REVIEW OF
BIODIVERSITY ASSESSMENT AND BIODIVERSITY MANAGEMENT PLAN
PT SUMBAWA JUTARAYA

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Contents

I. Background

PT Sumbawa Jutaraya (SJR) has already conducted assessment of biodiversity and critical habitat (based on available documents and field survey), as well as formulating biodiversity management plan, both were assisted by ERM. Documents containing data, interpretation, and management plan (2 documents) were already written in December 2022. Both documents were used as the basis for further analysis of this report, hereafter refer to as '**biodiversity assessment**' for the document entitled "Biodiversity and Critical Habitat Assessment of PT Sumbawa Jutaraya" and '**BMP**' (Biodiversity Management Plan) for the document entitled "Biodiversity Management Plan of PT Sumbawa Jutaraya".

The objectives of this report were to provide (1) a review and evaluation of the biodiversity assessment, especially related to the Key Biodiversity Area (KBA) of Dodo Jaranpusang, endangered species, and critical habitat; (2) a review and evaluation of the BMP, including provision of additional recommendations, if necessary; (3) provide a recommendation on the protocol in relation to the biodiversity management in SJR. Considering that there are many conservation aspects related to the geographic location of the SJR, an additional information on the conservation based on geographic context was provided prior to the three reviews listed above.

II. Geographical Context of the SJR

The area managed by SJR (8,697 ha) is located at the south-western Sumbawa Island, West Nusa Tenggara Province. A small part of the area borders with the sea, and thus the SJR has to consider both terrestrial and marine ecosystem in their plan and operation. Being located in Sumbawa Island, some facts related to biodiversity conservation need to carefully considered:

- In a larger scale, Sumbawa Island is part of Wallacean Region, where one of the greatest global endemicity of many species occurred. As a consequence, any large-scale development (including mining) within the Wallacean Region (Nusa Tenggara, Sulawesi, and Maluku) would attract national and international attention.
- Based on faunal taxa, the