by the Board of Directors. The EVPS is below the Chief Executive Officer. The EVPS is responsible for dealing with and connecting all topics related to the company's business in an overall perspective. This role includes the identification, addressing and treatment of critical issues that result in risks or business impact, defining the establishment of sustainability goals (including biodiversity), monitoring and implementing policies, strategies and specific initiatives, as well as the evaluation of proposals of investments in sustainability.
Board-level committee	The Board Committees advise the Board of Directors, including proposing improvements related to their areas of expertise. In order to give greater efficiency and quality to the decisions, the Board ensures the Company's activities are conducted in accordance with laws, ethics and internal controls. The Board deliberates on strategic guidelines and plans, monitors and evaluates Vale's economic and financial performance, analyses its corporate and financial risk policies, elects and evaluates the Executive Officers. The Sustainability Committee evaluates the sustainability strategy ensuring that it is being implemented into the overall strategy. Activities: review and recommend issues related to sustainability in the company's strategic planning, evaluating, complementing and suggesting changes in the company's socio-environmental strategies, monitoring their respective implementation; analyze socio-environmental strategies, mineral research and new technologies, the climate change agenda and issues with social aspects; evaluate Vale's performance and monitored indicators in relation to sustainability aspects, and also monitoring the Integrated Risk Map; Assess and advise on policies within its competence, positioning and communication strategy and Vale reputation related to its performance in the areas of safety, human rights, environment, health, relationship (social dialogue) with communities and other stakeholders, institutional relationships (Government and with Priority Entities), recognition of local talent. In addition, it is the role of the Sustainability Committee to propose guidelines and recommended the approval of the Integrated Report and accompanied the Journey to the Dow Jones Sustainability Index (DJSI, 2021 results). The Committee also acts to monitor the reparation actions related to Mariana (Renova Foundation) and Brumadinho's dam failure, ensuring the application of the guidelines established by the Extraordinary Independent Advisory Committee on Support and Reparation ("CIAE-AR") and demanding measures in the direction of the agility of the completion of all projects and compensation to those affected by the Mariana Disaster.

F-MM12.1b/F-CO12.1b

(F-MM12.1b/F-CO12.1b) Provide further details on the board's oversight of biodiversity-related issues.

	Frequency that biodiversity-related issues are a scheduled agenda item	Governance mechanisms into which biodiversity-related issues are integrated	Please explain
Row 1	Scheduled - some meetings	Monitoring implementation and performance	The Board of Directors monitors the implementation of policies within the company, which includes the sustainability policy and sustainability strategy. In order to do that, the Board shall meet on a monthly basis to monitor and evaluate the Company's economic and financial performance and to deliberate on strategic guidelines and plans. Biodiversity-related issues are part of the regular agenda of these meetings. Additional meetings can be called by its chairman, vice-chairman or any two directors to discuss biodiversity issues if needed.

F-MM12.2/F-CO12.2

(F-MM12.2/F-CO12.2) Provide the highest management-level position(s) or committee(s) with responsibility for biodiversity-related issues (do not include the names of individuals)

Name of the position(s) and/or committee(s)
Sustainability committee

Responsibility
Both assessing and managing biodiversity-related risks and opportunities

Frequency of reporting to the board on biodiversity-related issues
More frequently than quarterly

Please explain
The Sustainability Committee advises the Board on sustainability-related issues, including biodiversity. The Committee works continuously, not only upon demand of the Board, and follows an annual calendar. At least 2 members of the Committee must be also members of the Board. Among some of the attributions that belong to the Sustainability Committee, we highlight the following: review and recommend Sustainability issues, and their approach, in the company's strategic planning, evaluating, complementing and suggesting changes in the company's socio-environmental strategies, monitoring their respective implementation; assist in the definition, evaluation and monitoring of the Sustainability indicators and propose improvements; evaluate and propose Vale's adoption or adherence to initiatives or agreements at the national or international level related to issues of social and environmental responsibility, as well as monitoring the preparation and dissemination of the Sustainability Report/ Integrated Report, CDP questionnaire, and GHG inventory; evaluate projects, initiatives as well as the Company's investment proposals from the perspective of sustainability (including issues of biodiversity) and innovation, in addition to making possible recommendations to the Board of Directors; and monitor the scope of action and effectiveness of the area of institutional relations in dealings with regulatory bodies and other institutional relations associated with sustainability issues.

Name of the position(s) and/or committee(s)
Chief Sustainability Officer (CSO)

Responsibility
Both assessing and managing biodiversity-related risks and opportunities

Frequency of reporting to the board on biodiversity-related issues
More frequently than quarterly

Please explain
The Chief Sustainability Officer (The Executive Vice President of Sustainability) is the highest level in a management position responsible for sustainability issues, such as biodiversity and forest. This position is below the CEO. The Chief Sustainability Officer is the company's legal representative and its position level has the attribution of representing the company for sustainability issues, such as biodiversity and forest. It is responsible for proposing biodiversity policies, plans, projects and targets to the approval of the Executive Board, as well as for implementing the general policies and guidelines set forth by the Board of Directors. The Chief Sustainability is also responsible for evaluating, monitoring and reporting Vale's performance, risks and opportunities regarding environmental issues (like biodiversity and forest) to the Board of Directors. These topics are periodically presented to the Risk Management Executive Board, where they are reviewed for quarterly reporting to the Board of Directors and published in the Annual Report and the Sustainability Report. Vale's purpose to improve lives and transform the future is shared by all of its business areas and fronts. To this end, the company promotes management based on voluntary business actions and partnerships with different levels of government, public institutions, other companies and civil society. In this process, the Chief Sustainability Officer has the function of unfolding and monitoring progress in the execution of strategies and policies, in addition to being an agent of internal and external engagement, through actions and dialogue with stakeholders, as well as strengthening ties between Vale and society, being an important facilitator for the implementation of the new pact with society, one of Vale's strategic pillars.

F-MM12.3/F-CO12.3

(F-MM12.3/F-CO12.3) Do you provide incentives to C-suite employees or board members for the management of biodiversity-related issues?

	Are there incentives to C-suite employees or board members?	Comment
Row 1	Yes	Environmental and social indicators work as metrics to assess the sustainability of the different business areas, reflecting on the variable remuneration of the teams. All of these goals, once defined, are registered and monitored in the Career, Succession and Performance (CSP) system. Sustainability integrates the variable remuneration of all Vale employees and impacts all hierarchical levels, up to the CEO. In 2021, the targets related to sustainability represented 10% of the employees' short-term variable remuneration and the targets related to ESG represented 20% of the executive's long-term variable remuneration, including the CEO and Executive Board.

F-MM12.3a/F-CO12.3a

(F-MM12.3a/F-CO12.3a) What incentives are provided to C-Suite employees or board members for the management of biodiversity-related issues (do not include the names of individuals)?

	Role entitled to incentive	Indicator for incentivized performance	Please explain
Monetary reward	Corporate executive team Chief Executive Officer (CEO) Chief Financial Officer (CFO) Chief Operating Officer (COO) Chief Procurement Officer (CPO) Chief Risk Officer (CRO) Chief Sustainability Officer (CSO)	Achievement of commitments and targets	In 2020, Vale adopted metrics even more focused on environmental, social and governance (ESG) issues when considering its officers' short- and long-term variable compensation, seeking to strengthen our strategic pillars of Safety & Operational Excellence and the New Pact with Society. The Sustainability metrics are based on the 2030 Commitments that include: (i) reduction of greenhouse gas emissions in line with the Paris Agreement; (ii) 100% clean energy self-generation worldwide; (iii) a 10% reduction in fresh water intake; (iv) recovery and protection of 500,000 ha of degraded land beyond Vale's limits; and (v) socioeconomic contribution to health care, education and income generation. All of these goals, once defined, are registered and monitored in the Career, Succession and Performance (CSP) system. Alignment of remuneration with Vale's ambition being a leader in low carbon mining is associated with reduced emissions and reclamation of areas, therefore directly associated with reduced pressures on biodiversity and habitat rehabilitation/restoration. These indicators are relevant and strategic for Vale, because as they link the compensation of our employees as our goals, helping the sustainable performance of the Company and the return for its investors. This encourages the continuous improvement of the company's performance on material socio-environmental issues. Environmental and social indicators work as metrics to assess the sustainability of the different business areas, reflecting on the variable remuneration of the teams. In 2021, the targets related to sustainability represented 10%(which 5% are related to the climate agenda and 5% are related to the social agenda) of the employees' short-term variable remuneration, including CEO and Executive Board.
Non-monetary reward	No one is entitled to these incentives	No indicator for incentivized performance	Vale has no non-monetary rewards.

F-MM12.4/F-CO12.4

(F-MM12.4/F-CO12.4) Does your organization have a policy that includes biodiversity-related issues?

Yes, we have a documented biodiversity policy that is publicly available

F-MM12.4a/F-CO12.4a

(F-MM12.4a/F-CO12.4a) Select the options that best describe the scope and content of your policy.

	Format	Content	Please explain
Row 1	Part of company-wide environmental/sustainability policy	Recognition of the overall importance of natural habitats Recognition of potential business impact on natural habitats Commitments beyond regulatory compliance Commitment to transparency	Biodiversity as a cross-cutting theme is part of our Sustainability Policy. This sustainability policy is applied globally to Vale's activities. Therefore, in line with the Sustainability Policy, the following commitments stand out as the basis for our performance: - Know and monitor in the territories in which we operate; - Manage risks and impacts, with the adoption of prevention, mitigation / control, compensation and monitoring measures; - Promote transparency regarding practices and performance with stakeholders; - Build a positive legacy in the territories in which we operate; - Contribute to the achievement of global and national targets. With a focus on these commitments, Vale's long-term objective is to seek the Neutral Net Impact (No Net Loss) * on biodiversity.

F-MM12.5/F-CO12.5

(F-MM12.5/F-CO12.5) Has your organization made any public commitment(s) to reduce or avoid impacts on biodiversity?

Yes

F-MM12.5a/F-CO12.5a

(F-MM12.5a/F-CO12.5a) Provide details on your public commitment(s), including the description of specific criteria, coverage, and timeframe.

Commitment
No Net Loss

Coverage
Company-wide

% of total production covered by commitment
100%

Commitment timeframe
No specified timeframe

Please explain
Vale has established a long-term objective of seeking no net loss, with a focus on reducing significant losses of biodiversity on new projects and expansions. This commitment is fully aligned with the commitments made under the Sustainability Policy and the company's sustainability strategy. To achieve this goal, we are working to implement and reinforce the entire risk, impact, attributes and performance management process. This coverage is 100%, as it covers the entire Vale at the global level of its operations. In 2019, Vale developed a normative standard that provides guidelines and processes for biodiversity management focused on all stages of the life cycle, from project planning to post-closure, published in early 2020. This document brings the Hierarchy of Impact Mitigation, risk management, metrics and the necessary processes so that new projects and even operations can assess and manage biodiversity risks and establish goals and actions related to No Net Loss. No Net Loss in all new projects and expansions. In 2021, through the book Vale & Biodiversity, we share real-world examples of this approach and the outcomes of initiatives around the world that have delivered on our Strategies for Sustainability and Biodiversity.

Commitment
Other, please specify (Forest Target - Recover and protect 500,000 hectares of areas by 2030)

Coverage
Company-wide

% of total production covered by commitment
100%

Commitment timeframe
2019

Please explain
In 2018 Vale made public 2030 targets. In 2019, Vale strengthened and made ambitious its 2030 Agenda, in line with the UN Sustainable Development Goals. Addressing specifically the issue of biodiversity, the Agenda brings the Forestry Goal - Recover and protect 500,000 hectares of areas beyond our borders by 2030. This goal is also associated with the ambition to leave a positive legacy in territories. This goal is also aligned and could contribute to the Brazilian commitment to recover 12 million hectares of native vegetation provided for in the National Policy for the Recovery of Native Vegetation. In 2021, 62,248 hectares of forests remained protected and 5,125 areas were recovered in the year. In addition, the Vale agenda also includes goals related to water and climate change that are related to biodiversity from the moment they are associated with the reduction of pressures associated with important ecosystem services, the reduction of the capture of new water and the emission of greenhouse gases. This coverage is 100%, as it covers the entire Vale at the global level of its operations.

Commitment
Adoption of the mitigation hierarchy approach

Coverage
Company-wide

% of total production covered by commitment
100%

Commitment timeframe
No specified timeframe

Please explain
As a member of ICMM, Vale is committed to the principles established by the Board and in 2019 reinforced its commitment to Performance Expectation, which is focused on not operating in World Heritage Areas and on the implementation and strengthening of the impact mitigation hierarchy, with the objective of not having considerable biodiversity losses. The steps in this approach are the basis for the guidelines and processes established for biodiversity management within an internal regulatory standard published in 2020 and which has been implemented in our operations and new projects since 2021. In 2021, the processes became part of the Vale Management System (VPS) requirements and have been implemented and improved since then. In 2021, through the book Vale & Biodiversity, we share real-world examples of this approach and the outcomes of initiatives around the world that have delivered on our Strategies for Sustainability and Biodiversity.

Commitment
Not to explore or develop mines in World Heritage sites

Coverage
Company-wide

% of total production covered by commitment
100%

Commitment timeframe
No specified timeframe

Please explain
We do not have operations in UNESCO World Natural Heritage Sites and, as a member of ICMM, we have a commitment to not operate in these areas. In 2021, Vale made a public commitment not to operate in UNESCO Natural World Heritage Sites that reinforces this. The Vale Natural Reserve (RNV in Portuguese), a protected area owned by the company that is dedicated to the conservation of 23,000 ha of Atlantic Forest remnants, as well as the Sooretama Biological Reserve (REBio), a protected area that Vale protects in partnership with ICMBio, are part of the Discovery Coast Atlantic Forest Reserves World Heritage Site. They also constitute a Key Area for Biodiversity Conservation.

F13 Business strategy

F-MM13.1/F-CO13.1

(F-MM13.1/F-CO13.1) Are biodiversity issues integrated into any aspects of your long-term strategic business plan, and if so how?

	Are biodiversity-related issues integrated?	Long-term time horizon (years)	Please explain
Long-term business objectives	Yes, biodiversity-related issues are integrated	21-30	One of Vale's' strategic pillars is to incorporate sustainability into its business by building economic, social and environmental legacies and mitigating the impacts its operations. Reducing impacts, managing risks and impacts, working towards a positive legacy for the territories in which we operate is the basis of our sustainability strategy and covers biodiversity issues. Our long-term objective of neutralising impacts on aspects of biodiversity and the target of restoring and protecting forests, as well as our ambition to become a carbon-neutral company, are the directions and reflect the path we have been taking in implementing our strategy. Our climate change strategy and ambition to become carbon neutral by 2050 is interconnected with our biodiversity and forests strategy, so our horizon is 30 years. This strategic aspect encompasses all of Vale's operations. Vale has established a long-term objective to reach No Net Loss, focused on reducing significant biodiversity's losses and neutralize impacts to specific biodiversity features in new projects. In 2020, Vale published an internal normative standard that regulates our biodiversity management – risks and impacts – for all areas of our business, operations and projects. In the risk and impact management efforts, specific diagnoses are developed from the planning of entry into new territories to the final design of the projects, aiming to assess possible interference in world natural heritage sites, protected areas, as well as sensitive habitats and species. All expansion of operations and new projects are preceded by studies of environmental impacts in accordance with the rules and regulations of each country and region in which its operate.
Strategy for long-term objectives	Yes, biodiversity-related issues are integrated	5-10	The Forest Target is a commitment focused on leaving a positive impact and gains for climate, biodiversity and people, in our 2030 Agenda. Vale has committed to restoring 100,000 hectares and protecting an additional 400,000 hectares beyond our borders, thus contributing to key international climate and restoration commitments. Focusing on the recovery component - aimed at increasing the vegetation cover, resulting in carbon sequestration and social gains - we are working with mapping and support to sustainable businesses, initially focusing on agroforestry systems. To achieve this commitment, the Vale Fund supported the development of five agroforestry businesses that have implemented recovery of 5,125 hectares in a pilot phase, adding up, between 2020 and 2021, an area more than 6,000 hectares. Besides, at the end of 2021, the Vale Fund began, in together with its partners, an Acceleration Program with the purpose of being a catalyst for the businesses that operate sustainable value chains linked to Vale's forest recovery goals. For the protection component - aimed at the permanence and quality of the native vegetation cover, resulting in the maintenance of carbon stocks, we are working with partnerships with third part conservation units. For example, , Vale formed partnerships in 2021 with three Conservation Units managed by the Chico Mendes Institute for Biodiversity Conservation (ICMBio). Together, these Biological Reserves (REBio) help to protect more than 62,000 hectares of Atlantic Forest in three Brazilian states. Also, , we continue to work to protect and conserve the units covered by agreements we signed in 2020, which involve 52,848 hectares, adding up to an area of 115,093.96 hectares already protected in two years. Related to the No Net Loss commitment, Vale published an internal normative standard that regulates our biodiversity management – risks and impacts – for all areas of our business. and. We are also working on initiatives to compensate the impacts. In 2021 we continue implementing the guidelines and processes set out in the regulatory standard, by carrying out training, developing projects risk analyses, prioritizing associated research, including associated requirements in our management system and building risk scenarios. An example of these strategic is The Carajás Biodiversity Management Plan (PGBio Carajás), published in 2021.
Financial planning	Yes, biodiversity-related issues are integrated	5-10	Our governance model aims to realize the principles of clarity of roles, transparency and stability that guide our actions. In this sense, in addition to the forums that are established in our governance model, such as the Advisory Committees to the Board of Directors (focused on different areas such Sustainability and Finance), we have multi-disciplinary thematic groups, with the participation of members from outside Vale, which function as a sounding panel and which support us on strategic themes. Planning and execution monitoring is carried out for the entire sustainability agenda (and 2030 Sustainability Agenda) in order to meet the long-term goals established. The 2030 agenda is a priority investment. In 2021, Vale contributed USD 1.3 billion in socio-environmental expenditures, including related to Brumadinho, which represented an increase of 28% compared to 2020, and for environmental expenditures, the contribution totaled in USD 804.2 million, with water resources, environmental liabilities and energy (with 39% in voluntary actions and 61% in mandatory actions). Social expenditures totaled in USD 473.5 million, which 73% were with own resources and 27% through laws incentive. This strategic aspect encompasses all of Vale's operations.

F14 Implementation

F-MM14.1/F-CO14.1

(F-MM14.1/F-CO14.1) Have you specified any measurable and time-bound targets related to your commitment(s) to reduce or avoid impacts on biodiversity?

Yes

F-MM14.1a/F-CO14.1a

(F-MM14.1a/F-CO14.1a) Provide details of your target(s) related to your commitment(s) to reduce or avoid impacts on biodiversity, and progress made.

Target reference number
Target 1

Target label
Recover and protect 500,000 hectares of areas by 2030.

Base year
2019

Target year
2030

% of target achieved
21-30%

Please explain
In 2018, Vale announced its 2030 Agenda, in line with the UN Sustainable Development Goals. One of the targets is related to the recovery of degraded areas. Based on our already established protection initiatives, the new goal has become more audacious: the Forest Target - Recover and protect 500,000 hectares of areas beyond our borders by 2030. This represents a positive legacy in the biomes in which we operate. This is also aligned with our ambition to be net zero (Scope 1 and Scope 2) by 2050. This goal is also aligned and could contribute to the Brazilian commitment to recover 12 million hectares of native vegetation, as provided for in the National Policy for the Recovery of Native Vegetation. The target has been split into two blocks: recover 100,000 ha and protect 400,000 ha. Focusing on the recovery component - aimed at increasing the vegetation cover, resulting in carbon sequestration - we are working with mapping and support to sustainable businesses as a lever to achieve the 2030 target, initially focusing on agroforestry systems. For the protection component - aimed at the permanence and quality of the native vegetation cover, resulting in the maintenance of carbon stocks, targeting primary forests or medium and advanced stages of natural regeneration - we are working with partnerships with third part conservation units. In 2021 the Vale Fund supported the development of five agroforestry businesses that implemented productive recovery models on 5,125 hectares in a pilot phase, adding up to an area of more than 6,000 hectares between 2020 and 2021. In 2021 we formed partnerships with three Conservation Units managed by the Chico Mendes Institute for Biodiversity Conservation (ICMBio in Portuguese). Together, these Biological Reserves (REBio) help to protect more than 62,000 hectares. In addition, we continue to work to protect and conserve the units covered by the agreements we signed in 2020, which involve 52,848 hectares, adding up to an area of 115,093.96 hectares already protected in two years. Furthermore, Vale's 2030 agenda also includes goals related to water and climate change that are also connected to biodiversity as they are associated with the reduction of impacts related to important ecosystem services, the reduction of freshwater withdrawal and the emission of greenhouse gases.

Target reference number
Target 2

Target label
The commitment was to reduce by 10% the capture of fresh water for use in our processes by 2030.

Base year
2017

Target year
2030

% of target achieved
11-20%

Please explain
Vale 2030 Agenda also brings goals related to water and climate change that is related to biodiversity from the moment they are associated with reduction of interferences associated with important ecosystem services, with the reduction of new water collection and greenhouse gas emissions. The commitment was to reduce by 10% the capture of fresh water for use in our processes by 2030. In 2021, the global result accumulated since the base year was a 20% reduction, which exceeded the initial target set for 2030 (10% of reduction), with emphasis on operations in the Amazon region and part of the operations of southeastern Brazil, with a cumulative reduction of 47%.

Target reference number
Target 3

Target label
Reduce by 16% emissions of Material Particulate, Reduce emissions by 16% sulphur oxides and Reduce emissions by 10% nitrogen oxides.

Base year
2018

Target year
2030

% of target achieved
51-60%

Please explain
Given the impacts of atmospheric emissions and with the ambition to be a leader in sustainable mining, Vale established 2021 the following goals: to reduce by 16% emissions of Material Particulate, Reduce emissions by 16% sulfur oxides and Reduce emissions by 10% nitrogen oxides. In this context, in 2021, Vale invested approximately USD 80 million in operational improvements and the adoption of new technologies for the control and management of atmospheric emissions. This target is also related to biodiversity since it focuses on reducing environmental impacts.

F-MM14.2/F-CO14.2

(F-MM14.2/F-CO14.2) Provide details on mining projects that are required to produce Biodiversity Action Plans.

Row 1

Number of mining projects required to produce a biodiversity action plan
54

% of mining projects required to produce a biodiversity action plan that have one in place
94.4

Format
Stand-alone document
Part of general Environmental Management System

Frequency biodiversity action plans are reviewed
Regularly

Please explain
The main requirements for the preparation of management plans or biodiversity action plans are the existence of associated legal requirements, and high biodiversity value. Most of Vale's operational units have biodiversity action/management plans or programs associated with legal requirements within the licensing processes, covering actions to control and mitigate impacts, as well as recovery/restoration, compensation and impact monitoring actions. In order to assess the biodiversity values, in 2015 a biodiversity risk assessment was carried out, covering 33 operational units worldwide, using analyzes and overlapping of layers in a GIS tool, including information on protected areas, registration and concentration of biodiversity, the occurrence of endangered species, Key Biodiversity Areas, Ramsar Sites, Hotspots, Wilderness Areas, among others. From the classification of areas with high and very high risks to biodiversity, we seek to implement improvements in management and action plans. In 2017 we established a partnership with The Biodiversity Consultancy to develop Guidelines for the Development of Biodiversity Action Plans, with a focus on establishing improvements in our processes, which culminated in the development of a normative document establishing guidelines and processes for biodiversity management in new projects/expansions and operations. From July 2020 to July 2021, we joined IBAT to support and improve risk assessments for our territories where we operate and new projects/expansions. Among the 61 operating units evaluated in 2021, 54 (88.5%) needed the preparation of management programs. For these units, 51 (83,5%) programs have already been implemented, seven are under preparation and one is in the future proposal, some of which include more than one project and therefore have more than one associated program. Therefore, 94.4% (51/54) of the projects that need Biodiversity Action Programs are being implemented.

F-MM14.3/F-CO14.3

(F-MM14.3/F-CO14.3) Has your organization adopted avoidance and/or minimization as strategies to prevent or mitigate significant adverse impacts on biodiversity?
Yes

F-MM14.3a/F-CO14.3a

(F-MM14.3a/F-CO14.3a) Provide relevant company-specific examples of your implementation of avoidance and minimization actions to manage adverse impacts on biodiversity.

Mining project ID
Project 1

Approach
Avoidance

Type of measure
Project design

Description
The first stage of HMI is impact avoidance. Studying, knowing and understanding important environmental attributes (species of interest for conservation, species and critical environments, and protected areas, among others) is the basis for assessing risks and impacts on biodiversity in areas of interest for expansions and new projects. The involvement of environmental teams with teams responsible for engineering, short, medium and long-term planning and projects, among others, is essential so that impacts can be avoided, within the scope of the actions “Working together with project engineering to minimize current and/or future areas of intervention ”and“ Vegetation Suppression Minimization Subprogram ”- already carried out by the operational environment teams. Avoiding unnecessary interventions and certain impacts can directly affect licensing terms and costs with studies and programs related to licensing conditions. Vale has been seeking to work with the Impact Mitigation Hierarchy (HMI) approach in pilot projects with the aim of developing adaptations and capturing opportunities to prevent and mitigate impacts, in addition to planning increasingly effective impact management and conservation actions for biodiversity. Working with the biodiversity management strategy against the background of HMI is an opportunity to rethink the management process with a focus on organizing and improving performance, making it more effective and efficient to obtain a neutral or positive balance of impacts.. In Carajás, S11D Mine, the work of environmental, engineering, planning and environmental agencies led to several changes in the master plan that avoided impacts to more than 1,100 ha of natural habitat. The Project has committed to not disturb the habitat of a key plant species within the mine footprint until research in propagation and translocation techniques are proven to enable the project to achieve no net loss for the species.

Mining project ID
Project 1

Approach
Minimization

Type of measure
Operational controls

Description
After the effort to avoid impacts, these must be raised, analyzed and evaluated, and control and mitigation actions are proposed and established with a focus on implementation and operation that generate the least possible impact on biodiversity. Environmental controls must be installed, vegetation suppression must be monitored, and actions to drive away, rescue and relocate fauna and flora specimens, among other mitigation measures, are also implemented. The Carajás Complex Action Plan presents actions implemented or challenges related to impact mitigation. Among these actions, we can highlight some of the environmental control, that are barriers to reducing the impacts of works and operations on natural environments. These measures consist of containment systems, collection and treatment of effluents, drainage

devices, collection and disposal of solid waste, and sprinkler systems for access roads, among others. In parallel, monitoring programs are conducted to monitor these measures, such as effluent monitoring, surface water monitoring, among others, to follow up and guarantee the effectiveness of the control systems. Actions to mitigate impacts, such as the Program for the Management of Wild Land Fauna are also implemented. Scare away of fauna during vegetation suppression; Wildlife Management Program - Monitoring of wildlife, bioindicators and control of changes in the wildlife community, and others. In addition, another way to minimize the impact was through the construction of exclusive viaducts for the passage of animals that were created for the first time in Brazil. Both passes were executed by Vale and are in compliance with Ibama's determination to implement the S11D Railway Branch. The viaducts are located in the southeast of Pará and are part of a set of 32 fauna passages implanted along the 101 kilometers of the branch line. The rescue of flora is an important mitigation action, aiming to rescue individuals and seeds that will be used in future recovery of areas and restoration of habitats, allowing the conservation of genetic heritage. In 2021 the Subprogram for the rescue of epiphytes and species of flora of interest for conservation of the S11D Mine rescued 3,013 individuals from 194 different species. Seed rescue was also carried out, collecting seeds from 34 species with the aim of producing seedlings for recovery/restoration of areas.

Mining project ID
Project 2

Approach
Avoidance

Type of measure
Site selection

Description
The study of locational alternatives is a mandatory step of the environmental impact study, which aims to evaluate different viable locations for setting up an enterprise, in order to select the location that has the least socio-environmental impact. For example, in order to continue the waste disposal activity at the Conceição Mine, there was a need to find a new area to dispose of the waste for the next few years. In order to meet this new demand for disposal of waste, three areas were analyzed, located within a radius of approximately 15 km from the project. The southeastern expansion alternative of the Canga Sterile Disposal Pile was considered the most environmentally advantageous, as there is the possibility of reusing the area already impacted by the existing pile - Canga Leste, in addition to having the second smallest area for suppressing native vegetation, the least impact in drainages, the only one being entirely inserted in an area owned by Vale.

Mining project ID
Project 2

Approach
Minimization

Type of measure
Abatement controls

Description
The Environmental Impact Statement has a series of Environmental Programs that work in conjunction with the project's control systems to minimize negative impacts and maximize positive ones: Noise emissions: in the works, the noise will be restricted to those who will come from the activities of the machines and vehicles that will be employed in preparing the ground next to the new open areas. All the equipment and vehicles at the service of the enterprise pass preventive maintenance according to Vale standards, aiming at the proper operation that generates less noise and pollution. Atmospheric Emissions: in the works, the main sources of air pollution consist of dust generated mainly at the moment of carrying out the activities of handling of earth, movement of machinery and equipment and civil works, in addition to the gases generated by vehicle exhaust and machines used in the works. Water trucks are used to wet the roads and work fronts for the entire period of the work. In addition to the constant maintenance of equipment that uses fuels, so that there is no excessive consumption and that it releases gases above the permitted limits. Liquid Effluents: Chemical toilets are used in the work and/or hydraulics at construction sites and on the main fronts of service. The effluents are transported to a plant sewage treatment of the mine in operation, by means of sucking trucks. Regarding oily effluents, it is important to note that the maintenance of the equipment is carried out in the workshops that the Mining Complex of Itabira has already licensed and dedicated systems for the treatment of these effluents properly. Solid Waste: Solid waste are adequately managed according to the Waste Management Program Solids of the Mining Complex of Itabira. Thus, the mitigation of the impacts caused by the generation of waste will consist of the implementation of a management program based on the establishment of management measures involving handling, packaging, transportation, temporary storage and final destination. The control of atmospheric emissions, liquid effluents and solid waste enables a reduction in the impact on biodiversity in relation to pollution of habitats. And noise control enables a reduction in fauna afugentment.

Mining project ID
Project 2

Approach
Minimization

Type of measure
Other minimization measure, please specify (Reducing the impact to fauna and flora species)

Description
The suppression of vegetation and consequent loss/reduction of habitat will cause the spontaneous escape of fauna specimens or harm their dispersion. The Program for Monitoring the Suppression, scaring and Eventual Rescue of Fauna is an extremely important tool that aims to remove and scare away the animals from the area to be suppressed, seeking to reduce the impacts on them. The program operates on two fronts: planning of activities and actions to accompany suppression and fauna management, including field visits, satellite image analysis, and regional maps to define the best action strategy and suppression direction, as well as the selection of release areas for rescued species. The second stage includes monitoring suppression and actions to scare away, rescue and relocate captured individuals. The Flora Rescue Project acts in the areas to be suppressed and works as an important tool to save the genetic heritage and enrich the recovery and restoration actions. Before the actions to suppress native vegetation, specimens and seeds are rescued in the areas to be impacted, taken to the nursery and, later, the seedlings produced are used in actions to recover degraded areas and restore habitats and compensate programs.

Mining project ID
Project 3

Approach
Avoidance

Type of measure
Project design

Description
In the work of managing risks and impacts, specific diagnoses are prepared that range from planning the entry into new territories to the final design of the projects. In the planning stages of new projects and expansions, the environmental team, together with engineering, evaluates possible interferences in natural heritage areas and

protected areas, as well as sensitive habitats and species. World Heritage Site areas and protected areas of IUCN categories I to IV are always avoided, the latter being considered a fatal flaw of the projects, according to Brazilian legislation.

Mining project ID
Project 3

Approach
Minimization

Type of measure
Other minimization measure, please specify (Reducing the impact of vegetal suppression)

Description
The proposed mitigating measures were aimed at reducing the actual or potential adverse environmental impacts resulting from the action of removing the vegetation necessary for the implementation of the project. Thus, it constitutes an element of planning, as well as, guidance for the company's operations, in order to reduce its environmental impact. The preparation of mitigation measures was based on the impact matrix. In the process of project implementation, the suppression of native and planted vegetation of different types is planned. All developments have a vegetation suppression program whose main objective is to ensure that only the strictly necessary areas will be suppressed. To this end, the necessary and licensed areas are demarcated in the field, and the entire suppression process is monitored and directed. The alteration of the natural environment with the removal of vegetation produces significant changes in the diversity and abundance of plants and animals, generating ecological and genetic effects. The main impact is the loss of biodiversity. Considering the importance of vegetation for the conservation of biodiversity, maintaining the integrity of the soil and water resources, in addition to the interaction with wildlife, it is considered pertinent to adopt measures to mitigate the impacts related to the reduction of local biodiversity in different types of vegetation, resulting from the suppression of vegetation necessary for the expansion of enterprises. The loss of genetic variability in plant populations could be mitigated through measures such as flora rescue and reintroduction of plant species, contemplated in the flora program through flora rescue and restoration projects. Endangered species are prioritized in the flora rescue and later, these and other species are reintroduced during the implementation, operation and closure of the projects.

Mining project ID
Project 3

Approach
Minimization

Type of measure
Abatement controls

Description
Several environmental controls are implemented in order to avoid and reduce impacts related to the discharge of effluents, erosive processes, and waste generation, among others that may cause alterations in the physical environment that lead to impacts on biodiversity. Environmental impact studies for the Mariana Complex mines are assessed and monitored for water quality and noise levels, in order to mitigate potential environmental impacts. Water quality if not monitored can result in the loss of aquatic species or species that drink water from the water resource in question. And the noises if not monitored result in wildlife scaring away. The impact of noise levels is generally minimized by preventive maintenance of equipment and vehicles. And through this, it also allows fewer gases to be emitted which results in better air quality.

Mining project ID
Project 3

Approach
Minimization

Type of measure
Other minimization measure, please specify (Reducing the impact to flora and fauna species)

Description
The Rescue Flora Programs are initiated before the vegetation suppression actions, the rescue of seeds and specimens aiming the production of seedlings and germplasm conservation. The production of seedlings in nurseries favors the production of those rescued, focusing on the restoration of degraded areas and conservation of genetic variability. An example of this Program, in mining projects 4 and 5, in the preparation of the Protocol Cattleya milleri micropropagation in partnership with ITV. Cattleya milleri is an endemic species from the canga ecosystems of Quadrilatero Ferrífero/Minas Gerais that is currently classified as a critically endangered species because of its restricted occurrence and habitat loss and degradation. In this Protocol, the in vitro propagation technique proved to be a viable alternative for production in large-scale of seedlings for this species. A high number of seedlings were generated, later these seedlings were acclimatized and rustified successfully, which allowed the reintroduction of plants in a natural environment. The results obtained provide subsidies for conservation programs and expansion of the production of seedlings and introduction into a natural environment. The suppression of vegetation and consequent loss/reduction of habitat will cause the spontaneous escape of fauna specimens or harm their dispersion. The Program for Monitoring the Suppression, Disappearance and Eventual Rescue of Fauna is an extremely important tool that aims to remove and scare away the animals from the area to be suppressed, seeking to reduce the impacts on them. The program operates on two fronts: planning of activities and actions to accompany suppression and fauna management, including field visits, satellite image analysis, and regional maps to define the best action strategy and suppression direction, as well as the selection of release areas for rescued species. The second stage includes monitoring suppression and actions to scare away, rescue and relocate captured individuals.

Mining project ID
Project 4

Approach
Avoidance

Type of measure
Site selection

Description
In the work of managing risks and impacts, specific diagnoses are prepared that range from planning the entry into new territories to the final design of the projects. In the planning stages of new projects and expansions, the environmental team, together with engineering, evaluates possible interferences in natural heritage areas and protected areas, as well as sensitive habitats and species. World Heritage Site areas and protected areas of IUCN categories I to IV are always avoided, the latter being considered a fatal flaw of the projects, according to Brazilian legislation. The risk analysis procedure brings the prioritization of biodiversity features that can be used as information for this analysis and location definition. This is one of the processes of the biodiversity internal norm. The study of locational alternatives is a mandatory step of the environmental impact study, which aims to evaluate different viable locations for setting up an enterprise, in order to select the location that has the least socio-environmental impact.

Mining project ID
Project 5

Approach
Avoidance

Type of measure
Site selection

Description
In the work of managing risks and impacts, specific diagnoses are prepared that range from planning the entry into new territories to the final design of the projects. In the planning stages of new projects and expansions, the environmental team, together with engineering, evaluates possible interferences in natural heritage areas and protected areas, as well as sensitive habitats and species. World Heritage Site areas and protected areas of IUCN categories I to IV are always avoided, the latter being considered a fatal flaw of the projects, according to Brazilian legislation. The risk analysis procedure brings the prioritization of biodiversity features that can be used as information for this analysis and location definition. This is one of the processes of the biodiversity internal norm. The study of locational alternatives is a mandatory step of the environmental impact study, which aims to evaluate different viable locations for setting up an enterprise, in order to select the location that has the least socio-environmental impact.

Mining project ID
Project 6

Approach
Avoidance

Type of measure
Project design

Description
In the work of managing risks and impacts, specific diagnoses are prepared that range from planning the entry into new territories to the final design of the projects. In the planning stages of new projects and expansions, the environmental team, together with engineering, evaluates possible interferences in natural heritage areas and protected areas, as well as sensitive habitats and species. World Heritage Site areas and protected areas of IUCN categories I to IV are always avoided, the latter being considered a fatal flaw of the projects, according to Brazilian legislation. In the evaluation of locational alternatives for the expansion of the waste rock dumps PDE South and PDE 03 Far East, it was considered as a premise the prioritization of expansions in more altered areas in relation to vegetation cover and within the limits of Vale's properties, avoiding the need for intervention in areas of higher quality native vegetation cover.

Mining project ID
Project 6

Approach
Minimization

Type of measure
Operational controls

Description
The mines, as well as their expansion projects, have environmental control systems in place to treat liquid effluents, contain sediments, dispose of generated solid residues, and control dust. Sumps are basins dug into the ground with the function of containing the sediments carried by rain, an example of a control system implemented in the PDR and in the waste rock dump piles that minimize impacts on water courses and soil around the mine, reducing interference in the surrounding natural habitats. The mines also have monitoring and measurement procedures, including visual checks, to evaluate the performance of environmental control systems.

Mining project ID
Project 6

Approach
Minimization

Type of measure
Other minimization measure, please specify (Minimizing impacts to flora and fauna)

Description
The suppression of vegetation leads to the loss of flora individuals, as well as the reduction and loss of habitats for fauna. The Complex has flora rescue programs with actions carried out on all the necessary suppression fronts in order to reduce the loss of plant species and genetic diversity. Adult individuals, plantlets and seeds are rescued in the areas before suppression and taken to the nursery to produce seedlings that are later used in the recovery of degraded areas and in compensatory planting areas. In this way, the genetic material returns to compose new recovery areas. In the Brucutu expansion areas that involved the suppression of native vegetation, more than 10 thousand specimens (seeds and individuals) were rescued and taken to the nursery to produce seedlings.

Mining project ID
Project 7

Approach
Minimization

Type of measure
Operational controls

Description
Before the vegetation suppression actions are carried out, seeds are collected and taken to the nursery to produce seedlings for the subsequent recovery process of the mined areas. Seedlings of various species are produced, including endemic and endangered species. To support full-land rehabilitation activities, PT Vale has established a 2.5-hectare nursery that has been operating since April 2006. The nursery produces an average of 700,000 seedlings and rehabilitates more than 100 ha of post-mining land per year. PT Vale's nursery also produces various native and endemic species of plants as part of the biodiversity conservation program. Local plants include betao, bitti, nyatoh, and forest mangosteen. While for the endemic plants, there are ebony and dengen fruit. The local plant seeds are collected from the land to be mined or from the cooperation with the local community. Besides that, before mining activities were carried out, PT Vale ensured that no protected fauna or flora species were found at the mining site. In an effort to conserve biodiversity, PT Vale has a post-mining plan and biodiversity management for 100% of mining operation areas in the Sorowako block that refers to 2014 ESDM Minister Regulation No. 7 on Reclamation and Post-Mining. We collaborate with the Indonesia Business Council for Sustainable Development (IBCSD) in compiling the Guide for Sustainable Biodiversity Management. The document, released in 2017, becomes the first ever in the Indonesian mining business for

biodiversity conservation activities.

Mining project ID
Project 5

Approach
Minimization

Type of measure
Physical controls

Description
Environmental control measures are implemented at all of Vale's undertakings and are focused on constituting barriers to reducing the impacts of works and operations on natural environments. These measures consist of containment systems, collection and treatment of effluents, drainage devices, collection and disposal of solid waste, and sprinkler systems for access roads, among others. In parallel, monitoring programs are conducted to monitor these measures, such as effluent monitoring, surface water monitoring, among others, to follow up and guarantee the effectiveness of the control systems.

Mining project ID
Project 5

Approach
Minimization

Type of measure
Operational controls

Description
All Vale mining projects have a fire brigade ready to act when necessary. If the fire is not contained even in partnership with environmental agencies and firefighters, a third party is contracted. This structure is already implemented in Vale's operations and over time it has been improved. The response to fires is believed to be rapid and well-coordinated, joining efforts to be able to contain the fire as soon as possible. In this way, impacts on biodiversity and even social impacts will be minimized.

Mining project ID
Project 2

Approach
Minimization

Type of measure
Operational controls

Description
All Vale mining projects have a fire brigade ready to act when necessary. If the fire is not contained even in partnership with environmental agencies and firefighters, a third party is contracted. This structure is already implemented in Vale's operations and over time it has been improved. The response to fires is believed to be rapid and well-coordinated, joining efforts to be able to contain the fire as soon as possible. In this way, impacts on biodiversity and even social impacts will be minimized.

Mining project ID
Project 3

Approach
Minimization

Type of measure
Operational controls

Description
All Vale mining projects have a fire brigade ready to act when necessary. If the fire is not contained even in partnership with environmental agencies and firefighters, a third party is contracted. This structure is already implemented in Vale's operations and over time it has been improved. The response to fires is believed to be rapid and well-coordinated, joining efforts to be able to contain the fire as soon as possible. In this way, impacts on biodiversity and even social impacts will be minimized.

Mining project ID
Project 6

Approach
Minimization

Type of measure
Operational controls

Description
All Vale mining projects have a fire brigade ready to act when necessary. If the fire is not contained even in partnership with environmental agencies and firefighters, a third party is contracted. This structure is already implemented in Vale's operations and over time it has been improved. The response to fires is believed to be rapid and well-coordinated, joining efforts to be able to contain the fire as soon as possible. In this way, impacts on biodiversity and even social impacts will be minimized.

Mining project ID
Project 4

Approach
Minimization

Type of measure
Physical controls

Description
Environmental control measures are implemented at all of Vale's undertakings and are focused on constituting barriers to reducing the impacts of works and operations on natural environments. These measures consist of containment systems, collection and treatment of effluents, drainage devices, collection and disposal of solid waste, and

sprinkler systems for access roads, among others. In parallel, monitoring programs are conducted to monitor these measures, such as effluent monitoring, surface water monitoring, among others, to follow up and guarantee the effectiveness of the control systems.

Mining project ID
Project 4

Approach
Minimization

Type of measure
Operational controls

Description
All Vale mining projects have a fire brigade ready to act when necessary. If the fire is not contained even in partnership with environmental agencies and firefighters, a third party is contracted. This structure is already implemented in Vale's operations and over time it has been improved. The response to fires is believed to be rapid and well-coordinated, joining efforts to be able to contain the fire as soon as possible. In this way, impacts on biodiversity and even social impacts will be minimized.

Mining project ID
Project 4

Approach
Minimization

Type of measure
Other minimization measure, please specify (Reducing the impact to flora and fauna species)

Description
The Rescue Flora Programs are initiated before the vegetation suppression actions, the rescue of seeds and specimens aiming the production of seedlings and germplasm conservation. The production of seedlings in nurseries favors the production of those rescued, focusing on the restoration of degraded areas and conservation of genetic variability. An example of this Program, in mining projects 2, 3, 4, 5, and 6, is the preparation of the Protocol Cattleya milleri micropropagation in partnership with ITV. Cattleya milleri is an endemic species from the canga ecosystems of Quadrilatero Ferrífero/Minas Gerais that is currently classified as critically endangered species because of its restricted occurrence and habitat loss and degradation. In this Protocol, the in vitro propagation technique proved to be a viable alternative for production in large-scale of seedlings for this species. A high number of seedlings were generated, later these seedlings were acclimatized and rustified successfully, which allowed the reintroduction of plants in a natural environment. The results obtained provide subsidies for conservation programs and expansion of the production of seedlings and introduction into a natural environment. The suppression of vegetation and consequent loss/reduction of habitat will cause the spontaneous escape of fauna specimens or harm their dispersion. The Program for Monitoring the Suppression, Disappearance and Eventual Rescue of Fauna is an extremely important tool that aims to remove and scare away the animals from the area to be suppressed, seeking to reduce the impacts on them. The program operates on two fronts: planning of activities and actions to accompany suppression and fauna management, including field visits, satellite image analysis, and regional maps to define the best action strategy and suppression direction, as well as the selection of release areas for rescued species. The second stage includes monitoring suppression and actions to scare away, rescue and relocate captured individuals.

Mining project ID
Project 5

Approach
Minimization

Type of measure
Other minimization measure, please specify (Reducing the impact to flora and fauna species)

Description
The Rescue Flora Programs are initiated before the vegetation suppression actions, the rescue of seeds and specimens aiming the production of seedlings and germplasm conservation. The production of seedlings in nurseries favors the production of those rescued, focusing on the restoration of degraded areas and conservation of genetic variability. An example of this Program, in mining projects 4 and 5, in the preparation of the Protocol Cattleya milleri micropropagation in partnership with ITV. Cattleya milleri is an endemic species from the canga ecosystems of Quadrilatero Ferrífero/Minas Gerais that is currently classified as a critically endangered species because of its restricted occurrence and habitat loss and degradation. In this Protocol, the in vitro propagation technique proved to be a viable alternative for production in large-scale of seedlings for this species. A high number of seedlings were generated, later these seedlings were acclimatized and rustified successfully, which allowed the reintroduction of plants in a natural environment. The results obtained provide subsidies for conservation programs and expansion of the production of seedlings and introduction into a natural environment. The suppression of vegetation and consequent loss/reduction of habitat will cause the spontaneous escape of fauna specimens or harm their dispersion. The Program for Monitoring the Suppression, Disappearance and Eventual Rescue of Fauna is an extremely important tool that aims to remove and scare away the animals from the area to be suppressed, seeking to reduce the impacts on them. The program operates on two fronts: planning of activities and actions to accompany suppression and fauna management, including field visits, satellite image analysis, and regional maps to define the best action strategy and suppression direction, as well as the selection of release areas for rescued species. The second stage includes monitoring suppression and actions to scare away, rescue and relocate captured individuals.

F-MM14.4/F-CO14.4

(F-MM14.4/F-CO14.4) Have significant impacts on biodiversity been mitigated through restoration?

	Have significant impacts on biodiversity been mitigated through restoration?	Comment
Row 1	Yes	n.a.

F-MM14.4a/ F-CO14.4a

(F-MM14.4a/ F-CO14.4a) Provide details on restoration actions you have in place in your sites.

Mining project ID

Project 1

Description of the impact being mitigated by restoration
As the suppression of native vegetation is often an inevitable impact for the implementation of enterprises and expansions, mainly focused on structures that have locational rigidity such as pits, it is necessary to apply actions and compensatory measures, such as the conservation and recovery of other areas or other actions agreed between the applicant and the competent environmental agency. The impact on biodiversity to be recovered is the suppression of vegetation, habitat loss/reduction, and loss of individuals of plant species.

Type of ecosystem restored
Other ecosystems

Total area restored to date (hectares)
5268.4

Total area to be restored (hectares)
7620.6

Target year
2021

Describe restoration actions
The restoration actions involve seed collection and production and acquisition of native seedlings of the Amazon in local cooperatives, the preparation of the area, planting of seedlings, induction of natural regeneration, and control of invasive alien species. The primary procedures used in the forest restoration process included site protection with fencing to prevent access by cattle, creation and maintenance of fire breaks, promoting natural regeneration by creating patches of trees to attract dispersers, and forest enrichment by planting seedlings, transplanting seedlings from the soil seed bank, direct seeding and natural regeneration. More than 500,000 seedlings of different native forest species with high floristic diversity have been planted in reforestation projects. These areas have been systematically monitored. The actions work on two complementary fronts: reestablishing forest connectivity by creating ecological corridors in the mine's area of influence, and restoring supplementary forest patches on purchased properties in the immediate vicinity of the mine site, which also form a part of the ecological corridors. The first front is part of an environmental offsets program required under the environmental license for the mine, in which land is being purchased to offset the disturbance of the natural environment caused by mining. Ecological corridors are being established in the area surrounding the Complex through forest restoration on Vale-owned properties. In addition, in 2021 the target is 100 hectares of seedling planting, 150 hectares of maintenance and 450 hectares of induction of natural regeneration. Within the scope of the Degraded Areas Recovery Plan, more than 83 hectares were revegetated in 2021. For the same period, approximately 108 hectares were revegetated with the activities of the Forest Connectivity Reestablishment Subprogram. Some properties have been excluded from formal reporting of the total area recovered to date due to operational issues related to land ownership.

Mining project ID
Project 2

Description of the impact being mitigated by restoration
The impact of the project occurs in the Atlantic Forest biome, related to the reduction and suppression of forest and field habitats. This generates intervention is threatened and immune-cutting species.

Type of ecosystem restored
Forest ecosystems

Total area restored to date (hectares)
231.94

Total area to be restored (hectares)
0

Target year
2021

Describe restoration actions
Under the operations of the Itabira Complex, two restoration mechanisms are used, among them: Natural regeneration and artificial regeneration. Natural regeneration: consists of the fact that the vegetation regenerates through natural processes, through the germination of naturally dispersed seeds, and, to a lesser extent, by sprouting stumps and roots. This method basically depends on a viable seed source, appropriate environment for germination and appropriate environment for the establishment and initial growth of plants. It is a low-cost alternative, generally recommended for areas that present near remnants and already have some tree species, besides being characterized by high resilience. Artificial regeneration: recovery process by providing better conditions of establishment for the species that are brought to the site and not initially relying on dispersers and seed sources. The success of this method, however, depends on the definition of several aspects, such as planting models; selection of appropriate species; methods of soil preparation and planting; methods of pest and disease control, among others. Methodology for Recovery of degraded areas: - Selection of species (native species. For compensation for intervention in threatened and immune-cut species, those species that have underwent intervention are selected and planted). -Planting model (composition, spacing, arrangement). - Quality of the seedlings. -Pre-planting (Isolation of the area, fire protection, control of leaf-cutting ants, soil preparation, pit opening, control of invasive species, cathem). -Planting. -Maintenance (insulation and protection against fire, ant control, cover fertilization, control of invasive species. In addition, the target for 2021 was 98,15.

Mining project ID
Project 3

Description of the impact being mitigated by restoration
• Intervention in APP (CONAMA 369/2007; • Atlantic Forest Intervention - Art.32 (Law 11.428/06); • Intervention in threatened and immune-cutting species.

Type of ecosystem restored
Forest ecosystems

Total area restored to date (hectares)
390.76

Total area to be restored (hectares)
0

Target year
2021

Describe restoration actions
Natural regeneration consists of the fact that the vegetation regenerates through natural processes, through the germination of naturally dispersed seeds, and, to a lesser extent, by sprouting stumps and roots. This method basically depends on a viable seed source, appropriate environment for germination and appropriate environment for

the establishment and initial growth of plants. It is a low-cost alternative, generally recommended for areas that present near remnants and already have some tree species, besides being characterized by high resilience. On the other hand, artificial regeneration is a recovery process by providing better conditions of establishment for the species that are brought to the site and not initially relying on dispersers and seed sources. The success of this method, however, depends on the definition of several aspects, such as planting models; selection of appropriate species; methods of soil preparation and planting; methods of pest and disease control, among others. For these actions, priority is given to seedlings of specimens rescued from the suppressed areas, aiming at the conservation of genetic diversity. TAnd the Methodology for Recovery of degraded areas consists of these actions: Selection of species; (native species) for compensation for intervention in threatened and immune cut species, those species that have underwent intervention are selected and planted); Planting model (composition, spacing, arrangement); Quality of the seedlings; Pre-planting; (Isolation of the area, fire protection, control of leaf-cutting ants, soil preparation, pit opening, control of invasive species, cathem); Planting and Maintenance. (insulation and protection against fire, ant control, cover fertilization, control of invasive species. In addition, the target for 2021 was 352,48ha.

Mining project ID
Project 4

Description of the impact being mitigated by restoration
Iron mining, as well as the associated structures for processing and production, rely on land clearing and may lead to the suppression of native vegetation. The areas with ore occurrence have locational rigidity, and deforestation cannot be completely avoided or minimized. Suppression has direct and indirect impacts on biodiversity, such as the reduction and/or loss of habitats, loss of flora and fauna specimens, dispersal to surrounding environments, and destabilization of communities in these areas. Despite always working to avoid impacts and reduce as much as possible the impacts of its operations and new projects, the suppression of natural habitats is still necessary for the implementation and expansion of mining projects in our areas of operation. Therefore, restoration actions are important for the rehabilitation of degraded areas and the restoration of habitats and populations of impacted species. In 2021, Vale carried out restoration activities with a focus on species conservation, ecological corridors and fauna habitat.

Type of ecosystem restored
Forest ecosystems

Total area restored to date (hectares)
147.03

Total area to be restored (hectares)
35

Target year
2021

Describe restoration actions
Several techniques are used to recover degraded areas, selected according to the characteristics of the areas and the available resources. In general, the following techniques were used: ▪ Restoration in forest areas: isolation of the area that must be done before planting; selective manual weeding; ant control; initial planting that must be done with the direct opening of pits with adequate size and spacing; base fertilization; planting model in rows of cover + diversity to be carried out in the rainy season; choice of plant species according to function; ▪ Restoration in rupestrian field areas: deposition of "top soil" important to create a suitable substrate; planting seeds of rupestrian species; transplanting of rupestrian of rupestrian plants from the flora rescue program. In the first stage, the revegetation should use species grass and legume species should be used in the revegetation, aiming to provide coverage and improvement of soil characteristics. The grasses have a great capacity to cover the soil, while the legumes provide soil enrichment, thanks to their capacity to fix nitrogen, which contributes to the establishment of native species at a later stage. In the next step, the revegetation process will seek to meet other objectives, such as the landscaping of the area and the increase of biodiversity and faunal support. To this end, specific native species are used, in order to take advantage of their adaptive characteristics to the region and favor natural succession. These species should be obtained from the flora rescue program and from the nurseries. The rehabilitation actions of the degraded areas are periodically monitored, in order to follow the events of colonization of the flora to adjust habitat management actions when necessary. These can maximize the processes of natural succession and recovery of the areas being rehabilitated.. In addition, the target for 2021 was 109,44ha.

Mining project ID
Project 5

Description of the impact being mitigated by restoration
Vale recognizes the importance of biodiversity and evaluation as an intrinsic theme to its business, considering its wealth, breadth and value in maintaining life and ecosystem services. In the risk and impact management work, specific diagnoses are elaborated, ranging from the planning of entry into new territories to the final design of the projects, aiming to assess possible interference in areas of natural heritage, protected areas, as well as sensitive habitats and species. All expansions of operations and new projects are preceded by studies of environmental impacts in accordance with the rules and regulations of each country and region in which they operate. Iron mining, as well as the associated structures for processing and production, rely on land clearing and therefore the suppression of native vegetation. The areas with ore occurrence have locational rigidity, and deforestation cannot be completely avoided or minimized. Suppression has direct and indirect impacts on biodiversity, such as the reduction and/or loss of habitats, loss of flora and fauna specimens, dispersal to surrounding environments, and destabilization of communities in these areas. Despite always working to avoid impacts and reduce as much as possible the impacts of its operations and new projects, the suppression of natural habitats is still necessary for the implementation and expansion of mining projects in our areas of operation. Therefore, restoration actions are important for the rehabilitation of degraded areas and the restoration of habitats and populations of impacted species. In 2020, Vale carried out restoration activities with a focus on species conservation, ecological corridors and fauna habitat.

Type of ecosystem restored
Forest ecosystems

Total area restored to date (hectares)
10.06

Total area to be restored (hectares)
0

Target year
2021

Describe restoration actions
Several techniques are used to recover degraded areas, selected according to the characteristics of the areas and the available resources. In general, the following techniques were used: ▪ Restoration in forest areas: isolation of the area that must be done before planting; selective manual weeding; ant control; initial planting that must be done with the direct opening of pits with adequate size and spacing; base fertilization; planting model in rows of cover + diversity to be carried out in the rainy season; choice of plant species according to function; ▪ Restoration in rupestrian field areas: deposition of "top soil" important to create a suitable substrate; planting seeds of rupestrian species; transplanting of rupestrian of rupestrian plants from the flora rescue program. In the first stage, the revegetation should use species grass and legume species should be used in the revegetation, aiming to provide coverage and improvement of soil characteristics. The grasses have a great capacity to cover the soil, while the legumes provide soil enrichment, thanks to their capacity to fix nitrogen, which contributes to the establishment of native species at a later stage. In the next step, the revegetation process will seek to meet other objectives, such as the landscaping of the area and the increase of biodiversity and faunal support. To this end, specific native

species are used, in order to take advantage of their adaptive characteristics to the region and favor natural succession. These species should be obtained from the flora rescue program and from the nurseries. The rehabilitation actions of the degraded areas are periodically monitored, in order to follow the events of colonization of the flora to adjust habitat management actions when necessary. These can maximize the processes of natural succession and recovery of the areas being rehabilitated. In addition, the target for 2021 was 10.06 ha.

Mining project ID
Project 6

Description of the impact being mitigated by restoration
• Intervention in APP (CONAMA 369/2007; • Atlantic Forest Intervention - Art.32 (Law 11.428/06); • Intervention in threatened and immune-cutting species.

Type of ecosystem restored
Forest ecosystems

Total area restored to date (hectares)
15.54

Total area to be restored (hectares)
0

Target year
2021

Describe restoration actions
Natural regeneration consists of the fact that the vegetation regenerates through natural processes, through the germination of naturally dispersed seeds, and, to a lesser extent, by sprouting stumps and roots. This method basically depends on a viable seed source, appropriate environment for germination and appropriate environment for the establishment and initial growth of plants. It is a low-cost alternative, generally recommended for areas that present near remnants and already have some tree species, besides being characterized by high resilience. On the other hand, artificial regeneration is a recovery process by providing better conditions of establishment for the species that are brought to the site and not initially relying on dispersers and seed sources. The success of this method, however, depends on the definition of several aspects, such as planting models; selection of appropriate species; methods of soil preparation and planting; methods of pest and disease control, among others. And the Methodology for Recovery of degraded areas consists in these actions: Selection of species; (native species) for compensation for intervention in threatened and immune cut species, those species that have underwent intervention are selected and planted); Planting model (composition, spacing, arrangement); Quality of the seedlings; Pre-planting; (Isolation of the area, fire protection, control of leaf-cutting ants, soil preparation, pit opening, control of invasive species, cathem); Planting and Maintenance. (insulation and protection against fire, ant control, cover fertilization, control of invasive species. In addition, the target for 2021 was 15,54ha.

Mining project ID
Project 7

Description of the impact being mitigated by restoration
It is not always possible to avoid or mitigate all impacts, especially for structures that have locational rigidity according to the occurrence of the mineral, such as pits. For these residual impacts, related to the loss and/or reduction of habitats, including habitats of endemic and threatened species, changes in communities, loss of flora individuals, the recovery and reclamation actions are very important. The reclamation measures of post-mined areas consist of: - Recontouring/landscaping to get stable landform which conducive to the growth of vegetation - Planting of cover crops/ground cover to minimize erosion and enhance soil fertility - Planting of pioneer trees to provide an initial trees canopy to accommodate the local trees species - Planting of native/local trees species under the pioneer trees canopy To enhance the growth of planted cover crops and trees some fertilizer is applied to the soil. Vegetation maintenance is carried out up to 3 years to ensure the growth rate. After 3 years the natural soil regeneration is reestablished and allows self-sustained vegetation grows. The monitoring program was carried out to measure the reclamation success rate. Some additional vegetation maintenance activities took place if required. After 4 -5 years the natural forest recolonization has been established.

Type of ecosystem restored
Forest ecosystems

Total area restored to date (hectares)
3249.1

Total area to be restored (hectares)
15000

Target year
2025

Describe restoration actions
We are trying to rehabilitate post-mining and cross-border land in other areas, especially on critical land, and PT Vale continues to carry out post-mining rehabilitation. PTVI restoration program is carried out through gradual revegetation, the first stage is the restoration of pioneer vegetation then followed by enrichment planting with local and endemic species. The enrichment planting with local and endemic species is carried out 2 years after pioneer planting. Reclamation activities are monitored using a reporting mechanism to the authorities, and when reclaimed land is handed back to the Government, and is evaluated for the achievement of the Department of Environment and Permit Management (EPM) key performance indicators (KPI), as the party in charge of the activity. Post-mining rehabilitation land in 2021 reached 283.74 ha, 1.3% more than planned, resulting in a cumulative total of 3,249.11 ha. Apart from our employees, the reclamation activities also involve other stakeholders, including the central government's Ministry of Energy and Mineral Resources (ESDM) and Ministry of Environment and Forestry (LHK), and the local governments, communities and nongovernmental organizations (NGOs).

F-MM14.5/F-CO14.5

(F-MM14.5/F-CO14.5) Have significant residual impacts of your projects been compensated through biodiversity offsets?

	Have residual impacts been compensated through biodiversity offsets?	Comment
Row 1	Yes	n.a.

F-MM14.5a/F-CO14.5a

(F-MM14.5a/F-CO14.5a) Provide details on the biodiversity offsets you have in place.

Mining project ID
Project 1

Description of the impact being offset
Removal of vegetation cover. The method for quantifying this impact was to monitor the total vegetation area that was removed. Avoiding the impacts related to the natural habitat conversion was not possible for all the structure projects. However, minimization is possible from the monitoring of suppression, installation of control measures, rescue of flora and fauna. Recovery and restoration measures are important to establish ecological corridors not only to compensate for the habitat loss but the fragmentation of habits too, and to reestablish populations of animal and plant species impacted by the implementation of the projects.

Motivation
Legal requirements

Type of offset
Restoration offset (forests)

Area (hectares)
1451.85

Describe the offset
On March 13, 2017, VALE S / A and the Chico Mendes Institute for Biodiversity Conservation (ICMbio / Regional Coordination - 04) signed a Term of Commitment for the execution of the project called “Ecosystem Restoration Project in Preservation Areas (APP) in the vicinity of the Mosaic of Conservation Units of Carajás ”. This program includes the restoration of 1,451.85 ha of Preservation Areas Permanent (APP). The initiative aims to comply with current legislation and meet the environmental conditions of the Vegetation Suppression Authorizations (ASV), issued by the competent environmental agency, within the Carajás National Forest, in the Carajás Mining Complex. The area to be compensated is based on the Vegetation Authorizations. The compensation is mostly done by planting seedlings. But also, for natural regeneration, in this context, means applying mechanical methods that aim to eliminate or control the development of unwanted plant species (example: exotic grasses) and, at the same time, favor the development of native species of interest in forest restoration. Another way also used is through the planting of enrichment that consists of the introduction of species from the final stages of succession in the target areas of forest restoration. This method is used when the vegetation already presents in the region has low species diversity. For these plantations, methods such as the introduction of seedlings and seeds and the introduction of individuals produced from seeds of species already present in the area, collected in other regional fragments - genetic enrichment are most commonly used. And one way to control the netting area is with the use of a fence. Which is an object of isolation to prevent the entry of bovine and equine animals into the areas under restoration. Brackets are placed in strategic locations along the perimeter of the fence, allowing teams to enter to carry out the work. In 2021, the process of restoring APP areas (Gustavo, Zé Goiano, Edilson I and II) maintenance actions was maintained and covered: replanting, crowning, fertilization, manual and mechanized mowing, manual and mechanized maintenance of firebreaks and maintenance of fences in areas of APP. The planting/replanting totaled 39,128 seedlings of native forest species. The restored area accumulated between 2011 and 2021 corresponds to 313,94 ha.

Mining project ID
Project 1

Description of the impact being offset
The implementation of the S11D Complex resulted in the direct intervention of an area of 2,610.80 hectares (ha), of which about 1,725.33 ha were natural areas, causing losses in forest habitats and ferruginous rocky outcrops, and also impacted caves, and the plant and animal species associated. According to what is defined in Art. 36 of the Federal Law Law 9.985/2000 and provided for in the Basic Environmental Plan (PBA) Carajás Iron Ore Project, the Program for the Creation of a Conservation Unit in an area indicated in the Bocaina and Tarzan Mountains, where occur remnants of forest and ferruginous rupestrian fields. This area is of great relevance in terms of location to expand conservation and connection between representative environments of the Carajás National Forest (FLONA Carajás).

Motivation
Legal requirements

Type of offset
Compensation agreements

Area (hectares)
79000

Describe the offset
Determine the priority area for the creation of the UC was based on the provisions defined for the speleological compensation provided for in Decree No. 99,556/1990, in strict accordance with the objectives of Law 9.985/2000, in order to specify in terms of prioritization for the creation and implementation of conservation units in areas of speleological interest and covering forest habitats and iron rock outcrops (ferruginous rupestrian fields), whenever possible in the region of the project. Since 2013, VALE, in partnership with DIMAN/ICMBIO, has been designing the creation of the Campos Ferruginosos National Park (PARNA), by the legal requirements in the definition of priority area for conservation. In this context, on July 5, 2017, the PARNA was officially created, by means of a specific decree. The park is formed mostly by portions of land of the Carajás National Forest - Flona Carajás (Tarzan Mountain) and adjacent areas in the Bocaina Mountains. This protected area (IUCN Category II) has been established to manage and protect Bocaina and Tarzan rocky outcrops, as well as forest and cavities habitats, as well as guaranteeing the continuity of ecosystem services, ensuring the protection of the speleological heritage of ferruginous formation, of the vegetation of rustic rupestrian fields, contributing to the environmental stability of the region. Vale has forgone exploration rights to enable the long-term protection of these important habitats for endemic species. Today this protected area is managed for ICMBio with Vale support to ecosystem protection, fire prevention and fighting, landholding regularization, research and education actions. These support actions are recorded in an agreement between Vale and ICMBio for the protection of all the protected areas in Carajás, which is revalidated every two years.

Mining project ID
Project 2

Description of the impact being offset
As the suppression of native vegetation is often an unavoidable impact, for the implementation of the enterprise and expansions, it is necessary to apply compensatory actions and measures such as the reforestation of other areas or other actions agreed upon between the applicant and the competent environmental agency. The impact is characterized in environmental impact studies and quantified from the size of the suppressed area, type of vegetation and successional stage (habitat quality). The offset was predicted in compliance with Article 32 of the Atlantic Forest Law (11,428 / 2006), CONAMA RESOLUTION No. 369, of March 28, 2006, and Compensation for Intervention in Endangered Species - Annex I of the Normative Instruction Ministry of the Environment No. 06 of 23 of September 2008.

Motivation
Legal requirements

Type of offset
Compensation agreements

Area (hectares)

2983.79

Describe the offset
In order to recompose the native flora vegetation suppressed in the projects that had their licenses granted in this complex, the company seeks to delimit compensation/conservation, based on landscape analysis, taking into consideration the formation of ecological corridors by promoting connectivity between the fragments of natural areas, allowing the free movement of animals, seed dispersal and increased vegetation cover. The company owns some of these areas in the Iron Quadrangle region, including Private Natural Heritage Reserves (RPPN), areas inside Conservation Units, properties for conservation/ restoration and future compensation. These areas are important witnesses of regional biodiversity, constituting remnants for the conservation of sensitive habitats and endemic and endangered species of flora and fauna. In the Itabira complex, there is 2,983.79 ha of protected areas approved by the environmental agency, which include RPPNs and compensation proposals from enterprises, and of this total, 197.47 ha were approved in 2021.

Mining project ID
Project 3

Description of the impact being offset
As the suppression of native vegetation is an often inevitable impact on the implementation of enterprises and expansions, it is necessary to apply actions and compensatory measures, such as the conservation and recovery of other areas or other actions agreed between the applicant and the competent environmental agency. The impact is characterized in environmental impact studies and quantified from the size of the suppressed area, type of vegetation and successional stage. The compensation for the Complex was foreseen in accordance with Articles 17 and 32 of the Atlantic Forest Law (11,428/2006), CONAMA Resolution No. 369 of March 28, 2006, and Compensation for Intervention in Endangered Species - Annex I to Normative Instruction of the Ministry of the Environment No. 06 of September 23, 2008, Article 75 of State Law 20.922/2013, State Decree 47.749/2019 and SNUC Law 9,985/2000.

Motivation
Legal requirements

Type of offset
Compensation agreements

Area (hectares)
253.86

Describe the offset
In order, to remake the native vegetation of flora suppressed from the projects that had their licenses granted in this Complex, the company seeks to delimit areas of compensation/conservation/recovery, based on landscape analysis, taking into account the formation of ecological corridors through the promotion of connectivity between the fragments of natural areas, allowing the free displacement of animals, seed dispersal and increased vegetation cover. The company owns some of the areas in the Quadrilátero Ferrífero region, including Private Natural Heritage Reserves (RPPN), areas within Conservation Units, conservation/recovery properties and future compensation. These areas are important witnesses of regional biodiversity, constituting remnants for the conservation of sensitive habitats and endemic and endangered species of flora and fauna. In the Mariana complex, there is 2,610.09 ha of preserved areas approved by the environmental agency that include RPPN and proposals for compensation of the projects, of which 253.86 ha was approved in 2021.

Mining project ID
Project 3

Description of the impact being offset
The implementation of the mines that make up the Mariana Complex triggered habitat fragmentation due to vegetation suppression in the region that had the Atlantic Forest. This biome has a high level of biodiversity and also a high gene flow of species, so any fragmentation of this biome impacts their reproduction and locomotion. Thus, species that are threatened with extinction in the region have an even greater risk of losing individuals and populations. There are threatened flora species, like Brazilian sassafras (Ocotea odorifera), and for the fauna, the following threatened species were found: cougar (Puma concolor), Chaco eagle (Urubitinga coronata), ocelot (Leopardus pardalis) and black hawk-eagle (Spizaetus tyrannus). The impact was characterized by environmental impact studies and scientific literature. And the species were quantified through fieldwork and scientific bibliography as well. In addition, the removal of vegetation cover is an impact that cannot be avoided or totally minimized due to the operations that will take place there. However, by following the environmental impact studies carried out, it is possible to develop conservation plans for areas with recorded occurrences or habitats for these species.

Motivation
Legal requirements

Type of offset
Averted loss offset (forests)

Area (hectares)
11251

Describe the offset
One of Vale's main initiatives to promote ecological balance and guarantee the conservation of natural resources and ecosystem services is the protection of natural areas. In total, there are 9,5 6 thousand km² of protected areas, approximately 11 12 times larger than the total area occupied by the company's operating units, areas are included in regions classified as wilderness areas, hotspots and key biodiversity areas. The company owns some of these areas, comprising Private Reserves of the Natural Heritage (RPPN), and properties for conservation with perpetual servitude conservation and future compensation. These areas are important witnesses of regional biodiversity, constituting remnants for the conservation of sensitive habitats and endangered and endemic species of flora and fauna. Together with third-party conservation units, they are important areas that support endangered and endemic species. Currently, Vale maintains RPPNs in Minas Gerais and conservation areas with perpetual servitude, in the region of the Quadrilátero Ferrífero, protecting more than 12,800 ha of typical formations of the Atlantic Forest and transition with the Brazilian savanna. In the Mariana Complex, there are two RPPNs and compensation proposals from the enterprises with 2,610.09 ha of protected areas approved by the environmental agency. Of this total, 253.86 ha were approved in 2021. (RPPN Santurário da Serra do Caraça and RPPN Horto Alegria da Vale), totaling an area of more than 11,000 hectares of forest and grassland habitats, the protection of which guarantees the maintenance of populations of rare, endemic, and threatened species of fauna and flora. This category of Private Sustainable Use Conservation Units is essential for establishing ecological corridors, improving functional connectivity and ultimately structuring metapopulations and maintaining populations of threatened species. Finally, by protecting part of the land in which they are established, they help to prevent CO2 emissions from deforestation and degradation, in addition to providing other ecosystem services, like water provision and climate regulation.

Mining project ID
Project 4

Description of the impact being offset
The actions to compensate for impacts of the complex include both compensatory planting, which are areas for restoration of habitats and populations of endangered and legally protected species associated with compliance with legal requirements, and protected areas created by Vale for the conservation of habitats and associated endangered and endemic species. The main residual impacts offset relate to the loss of forest and grassland habitats, as well as populations of endemic and threatened

species associated with these habitats. The compensations for the Complex were provided in accordance with Articles 17 and 32 of the Atlantic Forest Law (11.428 / 2006), CONAMA RESOLUTION No. 369 of March 28, 2006, and Compensation for Intervention in Endangered Species - Annex I of the Normative Instruction of the Ministry of Environment No. 06 of September 23, 2008, Article 75 of State Law 20.922/2013, State Decree 47.749/2019 and SNUC Law 9.985/2000.

Motivation
Legal requirements

Type of offset
Compensation agreements

Area (hectares)
2146.47

Describe the offset
In order to recompose the native flora vegetation suppressed in the projects that had their licenses granted in this complex, the company seeks to delimit compensation/conservation/recovery areas, based on landscape analysis, taking into consideration the formation of ecological corridors by promoting connectivity between the fragments of natural areas, allowing the free movement of animals, seed dispersal and increased vegetation cover. The company owns some of these areas in the Iron Quadrangle region, including Private Natural Heritage Reserves (RPPN), areas inside Conservation Units, properties for conservation/ restoration and future compensation. These areas are important witnesses of regional biodiversity, constituting remnants for the conservation of sensitive habitats and endemic and endangered species of flora and fauna. In the Vargem Grande complex, there is 2,146.47 ha of preserved areas approved by the environmental agency that including RPPNs and compensation proposals from the projects. A specific example related to this Complex is Stephanopodium engleri, an herbaceous plant endemic to the state of Minas Gerais, which occurs in Seasonal Forests. This species had its population affected by the implementation of a waste rock dump, had its seeds rescued and seedlings produced and used in the recovery of areas, and has protected populations in Vale's RPPNs.

Mining project ID
Project 5

Description of the impact being offset
Environmental interventions with suppression of native vegetation of the Atlantic Forest biome and in Permanent Preservation Areas (APP) for project implementation. As the suppression of native vegetation is often an unavoidable impact on the implementation of enterprises and expansions, it is necessary to apply compensatory actions and measures, such as the conservation and recovery of other areas or other actions agreed upon between the applicant and the competent environmental agency. The impact is characterized in environmental impact studies and quantified based on the size of the suppressed area, type of vegetation, and successional stage. The compensations for the Complex were provided in accordance with Articles 17 and 32 of the Atlantic Forest Law (11.428 / 2006), CONAMA RESOLUTION No. 369 of March 28, 2006, and Compensation for Intervention in Endangered Species - Annex I of the Normative Instruction of the Ministry of Environment No. 06 of September 23, 2008, Article 75 of State Law 20.922/2013, State Decree 47.749/2019 and SNUC Law 9.985/2000.

Motivation
Legal requirements

Type of offset
Compensation agreements

Area (hectares)
2558.73

Describe the offset
In order to recompose the native flora vegetation suppressed in the projects that had their licenses granted in this complex, the company seeks to delimit compensation/conservation/recovery areas, based on landscape analysis, taking into consideration the formation of ecological corridors by promoting connectivity between the fragments of natural areas, allowing the free movement of animals, seed dispersal and increased vegetation cover. The company owns some of these areas in the Iron Quadrangle region, including Private Natural Heritage Reserves (RPPN), areas inside Conservation Units, properties for conservation/ restoration and future compensation. These areas are important witnesses of regional biodiversity, constituting remnants for the conservation of sensitive habitats and endemic and endangered species of flora and fauna. A specific example related to the Fábrica Mine is Stephanopodium engleri, an herbaceous plant endemic to the state of Minas Gerais, which occurs in Seasonal Forests. This species had its population affected by the implementation of a mining waste rock pile, had its seeds rescued and seedlings produced and used in the recovery of areas, and has protected populations in RPPNs Andaime and Capitão do Mato. The areas are rich in biodiversity, with rare, endemic and/or endangered species of fauna and flora, and protected different habitats. In the Paraopeba complex, there is 2,558.73 ha of protected areas approved by the environmental agency that includes RPPNs and compensation proposals from the projects.

Mining project ID
Project 6

Description of the impact being offset
As the suppression of native vegetation is often an unavoidable impact on the implementation of enterprises and expansions, especially when dealing with structures that present locational rigidity such as caverns, it is necessary to apply compensatory actions and measures, such as the conservation and recovery of other areas or other actions agreed between the applicant and the competent environmental agency. The impact is characterized in environmental impact studies and quantified based on the size of the suppressed area, type of vegetation, and successional stage. The compensations for the Complex were provided in accordance with Articles 17 and 32 of the Atlantic Forest Law (11.428 / 2006), CONAMA RESOLUTION No. 369 of March 28, 2006, and Compensation for Intervention in Endangered Species - Annex I of the Normative Instruction of the Ministry of Environment No. 06 of September 23, 2008, Article 75 of State Law 20.922/2013, State Decree 47.749/2019 and SNUC Law 9.985/2000.

Motivation
Legal requirements

Type of offset
Compensation agreements

Area (hectares)
5821.12

Describe the offset
In order to recompose the native flora vegetation suppressed in the projects that had their licenses granted in this complex, the company seeks to delimit compensation/conservation/recovery areas, based on landscape analysis, taking into consideration the formation of ecological corridors by promoting connectivity between the fragments of natural areas, allowing the free movement of animals, seed dispersal and increased vegetation cover. The company owns some of these areas in the Iron Quadrangle region, including Private Natural Heritage Reserves (RPPN), areas inside Conservation Units, properties for conservation/ restoration and future compensation. These areas are important witnesses of regional biodiversity, constituting remnants for the conservation of sensitive habitats and endemic and endangered species of flora and fauna. In the Brucutu/ Água Limpa complex, there are 5,821.12 ha of preserved areas approved by the environmental agency that includes RPPNs and compensation

proposals from the enterprises, and of this total, 22.70 ha were approved in 2021 and 661.49 ha in 2022

Mining project ID
Project 7

Description of the impact being offset
It is not always possible to avoid or mitigate all impacts, especially for structures that have locational rigidity according to the occurrence of the mineral, such as pits. After recovery and reclamation actions, for these residual impacts related to the loss and/or reduction of habitats, including habitats of endemic and threatened species, changes in communities, and loss of flora individuals, restoration and compensation actions are necessary. PTVI continue to maintain vegetation after pioneer planting and Plant enrichment until the percentage grows to 80%.

Motivation
Legal requirements

Type of offset
Averted loss offset (forests)

Area (hectares)
90

Describe the offset
Post-mining land reclamation helps to improve land ecosystems, conservation and protection of protected and endemic flora and fauna species and is a form of legal compliance. We are committed to limiting the open land areas for mining operations and implementing biodiversity management in the mining operation areas in accordance with Approval Letter No.188.4/66/II/ BAPEDALDA. We also carry out land rehabilitation and transboundary reforestation activities outside the mining operation areas, especially in critical land and watersheds (DAS). In 2021 we handed over 90 Ha of rehabilitated critical land and watersheds (DAS) to the Ministry of Environment and Forestry to fulfill our obligations as an IPPKH holder. The land handed over was in a protected forest area in Kawata Village and Ledu-Ledu Village, Wasuponda Subdistrict, East Luwu Regency.

Mining project ID
Project 2

Description of the impact being offset
This environmental compensation is in compliance with CONAMA Resolution No. 369/2006, which provides for the intervention or suppression of vegetation in Permanent Preservation Areas and in accordance with the Environmental Compensation Term No. 2101090505017, referring to Process 119/1986/111/ 2014 - Heightening of the Itabiruçu Dam, with a height of 850 m, located in Itabira-MG. The Itabiruçu Dam is part of the Itabira Mining Complex, owned by Vale S.A. inserted in the central portion of the municipality of Itabira, northeast of the Quadrilátero Ferrífero (QF), in the central portion of the state of Minas Gerais. From an ecological point of view, the Quadrilátero Ferrífero is located south of the Espinhaço mountain range, within the perimeter of the Espinhaço Biosphere Reserve, which aims to prioritize the conservation of biodiversity, sustainable development and scientific knowledge. In addition, all of it is indicated as a Priority Area for the Conservation of Flora and Fauna, situations that influence the State's decision regarding the granting of environmental licensing, currently regulated by the Ecological Economic Zoning, established by Decree 4,297/02, strengthening the measures of controls aimed at the conservation and recovery of biodiversity. It is, therefore, a region of extreme ecological importance, due to the lithological variety found in it, which shelters different ecosystems close to each other, which leads researchers to classify it as having great biological diversity.

Motivation
Legal requirements

Type of offset
Restoration offset (forests)

Area (hectares)
38.09

Describe the offset
Given the ecological importance of the area involved for the implementation of the project and the aims to compensate for the impacts generated by the suppression of native vegetation in the APP area and threatened species resulting from the implementation of the project, the measures proposed in the Flora Reconstitution Project are being carried out. The areas selected for the compensation of APP and endangered species are called Fazenda Caieiros and Sítio Córrego das Cobras, located in the municipality of Itabira-MG and, according to the Brazilian Institute of Geography and Statistics (IBGE, 2017), are located in the biomes Cerrado and Atlantic Forest. The compensation in these Permanent Preservation Areas (APP) will allow the resumption of environmental functions, contributing to the preservation of water resources, landscape, geological stability and biodiversity, ease of gene flow of fauna and flora, and soil protection, in addition to ensuring the well-being of human populations, as well as the enrichment of these areas with the compensation of threatened species. In 2021, 1,435 seedlings were planted in an area of 14.15 hectares on the Caieiros farm, 4,749 seedlings were planted in an area of 5.28 hectares on the Córrego das Cobras site and 6020 seedlings were planted in an area of 18.66 hectares on the Santa Catarina farm. Thus, totaling a planted area of 38.09 hectares and 12,204 seedlings used in this area.

F-MM14.6/F-CO14.6

(F-MM14.6/F-CO14.6) Is your organization implementing or supporting additional conservation actions?

	Implementing or supporting additional conservation actions?	Comment
Row 1	Yes	n.a.

F-MM14.6a/F-CO14.6a

(F-MM14.6a/F-CO14.6a) Provide details on the main additional conservation actions you are implementing or supporting.

Project title
Conservation of Quadrilátero Ferrífero Region Species

Project theme
Threatened species

Country/Area
Brazil

Location
In the area of influence of mining project

Primary motivation
Voluntary

Timeframe
Defined

Start year
2016

End year
2022

Description of project
This project began in 2016 and since then has been developed in partnership with consultants and researchers from all over Brazil. The main focus is to increase the knowledge about the plant species of the rock fields of the Quadrilátero Ferrífero region, Minas Gerais state (Brazil) in Vale's protected areas and other conservation units. The project actions involved modeling and predictive mapping of species considered rare, endemic and/or threatened in conservation units of the state until the in-depth study of populations and occurrence. After mapping and field campaigns, the species were collected and forwarded for taxonomic confirmation. New campaigns were scheduled for the study of these populations and the collection of genetic material and propagules aimed at the development of propagation protocols. Legal or regulatory aspects are not applicable to this project, as it is of voluntary origin.

Description of outcome to date
So far, this work has resulted in the recording of 1,026 species identified and registered in indexed herbaria of which four refer to new discoveries of species for science, two have already been described and officially published, and there is the possibility of another five being equally new to science. These records are very relevant for the knowledge of the ecology of these species and the definition of guidelines for their conservation. To share and disseminate the results of this project, three books have been published. In 2021 we published Volume II of the Plant Guide, bringing, in a didactic way, a little more knowledge about this rich flora, with information about some of the most representative families of the rupestrian fields, approaching and detailing common parts and characteristics that allow their identification by anyone.

Project title
Forest Goal – Support and protection of areas in Atlantic Forest

Project theme
Protected areas

Country/Area
Brazil

Location
Outside area of influence of mining project

Primary motivation
Voluntary

Timeframe
Defined

Start year
2020

End year
2026

Description of project
In 2019, during Vale Day on the New York Stock Exchange, Vale made public its "New Pact with society", with the aim of leading the transition to net zero (scope 1 and 2) mining by 2050, in line with the UN Sustainable Development Goals 15 (Terrestrial Life), as well as the global biodiversity strategy, focusing on Aichi's goals. One of the axes within the "New Pact with Society" is the Forest Goal - Recover and protect 500,000 hectares of areas by 2030, beyond its borders. Of these 500,000 hectares, 400,000 are focused on protection, mainly in partnerships with Conservation Units - UCs (municipal, state and, or federal), through Cooperation Agreements, without the direct transfer of any financial resources, and the investment is made through donations of goods /materials and provision of services. Legal or regulatory aspects are not applicable to this project, as it is of voluntary origin.

Description of outcome to date
In 2021, the protection and conservation activities of four conservation units whose cooperation agreements were signed at the end of 2020 with the Chico de Mendes Institute for Biodiversity Conservation (ICMBio), The Institute of Environment and Water Resources (Iema, ES) totaling more than 53,000 hectares of forest. Among the actions developed throughout 2021, about 19 environmental education events were held, aimed at raising awareness and training visitors, residents and communities around the Units, with the participation of more than 4,000 sensitized people. In addition, the Conservation Units were given several materials and equipment to support the protection and conservation of areas, such as drones for aerial monitoring and Eco-Counters, advanced technology sensor equipment that measures the access of people on the trails, generating data that can support decision-making regarding conservation actions. In the Cunhambebe State Park, 06 environmental monitors were hired that monitor the areas covered by the Park, , supporting actions to prevent the monitors are responsible for developing various activities of orientation and environmental education with visitors and communities around the Park. Also in this context, a temporary forest fire brigade was hired, which operates directly in forest fire prevention and combat activities, In December 2021, a new Cooperation Agreement was signed between Vale and ICMBio, aimed at combining efforts to adopt support measures in the activities of ecosystem protection, conservation and environmental education, of three more Conservation Units, totaling more than 62,000 hectares. In this scenario, Vale under Forest Goal acts to support the protection and conservation of more than 115,000 hectares of protected areas.

Project title
Vale and ICMBio Cooperation Agreement - Sooretama Biological Reserve

Project theme
Forest conservation

Country/Area
Brazil

Location
Outside area of influence of mining project

Primary motivation
Voluntary

Timeframe
Defined

Start year
1999

End year
2026

Description of project
The Biological Reserve of Sooretama (Rebio), covers the municipalities of Linhares, Sooretama, Jaguaré and Vila Valério, State of Espírito Santo. Rebio, together with the Vale Natural Reserve, and two Private Reserves of Natural Heritage (RPPNs) of Suzano S/A, make up the largest forest complex in the North of Espírito Santo, totaling 50,000 hectares of Atlantic Forest of Tabuleiro. The Conservation Unit is also part of the Atlantic Forest Reserves of the Discovery Coast, housing great biodiversity, including rare and endangered species, among them the tapir (Tapirus terrestres), jaguar (Panthera onca) and tatu canastra (Priodontes maximus). For all its importance for biodiversity conservation, Vale has been supporting the protection and conservation of the Sooretama Biological Reserve for 23 years through a Cooperation Agreement signed with ICMBio, the body responsible for the management of the Unit. In December 2021 the Agreement was renewed again between the parties, with the objective of continue to act in support of the actions of ecosystem protection and conservation of the Unit. In this scenario, the actions are developed without the direct transfer of any financial resources, and the investment is made through donations of goods/materials and provision of service. Legal or regulatory aspects are not applicable to this project, as it is of voluntary origin.

Description of outcome to date
Throughout 2021, Vale made available through hiring, an Ecosystem Protection team, composed of 08 members, among Vale employees and outsourced employees. This team is responsible for the daily monitoring of the Biological Reserve of Sooretama, performing an active search for traces and hunting gear scans through the displacement on roads and aceiros and walks inside the forest, passing on the information obtained in the field the Environmental Police and ICMBio agents. In addition, all records obtained in the field during monitoring are inserted in the Integrated Management System of Protected Areas (SGIAP), which consists of a system approved by Vale. SGIAP aims to store, organize and integrate important data for the management of this area. Within this system, there is the Ecosystem Protection module where records of hunting, fire and various occurrences related to environmental crimes are inserted. This SGIAP module has been used as a tool to monitor threats to the fauna and flora of the Sooretama Biological Reserve. In addition, the Ecosystem Protection team carried out 46 educational and preventive blitzes together with the Environmental Military Police in the region around Rebio, in order to sensitize the community about the importance of its conservation. Also in this context, an integrated action was developed with the Federal Highway Police, ICMBio and the Department of Environment of Linhares/ES, in which environmental guidance and education activities were carried out with drivers who transited the highway that cuts through the Conservation Unit, addressing topics such as conservation of natural resources and biodiversity of the forest, waste disposal, forest fires, wildlife trafficking and hunting. Another action developed was the Global BigDay event, where bird watchers worked to record the largest number of bird species over the course of a field day, with records of 112 species in Rebio, contributing even more to the knowledge about the biodiversity existing in the Unit and citizen science. In December 2021, the Cooperation Agreement was renewed again, covering the period from December/2021 to December 2026.

Project title
Environmental Education Projects - Vale Natural Reserve

Project theme
Forest conservation

Country/Area
Brazil

Location
Outside area of influence of mining project

Primary motivation
Voluntary

Timeframe
Undefined

Start year
2000

End year
<Not Applicable>

Description of project
The Vale Natural Reserve opened its Public Use area in 2000 years, and since then has been working on the development of environmental education projects and actions, in order to bring the RNV closer to its neighboring communities and visitors, promoting the awareness of social actors, converging to the common goal of social and environmental sustainability and biodiversity conservation. In this scenario, the projects Environmental Attitude and Researcher I Researcher have been developed. The Environmental Attitude Project aims to form information replicators for sustainable development, through presentations with videos, music and dynamics addressing environmental issues such as water, air, biodiversity, energy and waste, with students from elementary schools located around the Reserve. The Eu Pesquisador Project is developed in partnership with researchers from research and teaching institutions and aims to arouse interest in scientific knowledge about biodiversity, expanding socio-environmental awareness, with children and young people from schools located around the Vale and Biological Reserve of Sooretama Natural Reserve. The Sustainable Reserve Project aims to bring environmental themes for reflection and, possibly, possible promotion in the actions worked for the community. It is developed with its own team and each year has different themes to meet the demands of the region. Also in this context, the Vale Natural Reserve promotes environmental education events, involving lectures, workshops and dynamics, addressing topics such as environmental preservation and its biodiversity, conscious use of natural resources, health and well-being. Legal or regulatory aspects are not applicable to this project, as it is of voluntary origin.

Description of outcome to date
Throughout 2021, 36 environmental education events were held, including courses, workshops and lectures, on topics such as environmental preservation and its biodiversity, conscious use of natural resources, health and well-being, fostering change in sustainable attitudes, with the participation of more than 3,600 people. The Environmental Attitude project, was carried out in online format, with the participation of 61 school students located around the Vale Natural Reserve. During the event, students developed presentations focused on waste, including the reuse of recyclable materials used in daily life, such as pet bottles, tetra pak boxes, among others, for the manufacture of toys and games. The Eu Pesquisador Project, in 2021 had the participation of 17 students and teachers in the 7th year of elementary school. The project was worked on in five online modules, four meetings addressing relevant themes about the fauna of the Vale Natural Reserve (Mammals, Invertebrates, Herpetofauna and Birds) and the fifth closing module. In the Sustainable Reserve project, short courses were held for the adult public of the neighbouring communities and the academic

public. The following courses were taught: Domestic Composting, Botanical Identification, Ungulates of the Atlantic Forest and Introduction to Bird Watching.

Project title
Vale Zoobotanical Park (PZV)

Project theme
Forest conservation

Country/Area
Brazil

Location
In the area of influence of mining project

Primary motivation
Voluntary

Timeframe
Undefined

Start year
1985

End year
<Not Applicable>

Description of project
Created in 1985, maintained and administered by Vale, the Zoobotanical Park exclusively houses native species of Amazonian fauna and flora. It is located within the Carajás National Forest, in a Federal Conservation Unit, and occupies an area of 30 forest preserved hectares, which allows the free movement of bird, agoutis and monkey species in the visitation areas, offering a unique experience of immersion in the Amazon rainforest every tour. With free entrance and open to the public daily, the PZV has a zoo, veterinary hospital, orchid, herbarium, collection room, auditorium, exhibition area and environmental education room. The space receives about 100,000 visitors a year. In addition, we support several studies, research and environmental projects aimed at protecting local biodiversity, exposing and conserving species of Amazonian fauna and flora. In addition, the park receives animals seized by government enforcement agencies (IBAMA/ ICMBio). The animals received are treated, rehabilitated and monitored by a team of specialists. The park also takes part in exchange programs between zoos, as part of species conservation actions. Legal or regulatory aspects are not applicable to this project, as it is of voluntary origin.

Description of outcome to date
Approximately 360 animals are cared for on-site, distributed in more than 70 species of birds, mammals and reptiles, including some rare or endangered, such as the hawk, macaw, jaguar, suçuarana, white-fronted spider monkey and cuxiú monkey. In 2021 the park received more than 800 visitors, reopened for visitation only in October. Among the main activities developed at the PZV is the Reproductive Management Program for the Conservation of Endangered and Biologically Relevant Species, aimed at the captive reproduction of endangered species from the Amazon biome. Important results have already been achieved, such as the birth of baby macaws, jaguars, and harpy eagles. The space contributes to the conservation of the species, serving as a genetic stock and training specialized professionals to work for the benefit of preserving the fauna and flora of the Amazon.

Project title
Vale Natural Reserve

Project theme
Threatened species

Country/Area
Brazil

Location
Outside area of influence of mining project

Primary motivation
Voluntary

Timeframe
Undefined

Start year
1978

End year
<Not Applicable>

Description of project
Vale Natural Reserve (VNR) is one of the main protected areas maintained by Vale. It is located in Linhares, in the North region of Espírito Santo, and has approximately 23 thousand hectares that, together with the 27,000-hectare Sooretama Biological Reserve, are the largest continuous remnant of the Atlantic Forest in the Southeast tablelands of the country, especially in the Central Area of the Atlantic Forest. Acknowledged in 2008 as an Advanced Station of the Atlantic Forest Biosphere Reserve of UNESCO's Man and Biosphere Programme, it is an important area intended for conservation of flora and fauna of the biome. This area plays an important role in the conservation of biodiversity, sheltering 3,000 plant species and 1.5 thousand insect morphospecies, 27 fish species, 56 amphibian species, 64 reptile species, 401bird species and 103 mammal species, including rare, endemic and endangered species. Playing a key role in ex situ conservation, the Reserve has an herbarium comprising more than 17 thousand samples of species from the Atlantic Forest. Reinforcing this role, it has one of the largest seedling nurseries in Brazil, a reference in the cultivation of species from the Atlantic Forest, with a production capacity of up to three million seedlings/year, acting in environmental recovery projects in the State. The area also has partnerships for the development of scientific research and an area of public use that receives more than 30 thousand visitors per year. Bringing people closer to VNR through public use activities benefits the local population while raising awareness of the importance of conserving the rich biodiversity of the Atlantic Forest. Legal or regulatory aspects are not applicable to this project, as it is of voluntary origin.

Description of outcome to date
This year the Reserve celebrates 43 years of dedication to biodiversity Atlantic forest conservation and research. In these 43 years, more than 241 research projects were developed, 117 new species of flora were described, environmental education projects with researchers in partnership with the Reserve, discovery and monitoring of new nests of the harpy eagle, a species that is critically endangered. The Reserve protects about five Thousand species of plants and animals from the Atlantic Forest, including more than 160 endangered species and 64 endemic species. Preserving this unique heritage and taking care of its maintenance, reducing threats that put pressure on VNR, has been Vale's goal while maintaining the area. In addition, it has public open areas for greater integration of communities and the general public with nature, including

trails, exhibitions, an event venue, and a hotel receiving more than 30 thousand visitors per year. The Reserve has a tree nursery established in the early 1970s that has since supported the restoration and reintroduction of species across a variety of projects. One of the nursery's objectives is to support the conservation of Atlantic Forest genetic heritage, with a primary focus on threatened species. These initiatives support the reintroduction of these species in their original habitats and can, in the long term, help to reestablish populations and even generate a positive change in the face of threats. In addition to forest restoration initiatives, seedlings have also been used for urban tree planting and environmental awareness campaigns. These campaigns help communities to feel they are a part of the species conservation process, which can be a first step in sparking environmental awareness. In 2021 new partnerships with conservation and research projects were signed, such as the partnership with the Marcos Daniel Institute (IMD) to support the Saíra-Apunhalada Conservation Program. With expected duration of three years, its objective is to increase knowledge and develop conservation actions for this critically endangered bird species, found only in the mountainous region of Espírito Santo. In addition, seven new species were discovered in the reserve's area in 2021.

Project title
Reserva Particular do Patrimônio Natural Mata do Jambreiro

Project theme
Protected areas

Country/Area
Brazil

Location
In the area of influence of mining project

Primary motivation
Voluntary

Timeframe
Undefined

Start year
1998

End year
<Not Applicable>

Description of project
The Private Natural Heritage Reserve (RPPN) Mata do Jambreiro is the largest private protected area in the Metropolitan Region of Belo Horizonte, State of Minas Gerais, Brazil. Created in 1998, it covers 912 hectares of forests and fields in the transition between two biomes considered of global importance for conservation: the Atlantic Forest and the Cerrado. The work started by Vale two decades ago proves that economic development can happen in harmony with the preservation of our green areas. The ecosystem of this RPPN is home to 33 springs, 180 species of birds, 62 species of mammals and more than 100 species of plants. Legal or regulatory aspects are not applicable to this project, as it is of voluntary origin.

Description of outcome to date
The area protects essential ecosystem services for the surrounding communities, contributing to the climate balance in the region, preserving 33 springs and waterways, and contributing to the formation of ecological corridors. Several research projects have registered 180 bird species, 62 mammal species, and more than 100 plant species protected in the area, including endemic and endangered species.

Project title
Corn Productions Incentives - Nova Esperança Juzeiro (PA)

Project theme
Community development

Country/Area
Brazil

Location
Outside area of influence of mining project

Primary motivation
Voluntary

Timeframe
Undefined

Start year
2015

End year
<Not Applicable>

Description of project
The Corn Production Incentive Project focuses on family farming carried out due to the need of farmers linked to the Nova Esperança/Juazeiro Small Rural Producers' Association. They needed cereals to be used as animal feed, particularly the smaller ones located on properties, and as a food staples for families, with surpluses commercialized in Parauapebas and/or the surrounding region. Corn production is currently one of the community's main sources of income. Objective(s): Increase potential corn produced through dryland farming without irrigation. Formation of Management Group: The process of constituting the group started in 2016 and was established from meetings with the community, in which there was strong engagement and participation of all in defining necessary initiatives for the community. This project is annually monitored and assessed since its deployment. Legal or regulatory aspects are not applicable to this project, as it is of voluntary origin.

Description of outcome to date
In 2020/2021, the signing of the agricultural production agreement maintains support for the expansion of corn production, providing continuity for the Agroforestry Systems Project and implementing olericulture project as part of the Community Relations Plan. The results are: Increase in production from 40 bags/ha, which provided basic sustenance, to 100 bags/ha in 2021; Reduction in the time needed to complete harvest; Improved financial security; Collective relationships strengthened; Increased associativism; Technical training provided, allowing for the increased organization in processes involved in both soil preparation and sale; Greater pride taken in being a rural producer recognized for producing high-quality corn.

Project title
Lake Matano Rehabilitation Project

Project theme
Restoration (other)

Country/Area
Indonesia

Location
In the area of influence of mining project

Primary motivation
Legal requirements

Timeframe
Defined

Start year
2021

End year
2023

Description of project
PT Vale together with the Government and the communities planted 1,000 tembeuwa seedlings in Muara Tapolemo, on the shores of Lake Matano, East Luwu Regency, to rehabilitate and maintain the lake ecosystem, especially on the shoreline.

Description of outcome to date
Tembeuwa (Kjellbergiodendron celebicum) is a type of vegetation often found on the shores of Lake Matano,and is endemic to Sulawesi. Previously, 1,200 tembeuwa seedlings from PT Vale's nursery facilities had been planted in Soluro, on the west shore of Lake Matano. Tembeuwa has a similar function to mangrove and can withstand abrasion, ensuring the lake water quality is maintained. Post-planting, activities will include monitoring and evaluations over the next two years.

F-MM14.7/F-CO14.7

(F-MM14.7/F-CO14.7) Do your mining projects have closure plans in place?

	Are there closure plans in place?	Comment
Row 1	Yes	The process of planning for the closure of assets should occur in parallel to the operation, minimizing risks and maximizing opportunities to generate value for the territories. Currently, we work with an annual cycle to plan and execute the progressive closure of assets and study our territories' aptitudes and potentialities. In the 2021 cycle, 100% of our mapped operations had Closure Plans and made provisions totalling approximately USD 4.2 billion. The plans are in line with the good practices adopted by ICMM and national legislation.

F-MM14.7a/F-CO14.7a

(F-MM14.7a/F-CO14.7a) Please provide details on mines with closure plans.

Row 1

Percentage of mines with closure plans
100

Percentage of closure plans that take biodiversity aspects into consideration
100

Is there a financial provision for mine closure expenditure?
Yes, for all mines

Frequency closure plans are reviewed
Occasionally (all projects)

Please explain
The guidelines for asset decommissioning and mine closure include good corporate practices and procedures, also include the composition of the asset decommissioning provision, in line with the guidelines of the Securities and Exchange Commission - CVM and the Securities and Exchange Commission - SEC (IAS 37 and Sarbanes-Oxley Act) implemented throughout the project's life cycle (Pages 293-294, Vale Reference Form). The definition of the future use of each unit is chosen in the Mine Closure Plan, considering the environmental, social and economic aspects, according to the specific operational procedure. All Vale operations have a Mine Closure Plan. A provision is made for the costs expected to close the mines and deactivate related mining assets. In 2021, considering changes in discount rates and update plans for closing the mine, which also considers new legal requirements related to decommissioning, the provision was US$ 4,283 million dollars. The closure plan is made by successive approximations, which will depend on the type of operation, the socio-environmental scope and the useful life of the project. Therefore, it is indicated that the Conceptual Closure Plan is updated periodically, or when there are no substantial developments in its operations and / or in the conditions and aspects related to related parties. In addition, in accordance with Vale's internal Biodiversity policy, it is suggested that recovery / restoration actions be planned jointly with the RAD and Mine Closure teams, with a focus on obtaining gains from these actions for the biodiversity. An example of this planning was the S11D Complex belonging to the Carajás Complex. Where the plan was developed based on the guidelines in Vale's Mine Closure Guide and best international practices, according to the ICMM. According to the methodology of the Closing Guide, the mine (operational unit) must be divided into typical structures, which are the areas that make up the project and can be grouped by similar characteristics. And a large part of the undertaking, such as pits, waste piles and sediment containment dykes in the Carajás area, was designed for future use in environmental conservation. These areas must be submitted to rehabilitation aiming at integration with the local environment.

F-MM14.8/F-CO14.8

(F-MM14.8/F-CO14.8) Can you disclose the area rehabilitated (in total and in the reporting year) for each of your mining projects?

	Disclosing area rehabilitated (in total and in the reporting year)?	Comment
Row 1	Yes	

F-MM14.8a/F-CO14.8a

(F-MM14.8a/F-CO14.8a) Provide details on the area rehabilitated (total/reporting year) for each of your mining projects, including post-mining land use.

Mining project ID
Project 1

Total area rehabilitated (hectares)
1486.79

Area rehabilitated in the reporting year (hectares)
255.97

Describe post-mining land use
Due to the insertion of a large part of the project (excavations, piles of waste and sediment containment dikes) in the Flona de Carajás, the future use of environmental conservation was considered for these areas. The areas of the pits, waste piles and sediment containment dikes should be subjected to rehabilitation aiming at integration with the local environment, based on measures that will initially be developed within the scope of the Degraded Area Recovery Plan. For the areas of the enterprise located outside of Flona (processing plant and part of the administrative structures), a future agrosilvopastoral use is proposed (current land use). It is indicated that in future revisions / updates of the conceptual closure plan, a study of alternatives for future more in-depth use will be carried out. This study should also take into account the expectations of stakeholders (surrounding communities, environmental agencies) about the future of the area. Due to the proposed future use, the premise was adopted that the industrial areas will be dismantled, dismantled and removed and the remaining area will be rehabilitated. Some structures may remain, if they do not represent environmental risks. However, as the definition of the structures that may remain will only be carried out at a time close to the closure of the mine, in this conceptual closure plan it was considered that all administrative structures will be removed. Finally, the total rehabilitated area was calculated from the reporting of the last 6 years related to GRI indicator MM1, being reported here the permanent and temporary rehabilitation of mined areas. Similarly, the area rehabilitated in the reporting year corresponds to that reported against GRI indicator MM1, referring to permanent and temporary rehabilitation.

Mining project ID
Project 2

Total area rehabilitated (hectares)
11611.16

Area rehabilitated in the reporting year (hectares)
291.81

Describe post-mining land use
Itabira is the city where Vale was born in 1942. Today, Vale is looking for ways to continue operations there while beginning the closure process in a responsible, sustainable and gradual manner. For the future, Vale is transitioning to post-mining activities. The total rehabilitated area was calculated from the reporting of the last 6 years related to GRI indicator MM1, being reported here the permanent and temporary rehabilitation of mined areas. Similarly, the area rehabilitated in the reporting year corresponds to that reported against GRI indicator MM1, referring to permanent and temporary rehabilitation. These reports are made by directorate, and the figures presented here refer to the Mariana, Itabira and Brucutu/Agua Limpa complexes together, representing the rehabilitated area in hectares. Promoting the improvement of environmental quality and to meet the conditions, Vale carries out rehabilitation actions in degraded areas in the Mining Complex of Itabira with the objective of making these areas suitable for new uses in conditions of environmental balance. For the rehabilitation to take place, agronomic techniques and practices are used that promote the vegetation cover, aiming at the restoration and stabilization of the relief and improvement of the productive potential. In addition to the use of planting techniques for the rehabilitation of degraded areas, these were also used in the implementation of the physical barriers and tree curtains present in the Mining Complex of Itabira. These green belts have several environmental functions, such as: protecting the area of the enterprise by blocking the access of people in risk areas, softening the visual impact of the landscape and noise on the surrounding communities, and reducing the spread of dust and wind to the city and public roads. The rehabilitation of degraded areas and the installation and maintenance of the green curtain sought to meet the conditions stipulated by the environmental agency. The Environmental Mine Closure Plan, which will contemplate the future use of the rehabilitated area, will be presented by Vale to the competent bodies, as determined by DN No. 127/2008 in its article 5: "At least two years before the closure of the mine , the entrepreneur must file the Environmental Mine Closure Plan at the unit of the environmental agency responsible for licensing the project.

Mining project ID
Project 3

Total area rehabilitated (hectares)
1611.16

Area rehabilitated in the reporting year (hectares)
451.64

Describe post-mining land use
The Environmental Rehabilitation services performed represent an important stage of Vale S.A.'s Environmental Rehabilitation Program, composed of the rehabilitation plans approved in the environmental licensing processes of its projects. The planning works for the areas to be rehabilitated are carried out through the definition of stable surfaces, with adequate drainage and subject to revegetation. The planning system takes into account the internal policy of promoting the revegetation of all areas cleared by mine planning and operation, covering all land structures that would remain unchanged for six months or more. Environmental rehabilitation services are performed by contracted and specialized companies with professionals duly technically qualified for the tasks. The execution methodologies were passed on to the contracted companies through technical recommendations and specifications of the minimum quantities of seeds, fertilizers and correctives for the execution of the various plantations requested. Rehabilitation was implemented through Revegetation through the sowing of forages; Revegetation through the planting of tree species; and Revegetation through the reintroduction of plants rescued from the native flora. The total rehabilitated area was calculated from the reporting of the last 5 6 years related to GRI indicator MM1, being reported here the permanent and temporary rehabilitation of mined areas. These reports are made by directorate, and the figures presented here refer to the Mariana, Itabira and Brucutu/Agua Limpa complexes together, representing the rehabilitated area in hectares. Similarly, tThe area rehabilitated in the reporting year corresponds to that reported against GRI indicator MM1, referring to permanent and temporary rehabilitation in Mariana Complex.

Mining project ID

Project 4

Total area rehabilitated (hectares)
2745.63

Area rehabilitated in the reporting year (hectares)
328

Describe post-mining land use
The total rehabilitated area was calculated from the reporting of the last 6 years related to GRI indicator MM1, being reported here the permanent and temporary rehabilitation of mined areas. Similarly, the area rehabilitated in the reporting year corresponds to that reported against GRI indicator MM1, referring to permanent and temporary rehabilitation. These reports are made by directorate, and the figures presented here refer to the Paraopebas and Vargem Grande complexes together, representing the rehabilitated area in hectares. The actions to rehabilitate degraded areas that resulted in these figures refer both to those aimed at recovering physical stability, which are related to temporary rehabilitation areas, and to permanent actions related to the re-establishment of physical, chemical and biological conditions, re-establishing habitats that will be incorporated again into the natural landscape. Reestablishing these habitats and incorporating them back into the landscape, in search of the reestablishment of their main ecological functions, is the main objective of the permanent rehabilitation of the areas. The recovery of degraded areas (RAD) is a process that is inherent to mining, and is planned by Vale throughout the different phases of its ventures, from planning, through operations, to the closure of its activities.

Mining project ID
Project 5

Total area rehabilitated (hectares)
2745.63

Area rehabilitated in the reporting year (hectares)
257

Describe post-mining land use
The total rehabilitated area was calculated from the reporting of the last 6 years related to GRI indicator MM1, being reported here the permanent and temporary rehabilitation of mined areas. Similarly, the area rehabilitated in the reporting year corresponds to that reported against GRI indicator MM1, referring to permanent and temporary rehabilitation. These reports are made by directorate, and the figures presented here refer to the Paraopebas and Vargem Grande complexes together, representing the rehabilitated area in hectares. The actions to rehabilitate degraded areas that resulted in these figures refer both to those aimed at recovering physical stability, which are related to temporary rehabilitation areas, and to permanent actions related to the re-establishment of physical, chemical and biological conditions, re-establishing habitats that will be incorporated again into the natural landscape. Reestablishing these habitats and incorporating them back into the landscape, in search of the reestablishment of their main ecological functions, is the main objective of the permanent rehabilitation of the areas. The recovery of degraded areas (RAD) is a process that is inherent to mining, and is planned by Vale throughout the different phases of its ventures, from planning, through operations, to the closure of its activities.

Mining project ID
Project 6

Total area rehabilitated (hectares)
1611.16

Area rehabilitated in the reporting year (hectares)
5.75

Describe post-mining land use
Alternatives for the future use of the area will be presented in accordance with the Normative Deliberation COPAM (State Council for Environmental Policy) No. 127/2008, at least two years before the deactivation of the enterprise. These alternatives will be reported in the Environmental Mine Closure Plan. It should be noted that, due to possible changes in legislation and/or in the estimated useful life of the project, the referred plan may be anticipated or extended. However, Vale has been carrying out environmental rehabilitation actions in its mining projects, as the company believes that the execution of environmental rehabilitation works concurrently with the operation of the project contributes to the complex process of closing the mine. Since taking over the operation of the Brucutu Mine in 1994, Vale has been carrying out environmental rehabilitation work in its areas, from the moment they are released by the operation. The environmental rehabilitation actions of the Brucutu mine pit are aimed at stabilizing the banks of the Sterile Disposal Pile and minimizing the carrying of sediments. The finished banks have been stabilized, reconfigured and restored. As the banks are finalized and stabilized, the process of environmental rehabilitation of the pile takes place through the revegetation procedures of these banks. At the end of the disposition in a given bank, erosions and irregularities are reconfigured; liming is carried out by incorporating dolomitic limestone into the soil and then digging holes over the entire surface, which provides the soil with sufficient roughness to allow the fixation of agricultural inputs. After digging, the input cocktail is prepared, consisting of fertilizers and grass and legume seeds, to be applied in the area. The total rehabilitated area was calculated from the reporting of the last 6 years related to GRI indicator MM1, being reported here the permanent and temporary rehabilitation of mined areas. Similarly, the area rehabilitated in the reporting year corresponds to that reported against GRI indicator MM1, referring to permanent and temporary rehabilitation. These reports are made by directorate, and the figures presented here refer to the Mariana, Itabira and Brucutu/Agua Limpa complexes together, representing the rehabilitated area in hectares.

Mining project ID
Project 7

Total area rehabilitated (hectares)
3249.1

Area rehabilitated in the reporting year (hectares)
283.76

Describe post-mining land use
The project brings the concept of land rehabilitation and reclamation simultaneously to the opening of new areas as the mining areas are cleared. The stages of land rehabilitation in the post-mining area include land surface arrangement/formation with standard slope rehabilitation terrain, topsoil restoration using collected topsoil, erosion control, drainage construction, revegetation road construction, reforestation, plant maintenance - including weed clearing, pest control, manipulation of stunted plant roots, and fertilization - until they can grow naturally in a sustainable manner. In an effort to conserve biodiversity, PT Vale has a post-mining plan and biodiversity management for 100% of mining operation areas in the Sorowako block. By 2025, PT Vale's targets are restoring 15,000 hectares of land to become forest through its post-mining rehabilitation activities and the rehabilitation of critical land and watersheds. By the end of 2021 the accumulated land area rehabilitated was 3,249 Ha, which included 283.73 ha of land rehabilitated during 2021 is. For the remainder, we are targeting more than 10,000 ha of land for reclamation and rehabilitation by 2024.

F15 Engagement

F-MM15.1/F-CO15.1

(F-MM15.1/F-CO15.1) Do you participate in or endorse any of the following global initiatives?

	Participate or endorse?	Comment
Extractive Industries Transparency Initiative	Yes	Vale participates in the Extractive Industries Transparency Initiative (EITI), as well as other sector entities such as the International Council on Mining and Metals (ICMM).
UN Global Compact	No	Vale is committed to the UN Global Compact. Vale was a member of the UN Global Compact since 2007 and part of the LEAD group between 2011 and 2018. Due to the tragedy of the Brumadinho tailings dam rupture, out of respect for the institution and its members, Vale requested to be delisted in May 2019. Since then, Vale has committed to the full reparation of the impacts caused and focused on stepping up its governance, sustainability commitments, operational excellence (operational risks and asset management), health & safety, amongst others. The company has diligently implemented the 10 UN Global Compact Principles and engaged with the Global Compact secretariat annually.
Natural Capital Coalition	No	Vale does not participate directly in the Natural Capital Coalition but participates in discussions from the CEBDS Technical Biodiversity Chamber, which is a member and representative of the coalition in Brazil.
Business and Biodiversity Pledge	Yes	Vale is part of the Brazilian Business Commitment to Biodiversity (CEBDS) initiative, and is very active in the Technical Biodiversity Chamber which commits to contribute to the following goals, addressed in the pillars of avoidance, mitigation, compensation and generation and sharing information of biodiversity, by 2030, such as: Inserting the theme of biodiversity in the company's business strategy; Apply the mitigation hierarchy, prevent, mitigate, recover and offset impacts on biodiversity, throughout the life cycle of the projects; Promote and strengthen best practices that favor the rational use of biodiversity resources. Vale is a signatory to the Business for Nature Call to Action. Business for Nature is a global coalition bringing together influential organizations and forward-thinking businesses. The Call to Action is the statement that Business for Nature is asking businesses to sign up to and demonstrate business momentum on nature. It'll use this powerful collective business voice to call on governments to adopt ambitious nature policies to reverse nature loss in this decade. Vale is part of the Business Movement for the Amazon and sign in 2021 the Business Sector Positioning on the Amazon, a result of a partnership between CEBDS and the A Concertation for the Amazon Initiative, that has six pillars focused on combating illegal deforestation and promoting an inclusive and regenerative economy.
New York Declaration on Forests	No	

F-MM15.2/F-CO15.2

(F-MM15.2/F-CO15.2) Do you participate in or support industry-led and/or standards-setting initiatives and organizations promoting sustainability in the mining sector?

	Participating or supporting industry-led and/or standards-setting initiatives?	Comment
Row 1	Yes	Vale is committed to integrating sustainability into its business by building a strong and positive economic, social and environmental legacy and mitigating the impacts of its operations. Therefore, we seek to build strong and lasting relationships with our stakeholders, invest in mitigating the effects of our activities, work with high ethical standards, have transparent management and actively contribute to advances related to the environment, biodiversity and sustainable development. We associate with various entities and associations reinforcing our commitments to sustainability and society, focusing on best practices for sustainable mining.

F-MM15.2a/F-CO15.2a

(F-MM15.2a/F-CO15.2a) Indicate the initiatives and/or organizations you took part in or supported during the reporting year.

Activities	Initiatives	Comment
Industry-led mining sustainability initiative/organization	ICMM Towards Sustainable Mining - TSM (Mining Association of Canada) Other industry-led initiative, please specify (IGF, IMA, AFMA, IBRAM)	Vale is member of International Council on Mining and Metals - ICMM. The ICMM members recognise that they have a responsibility to promote and support sustainable development wherever they work. Vale is an active member in the Mining Association of Canada (MAC) and voluntary participant in the association's initiative called Towards Sustainable Mining (TSM). This initiative aims to improve the industry's performance by aligning its actions with the priorities and values of Canadians. TSM provides a way of finding common ground with communities of interest in order to build a better mining industry, today and in the future. TSM is based on a set of guiding principles that are, in turn, supported by performance elements and indicators. IBRAM (Brazilian Mining Institute): represents the companies and institutions that operate in the mineral sector in search of establishing a favorable environment for business, competitiveness and sustainable development. The Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF) is a voluntary initiative supporting more than 75 nations committed to leveraging mining for sustainable development to ensure negative impacts are limited and financial benefits are shared. The Indonesian Mining Association is a non-governmental, non-political, non-profit organization established in accordance with the laws of the Republic of Indonesia. The headquarters and registered office of the association shall be situated within Jakarta. The association serves as a link between Government and the mining industry., organizing lectures, seminars and training activities for the members, organizing periodic conference on mining in Indonesia, publishes proceedings and mining information, and represents the indonesian mining industry at national and international meetings. IMA is a founding member for the Asean Federation of Mining Association (AFMA) and currently provides the secretariat for the Federation. (see more entities and associations in 2021 Integrated Report, pg 117).
Standard-setting initiative/organization	Other standard-setting initiative, please specify (World Business Council for Sustainable Development (WBCSD); Brazilian Business Council for Sustainable Development (CEBDS); Task Force on Climate-related Financial Disclosure (TCFD).)	Vale's company make part of World Business Council for Sustainable Development (WBCSD). According to its website the WBCSD is a global, CEO-led organization of over 200 leading businesses working together to accelerate the transition to a sustainable world. Thus, Vale follow the approaches and targets business solutions aim to scale up business impact in compliance with WBCSD. Therefore, it targets the realization of the Sustainable Development Goals (SDGs) through six work programs to achieve systems transformation, as Circular Economy, Cities % Mobility, Climate & Energy, Food & Nature, Redefining Value and People. Vale is part of the Brasilian Business Council for Sustainable Development. Vale is part of the Brazilian Business Commitment to Biodiversity (CEBDS) initiative, which commits to contribute to the following goals, addressed in the pillars of avoidance, mitigation, compensation and generation and sharing information of biodiversity, by 2030, such as: Inserting the theme of biodiversity in the company's business strategy; Apply the mitigation hierarchy, prevent, mitigate, recover and offset impacts on biodiversity, throughout the life cycle of the projects; Promote and strengthen best practices that favor the rational use of biodiversity resources. Finally, in 2017, Vale adhered to the Task Force on Climate-related Financial Disclosure (TCFD) recommendations led by the Financial Stability Board, containing guidelines for reporting financial risks related to climate change by companies and financial institutions.

F-MM15.3/F-CO15.3

(F-MM15.3/F-CO15.3) Do you collaborate or engage in partnerships with non-governmental organizations to promote the implementation of your biodiversity-related goals and commitments?

	Collaborating or partnering with non-governmental organizations?	Comment
Row 1	Yes	Since Fundo Vale's mission is to promote solutions with a positive socio-environmental impact that strengthen a sustainable, fair and inclusive economy - primarily in the Amazon biome - they decided to work closely with organizations and businesses that are hands on the ground, through listening, discussion and apprenticeship. This strategy combines keeping the forest standing, while fostering the development and strengthening of businesses with a positive socio-environmental impact. Our approach is systemic, knowing, articulating and working with the different actors in the ecosystem, including non-governmental organizations. Partnerships with several NGOs contribute to the achievement of strategies and results foreseen in our Theory of Change – especially described here: strategies to catalyze businesses with socio-environmental impact and work in coalitions (the examples listed are not exhausting). In 2021, Vale signed Technical Cooperation Agreement with the Marcos Daniel Institute, an educational, research and environmental preservation institution, aiming at combining efforts to adopt specific measures to support the conservation activities of the stabbing (Nemosia rourei), a species of bird endemic to Espírito Santo and critically threatened with extinction in the IUCN list. The experts of the Vale Nature Reserve support with activities of floristic survey, recovery of degraded areas, monitoring of the ecology of the species and search for nests, contributing to imminent understanding of biology, needs and threats of the stabbing exit in the Atlantic Forest, in order to prevent its extinction and ensure its long-term survival. In addition, for Project 7, Vale is collaborating with Univ. Hassanudin for Baseline study and monitoring of Biodiversity.

F-MM15.3a/F-CO15.3a

(F-MM15.3a/F-CO15.3a) Provide details on main collaborations and/or partnerships with non-governmental organizations that were active during the reporting year.

Organization
AMDA

Scope of collaboration
Specific mining project(s)

Mining project ID
Project 2
Project 3
Project 4
Project 5
Project 6

Areas of collaborations
Other, please specify (Fire prevention and combat)

Describe the nature of the collaboration
One of the greatest threats to the protection of biodiversity in the region that encompasses municipalities located in the Quadrilatero Ferrifero Region is forest fires that, annually, in the dry months, degrade extensive areas of natural vegetation. The forest types in the valley and slopes are certainly the most impacted due to the lower resilience of their species in relation to those of rural and savanna formations. In the stretches where the fires were more severe, the forest vegetation was fragmented, leaving isolated capons, with extremely negative consequences for the function of ecological corridors and fauna recolonization. In view of the characteristics of the area of operation of the Brigades Amda / Sindiextra / Vale, their protection is extremely important for the conservation of biodiversity. They work directly in combat forest fires and it acts strongly in the prevention of these events and in the mitigation of fire damage.

Duration (until)
2021-2025

Organization
COEX - (Carajás National Forest Extractive Cooperative)

Scope of collaboration
Specific mining project(s)

Mining project ID
Project 1

Areas of collaborations
Protected areas
Endangered species
Restoration

Describe the nature of the collaboration
The agreement between Vale and COEX (Extractive Cooperative of Flona de Carajás) allows the direct purchase of seeds of native plants for use in seedling development, area recovery and species conservation. As well as, this purchase mechanism generates income for the local communities in the other months when the collection of jaborandi leaf is not possible. This partnership is also very important for the diversity of species and for the conservation of endangered species. In order for the activity of extractivists to stop representing risks to the conservation of jaborandi, it was necessary to adopt sustainable collection techniques. The main one is that the plants started to be pruned and not uprooted, as it used to happen. The collectors received training and learned to handle correctly. And this partnership is not limited to COEX but also involves an environmental governamental agency (ICMBio) and the Federal Rural University of the Amazon (UFRA), thus composing the Jaborandi Project. Thus, research is carried out to produce knowledge about the plant's ecosystem and the leaf collectors themselves became allies of the project and became guardians of the species. Therefore, it will not only be possible to conserve the species, but also its sustainable use. During 2021, 5,791 kilograms of native seeds of 159 different species were acquired from COEX. Outcomes to date: Rehabilitation of approximately 145 hectares of land with jaborandi seeds collected and supplied by the cooperative for Vale's reforestation projects. 350 seed species sold per year, all registered with the Brazilian Seed and Seedlings Registry (RENASEM) and inspected by an expert, supporting conservation of local biodiversity. An added source of monthly income for 39 collectors and their families.

Duration (until)

2021-2025

Organization
IDESAM – Amaz Impact Business Accelerator

Scope of collaboration
Company-wide

Mining project ID
<Not Applicable>

Areas of collaborations
Other, please specify (Acceleration of socio environmental impact businesses in the Amazon.)

Describe the nature of the collaboration
Created by Idesam, the accelerator is 100% dedicated to entrepreneurs working in the Amazon. Amaz arises from the evolution of the Acceleration and Investment Program of the Partners for the Amazon Platform, after accelerating 30 startups and being recognized as the best acceleration program in the north of the country. It has already invested around R$ 6.8 million in 11 projects and offers business support in various topics such as financial and administrative management, cooperation in logistics and market access. In its operating model, it operates with the logic of hybrid financing (blended finance), combining philanthropic resources and reimbursable investment.

Duration (until)
>2030

Organization
Sustainable Connections Institute (Conexsus) - Socio-environmental Response Plan to COVID 19

Scope of collaboration
Company-wide

Mining project ID
<Not Applicable>

Areas of collaborations
Other, please specify (Technical assistance and support for the financial structuring of community businesses (associations and cooperatives) in the Amazon region.)

Describe the nature of the collaboration
Developed to activate key areas of the socio-environmental impact community business ecosystem in order to make them more resilient and reduce the negative impacts generated by the coronavirus pandemic. Through this partnership, 85 businesses in family farming and extractives received in 2020 a total of R$ 10.1 million in credit, to overcome challenges economics of pandemic.

Duration (until)
2021-2025

Organization
IMAZON – Previsia.

Scope of collaboration
Company-wide

Mining project ID
<Not Applicable>

Areas of collaborations
Deforestation and /or forest degradation

Describe the nature of the collaboration
The development of a free artificial intelligence tool that analyzes various data - such as topography, land cover, urban infrastructure, official and unofficial roads and socioeconomic data - to predict deforestation in the Brazilian Legal Amazon, identifying areas at risk in the next 12 months. It has already identified that 15,391 km² of the legal Amazon are at high and very high risk of deforestation in 2022.

Duration (until)
2021-2025

Organization
Fundação Certi – Jornada Amazônia.

Scope of collaboration
Company-wide

Mining project ID
<Not Applicable>

Areas of collaborations
Other, please specify (Economic competitiveness of the forest standing through biodiversity and innovation.)

Describe the nature of the collaboration
Expand business opportunities based on biodiversity from a forest that remains standing, alive, rich and preserved, fostering impact entrepreneurship in the Amazon region and stimulating innovative proposals that generate economic and socio-environmental value. Up until now this initiative contributed to one million hectares of forest preserved through innovative production chains that already work in the region.

Duration (until)
2021-2025

Organization
The Marcos Daniel Institute is a private non-profit association qualified as OSCIP (Civil Society Organization of Public Interest), located in Vitória, Espírito Santo, Brazil. The focus of IMD's activities is the development of biodiversity conservation projects and the formation of multipliers for nature conservation.

Scope of collaboration
Company-wide

Mining project ID
<Not Applicable>

Areas of collaborations
Biodiversity Action Plans
Protected areas
Endangered species
Restoration

Describe the nature of the collaboration
Vale technically supports the Stabbing Exit Conservation Program (Nemosia rourei), through cooperation agreement, ceding experts from the Vale Nature Reserve for the development of floristic survey activities, evaluation of reports for recovery of degraded areas, monitoring of the ecology of the species and search for nests, contributing to imminent understanding of biology, needs and threats to the stabbing in the Atlantic Forest, in order to prevent its extinction and ensure its long-term survival. These activities are in line with the actions of the objectives of the action plan for the conservation of the stabbing, in which Vale participated contributing to the discussions during the workshop for its construction.

Duration (until)
2021-2025

Organization
Indonesia Business Council for Sustainable Development (IBCSD)

Scope of collaboration
Specific mining project(s)

Mining project ID
Project 7

Areas of collaborations
Protected areas
Endangered species
Restoration

Describe the nature of the collaboration
Vale collaborates with the Indonesia Business Council for Sustainable Development (IBCSD) in compiling the Guide for Sustainable Biodiversity Management. The document, released in 2017, becomes the first ever in the Indonesian mining business for biodiversity conservation activities. This project will encourage mining company to implement best practice to manage biodiversity in site of mining area.

Duration (until)
2021-2025

Organization
Institute of Mankind and Environment of the Amazon (Imazon - in the Portuguese acronym)

Scope of collaboration
Specific mining project(s)

Mining project ID
Project 1

Areas of collaborations
Landscape-scale assessments

Describe the nature of the collaboration
As a result of a partnership between Fundo Vale, Microsoft and Imazon, the project “Artificial Intelligence for Risk Assessment and Prevention of Deforestation and Burning in the Amazon region” developed a platform for prior identification of areas that are likely to be deforested in the Amazon region in the next 12 months, using artificial intelligence. It aims to provide information to society, focusing on agents that can act in the prevention of deforestation and burnings in the Amazon, such as public agencies, social and environmental organizations, banks, investment funds and rural producers. It's a partnership through Technical and Financial Cooperation Term and involving the transference of financial resources. It has already identified that 15,391 km² of the legal Amazon are at high and very high risk of deforestation in 2022. Over these 30 years, about 700 technical works were published in international scientific journals, in addition to this, more than 100 books, guides and manuals, were available free of charge on the Institute's website, which are intended to contribute to the replication of good results in other territories and initiatives and, also, serve as a consultation for the literature on sustainable development in the Amazon. All this based on scientific rigor, empirical approach and search for solutions.

Duration (until)
2021-2025

F-MM15.5/F-CO15.5

(F-MM15.5/F-CO15.5) Do you engage with other stakeholders to further the implementation of your policies concerning biodiversity?
Yes

F-MM15.5a/F-CO15.5a

(F-MM15.5a/F-CO15.5a) Provide relevant examples of other biodiversity-related engagement activities that happened during the reporting year.

Activities
Funding research organizations

Mining project ID
Project 2
Project 3
Project 4
Project 5
Project 6

Please explain
During 2021, we still had in progress the Taxonomists Network, which was implemented considering botanical specialists from all over Brazil, involving 25 researchers from 15 different institutions. In all, 1,778 botanical samples were identified, which later became part of the botanical collections of indexed herbaria. This network aimed to accurately identify botanical samples of taxonomic complexity that were often not determined by the botanists of the consultancies, given the need for specialization. With this work it was possible to ratify the identification of species that had not been recorded for a long time, in addition to confirming the discovery of 10 new species for science and starting in their process of description and publication.

Activities
Engaging with local communities

Mining project ID
Project 1

Please explain
Vale S.A. signed an agreement to accelerate the Carajás Extractive Cooperative (COEX) for the development of sustainable extractive activities of the jaborandi, which included the participation of the Instituto de Socioeconomia Solidária (ISES). The COEX, located in the municipality of Parauapebas (Pará, Brazil) has as main activity is the extraction and commercialization of jaborandi leaf, used in the production of remedies for glaucoma and cancer. The work contributes to the preservation of the Amazon Forest, generates income for local communities, reduces deforestation rates and prevents the loss of biodiversity of native species. The Jaborandi (Pilocarpus microphyllus) is an endangered species, native to regions of hot and humid climate and found in the states of Pará, Maranhão and Piauí. In partnership with COEX Carajás, the Vale Technological Institute for Sustainable Development (ITV-DS) carried out, for the first time, the DNA sequencing of the plant. This will allow researchers to map the genetic diversity of Jaborandi and understand how pilocarpine is produced, helping to ensure long-term survival of the species. On the business side, one of COEX's main clients is Carajás's Vale Seedling Nursery, the region where the mining company's largest mine is located. Today it is the only local extraction cooperative based on environmental conservation and has authorization from ICMBio (federal agency responsible for the management of the protected area) to carry out this collection in a sustainable manner within Flona. In addition, as the collection of jaborandi leaf is an activity that occurs only in three months of the year, there was a need to create income generation mechanisms for local communities in the other months. During 2021, 5,791 kilograms of native seeds of 159 different species were acquired from COEX. The Vale Fund supports mechanisms to promote and strengthen the business, Vale's operations provide training and are the largest purchasers of seeds used for habitat restoration, while the ITV carries out research focused on improving collection, maintenance and recovery techniques for the cooperative's target species - today the project benefits 39 families and have 350 species commercialized, supporting forest restoring and conservation.

Activities
Engaging with local communities

Mining project ID
Project 1

Please explain
Biodiversity is an important and intrinsic theme to the business, from its wealth, breadth and value. Maintaining life and ecosystem services is essential for Vale. Among the additional and voluntary actions related to the conservation of biodiversity, the Vale Zoobotânico Park (PZV), located in the National Forest of Carajás, houses a breeding stock with 70 species of Amazonian fauna and more than 360 individuals, working on ex situ conservation of endemic species and threatened. They are animals from rescues in the company's operations, in addition to seizures and rescues by environmental agencies. The Park works with important environmental education and conservation awareness actions. The park's visitation average is around 100 thousand visitors per year, including families, schools, universities and research institutions. In addition, the PZV develops a program for the reproduction of threatened species, such as the macaw (Guaruba guarouba), endemic to the Brazilian Amazon and considered vulnerable to extinction. Several chicks have been born in the Park and three of them were reintroduced into natural areas in the city of Belém, in partnership with the Institute for Forestry and Biodiversity Development (Ideflor-bio), in the Project Reintroduction and Monitoring of Ararajubas in Conservation Units of RMB - Belém Mais Linda.

Activities
Engaging with local communities

Mining project ID
Project 1

Please explain
Since 2009, Vale has maintained the Vale Technological Institute - Mining and Sustainable Development (ITV DS) in Belém, a non-profit institution for postgraduate research and teaching. This institution has a group of researchers dedicated to research related to biodiversity and ecosystem services with a focus on the Carajás National Forest. The research carried out at ITV is oriented towards socio-environmental issues that challenge the mining chain, primarily in the territories in which Vale operates for example The Carajás Complex. The Institute's agenda focuses on the themes of biodiversity, environmental services, water resources, environmental genomics, reforestation with native species, recovery of degraded areas, climate change, occupation and use of land and socioeconomics. In addition, we have a programme of partnerships with universities and institutions to promote research and development, supporting research projects related to the conservation of endangered, endemic and rare species, natural habitats, restoration and other issues. These partnerships include national institutions such as USP (University of São Paulo), INPE (National Institute for Space Research), FIOCRUZ (Oswaldo Cruz Foundation) and others. As well as international institutions such as University of Copenhagen, University of Queensland and others. Finally, there are also partnerships with agencies that promote research and environmental agencies. ITV DS is also active in training young researchers through the Professional Master's in Sustainable Use of Natural Resources in Tropical Regions. More than 120 professionals from all over the country had been trained by 2021. On this front, we highlight the research scholarship and project subsidies program for young residents in Pará whose dissertations in line with one of the Unite Nations Sustainable Development Goals (SDGs).

Activities
Engaging with local communities

Mining project ID
Project 7

Please explain
PTVI signed MoU (Memorandum of Understanding) with Local Community Cooperative named MMA in 2019 to conduct biodiversity conservation activities on the reclaimed post mined areas for 50Ha The Cooperative will supply and planting of native trees species seedlings and some beneficial trees which will produce non wood forest product such as fruits, sap, etc. The selection of trees species is based the Cooperative aspiration aligned with the closure plan. One of the objective of this initiative is to provide

alternative economic source prior the closure of the mine. Almost all reclamation activities involve local communities is divided into several vendors. Each week will be assessed by each target given. In the scope of the contract, the vendor will be prepared all equipment to support land preparation activities. In the scope, the warranty is emphasized regarding the percent of plant growth for a duration of 6 months and if the percent grows less than 80% before planting local plants then the vendor is obliged to re-enrich.

Activities
Participating in government-led initiatives

Mining project ID
Project 7

Please explain
Since 2018, we have implemented the patterns and schemes of our Community Development and Empowerment Program (PPM) based on our Independent Rural Development Program (PKPM) within the four areas in Blok Sorowako, East Luwu Regency, and South Sulawesi. It's a five-year period (2018-2023) partnership program between the community, local government and PT Vale. Through this PPM-PKPM program, PT Vale gives stimulant funds to the community so that they can develop their regions and chief products. For five decades operation, PT Vale brought major changes for local community life. These changes gave positive impact for working opportunity and developing various public infrastructure, such as health, education and transportation facilities and other infrastructure that drives local economy. PT Vale also implements various community development programs. Entering 2013, PT Vale changed approach in community development programs implementation through the Integrated Community Development Program (PTPM). PTPM planning and implementation aligned with East Luwu Regency Government's road map and long term development program that prioritizes transparency and accountability. In 2018, the transformation was carried out. When villages in one area join and develop their best potential which also lead economic growth to community independence more fast faster. PKPM was born as the innovation to continue previous program. Villages no longer run individually but connected and together, move forward together in one area. PKPM, It's a five-year period (2018-2023) partnership program between the community, local government and PT Vale. PKPM is to increase production, competitiveness, to give added value and economic independence for community in mining operation affected areas. PKPM gives stimulant funds to the community so that they can develop their superior region products. Cooperation scope includes development-empowerment communities and rural areas, implementation of the Community Development and Empowerment Program (PPM) and PKPM, fostering and strengthening government institutions capacity in village, fostering and strengthening Inter-Village Cooperation Bodies capacity, as well as strengthening Owned Enterprises Village.

Activities
Funding research organizations

Mining project ID
Project 7

Please explain
Scope of work on MoU (Memorandum of Understanding)with the University includes several items with the aim of determining the right steps in the future. PT Vale is committed to completing its biodiversity management plan, covering the entire mining operation areas in the Sorowako Block. By the end of the reporting period, the management has been implemented 100%. In 2021, PT Vale continued the study of protected species started in 2020 with Hasanuddin University. The results show that several species of fauna and flora are protected or threatened with extinction, and need to be conserved to maintain their sustainability. The list of protected species is based on the IUCN red list.

Activities
Other, please specify (Fauna monitoring in partnership with university)

Mining project ID
Project 3
Project 5

Please explain
Investment in research is essential to expand the knowledge about our areas and develop new methods and technologies that support the knowledge and conservation of species and their habitats. The study "Surveying and Monitoring of Threatened Medium and Large Mammals using Drone Imagery", a partnership with the Federal University of Viçosa, is being developed in Vale protected areas in the Iron Quadrangle region. The study evaluates the efficiency of the camera trap, linear transect and thermal drone methodologies, aiming for a better estimate of species richness and diversity. Furthermore, this study aims to improve knowledge about the species of medium and large mammals present in four Private Natural Heritage Reserves (RPPNs) in Mariana and Paraopeba Complex. The project has a duration of four years. Adding the results obtained in 2021, 30 species have been recorded so far, with Tamandua tetradactyla, Sapajus nigritus and Eira barbara recorded by the scanning method with drones attached to thermal cameras.

Activities
Engaging with local communities

Mining project ID
Project 5

Please explain
Vale has an open, transparent relationship channel with the public around its operations, and to make this dialogue easier and closer it has a Community Relations team in each territory where it operates, which are the company's official representatives in the area of influence of its operations and projects. Several actions were articulated with the community and developed in the territory. These are activities that promote local development, infrastructure improvements, compensation and mitigation of impacts, and actions to conserve the environment. The Relationship and Social Investment Plan was built based on the dialogue with the community, taking as a reference the meetings of the Social Committee and the notes made regarding the operational impacts in the territory. Other activities that were already underway, from previous years, were maintained in 2021. Since the beginning of the pandemic, meetings have been held through online meetings. The monitoring of the execution of the Relationship and Social Investment Plan is carried out through Vale's internal system, SDI (Stakeholders, Demands and Problems).

Activities
Engaging with local communities

Mining project ID
Project 6

Please explain
One of Vale's activities related to the Brucutu Água Limpa Complex is the Environmental Attitude Program. It is a program based on behavior change, cultural transformation, the acquisition of new values that favor the conservation and maintenance of natural resources and the environment and, mainly, on the formation of subjects aware of their fundamental role in the transformations of the society in which you live. Its activities are aimed at both the internal (employees, employees and contractors) and external audiences and its main strategy is to invest in education. This program seeks to spread the principles of environmental, social and sustainable development responsibility in the communities of which it is an integral part. The Program has as partners the Municipal Departments of Education and Environment, the

Schools of the Public Teaching Network, their students, employees and educators, in addition to leaders and representatives of the Communities. In the area covered by the Brucutu Mine, the Program operates in the following locations: Barão de Cocais, Santa Bárbara, Rio Piracicaba and São Gonçalo do Rio Abaixo. In addition, the company carries out several awareness campaigns to publicize World Water Day, World Environment Day, among others.

Activities
Engaging with local communities

Mining project ID
Project 2

Please explain
Engagement with local communities is through the Environmental Education Program. This program has the objective of developing projects and actions for Vale employees, contracted companies and for the local community, expanding the perception in relation to the enterprise and aiming at a greater participation of this public. The Program offers a range of educational activities for both Vale employees and the communities where our operations are located, providing opportunities to present and discuss environmental impacts and to raise awareness about the importance and role of each person in caring for the environment.

Activities
Engaging with local communities

Mining project ID
Project 2

Please explain
The Itabira City Hall, Unifei (local university) and Vale have signed a partnership in 2019 with the goal that the city becomes a hub of education, innovation and technology. An investment of around R$100 million was made by Vale, aimed at strengthening education practices, encouraging technology-based research and entrepreneurship, and constructing new buildings as part of the University's Technology Park. The choice to invest in the education area is the result of a series of discussions and studies by the Working Group (WG) led by the Itabira City Hall to seek alternatives for economic diversification. According to Unifei's own studies, the expansion of the university, with the construction of three new buildings, will increase the supply of courses and quadruple the number of vacancies in undergraduate courses.

Activities
Engaging with local communities

Mining project ID
Project 2

Please explain
Fazer Ciência (Doing Science) is an initiative of the Vale Foundation, in partnership with the Itabira Municipal Secretariat of Education and the CEDAC Educational Community. It values the teaching of science and mathematics in schools, encouraging students' autonomy in problem solving. Fazer Ciências provides for the systematic training of elementary school teachers and other professionals, such as the Itabira Municipal Secretariat of Education staff, school managers, and pedagogical coordinators. Besides the educators' training, it is equally important that the students have access to situations and materials so that they can investigate, think, and systematize new knowledge. In this way, the project also provides content and materials for schools, contributing to the development of investigative activities of real problem situations with students in the areas of Natural Sciences and Mathematics.

Activities
Engaging with local communities

Mining project ID
Project 4

Please explain
Vale has an open, transparent relationship channel with the public around its operations, and to make this dialogue easier and closer it has a Community Relations team in each territory where it operates, which are the company's official representatives in the area of influence of its operations and projects. Several actions were articulated with the community and developed in the territory. These are activities that promote local development, infrastructure improvements, compensation and mitigation of impacts, and actions to preserve the environment. Other activities that were already underway, from previous years, were maintained in 2021. Since the beginning of the pandemic, meetings have been held through online meetings. The actions being implemented involve support for social projects and local associations, environmental education actions, implementation and monitoring of environmental controls related to dust and noise (tree curtains, road sprinkling) and improvements in the paving and safety infrastructure, among others. The monitoring of the execution of the Relationship and Social Investment Plan is carried out through Vale's internal system, SDI (Stakeholders, Demands and Problems).

Activities
Funding research organizations

Mining project ID
Project 4

Please explain
Since 2017, Vale has been supporting the Federal University of Viçosa (UFV) in Minas Gerais in the development of research projects related to the recovery of areas and habitat restoration. The projects are being developed in the area of influence of the Vargem Grande and Paraopeba Complexes and involve the development of specific methodologies for evaluating areas in recovery, as well as improving recovery processes. Part of this research was finalized in 2021.

F16 Verification

F-MM16.1/F-CO16.1

(F-MM16.1/F-CO16.1) Do you verify any biodiversity-related information reported in your CDP disclosure?
Yes

F-MM16.1a/F-CO16.1a

(F-MM16.1a/F-CO16.1a) Which data points within your CDP disclosure have been verified, and which standards were used?

Disclosure module
F1. Introduction

Data points verified
Operations, number of employees, expenses with social actions, repairs, related to waste management, atmospheric emissions, water resources and biodiversity.

Verification standard
GRI Standards, was selected because Vale has been publishing its sustainability report for years and the 2021 Integrated Report and these documents are audited by third party companies. GRI Standards is one of the frameworks known worldwide, it is an international organization that helps companies and other organizations to disseminate their impacts through transparent communication and addressing various aspects related to sustainability.

Please explain
Vale publishes its sustainability report based on the GRI Standards on an annual basis and the information reported in this report is audited by an independent audit. In this way, it is possible to take advantage of some of this information to be included in the CDP questionnaire. This information covers all of Vale's operations at a global level.

Disclosure module
F9. Current state

Data points verified
Significant impacts of activities, products and services on biodiversity

Verification standard
GRI Standards, was selected because Vale has been publishing its sustainability report for years and the 2021 Integrated Report and these documents are audited by third party companies. GRI Standards is one of the frameworks known worldwide, it is an international organization that helps companies and other organizations to disseminate their impacts through transparent communication and addressing various aspects related to sustainability.

Please explain
Vale publishes its sustainability report based on the GRI Standards on an annual basis and the information reported in this report is audited by an independent audit. In this way, it is possible to take advantage of some of this information to be included in the CDP questionnaire. This information covers all of Vale's operations at a global level.

Disclosure module
F10. Procedures

Data points verified
Reputation and markets: Deforestation

Verification standard
GRI Standards, was selected because Vale has been publishing its sustainability report for years and the 2021 Integrated Report and these documents are audited by third party companies. GRI Standards is one of the frameworks known worldwide, it is an international organization that helps companies and other organizations to disseminate their impacts through transparent communication and addressing various aspects related to sustainability.

Please explain
Vale publishes its sustainability report based on the GRI Standards on an annual basis and the information reported in this report is audited by an independent audit. In this way, it is possible to take advantage of some of this information to be included in the CDP questionnaire. This information covers all of Vale's operations at a global level.

Disclosure module
F12. Governance

Data points verified
Incentives for executive employees or board members to manage biodiversity-related issues

Verification standard
GRI Standards, was selected because Vale has been publishing its sustainability report for years and the 2021 Integrated Report and these documents are audited by third party companies. GRI Standards is one of the frameworks known worldwide, it is an international organization that helps companies and other organizations to disseminate their impacts through transparent communication and addressing various aspects related to sustainability.

Please explain
Vale publishes its sustainability report based on the GRI Standards on an annual basis and the information reported in this report is audited by an independent audit. In this way, it is possible to take advantage of some of this information to be included in the CDP questionnaire. This information covers all of Vale's operations at a global level.

Disclosure module
F14. Implementation

Data points verified
Number of projects analyzed regarding their need for management plans.

Verification standard
GRI Standards, was selected because Vale has been publishing its sustainability report for years and the 2021 Integrated Report and these documents are audited by third party companies. GRI Standards is one of the frameworks known worldwide, it is an international organization that helps companies and other organizations to disseminate their impacts through transparent communication and addressing various aspects related to sustainability.

Please explain
Vale publishes its sustainability report based on the GRI Standards on an annual basis and the information reported in this report is audited by an independent audit. In this way, it is possible to take advantage of some of this information to be included in the CDP questionnaire. This information covers all of Vale's operations at a global level.

Disclosure module
Other, please specify (F15. Engagement)

Data points verified

Engagement approach to artisanal and small-scale mining (ASM)

Verification standard

GRI Standards, was selected because Vale has been publishing its sustainability report for years and the 2021 Integrated Report and these documents are audited by third party companies. GRI Standards is one of the frameworks known worldwide, it is an international organization that helps companies and other organizations to disseminate their impacts through transparent communication and addressing various aspects related to sustainability.

Please explain

Vale publishes its sustainability report based on the GRI Standards on an annual basis and the information reported in this report is audited by an independent audit. In this way, it is possible to take advantage of some of this information to be included in the CDP questionnaire. This information covers all of Vale's operations at a global level.

F17 Signoff

F-FI

(F-FI) Use this field to provide any additional information or context that you feel is relevant to your organization's response. Please note that this field is optional and is not scored.

Further information on Vale's approach to forest and biodiversity can be found on the following documents:

- Vale Integrated Report 2021 (http://www.vale.com/PT/sustainability/relato-integrado-2021/SiteAssets/assets/Vale_Integrated_Report_2021_EN.pdf)

- Vale 20F FY2021 (http://www.vale.com/brasil/pt/investors/information-market/annual-reports/20f/paginas/default.aspx)

- Vale's Reference Form 2021 (https://api.mziq.com/mzfilemanager/v2/d/53207d1c-63b4-48f1-96b7-19869fae19fe/95362b5d-56b4-1317-3eab-3cf2a928a9ad?origin=1)

- Vale's ESG Portal (http://www.vale.com/esg/en/Pages/Home.aspx)

- Fundo Vale (http://www.fundovale.org/)

- Climate Venture Institute (https://www.climateventures.co/)

- Imazon (https://imazon.org.br/imprensa/inteligencia-artificial-na-protecao-da-amazonia/)

- World Business Council for Sustainable Development (WBCSD) (https://www.wbcsd.org/)

F17.1

(F17.1) Provide the following information for the person that has signed off (approved) your CDP forests response.

	Job Title	Corresponding job category
Row 1	Executive Director of Finance and Investor Relations	Chief Financial Officer (CFO)

Submit your response

In which language are you submitting your response?

English

Please confirm how your response should be handled by CDP

	I understand that my response will be shared with all requesting stakeholders	Response permission
Please select your submission options	Yes	Public

Please confirm below

I have read and accept the applicable Terms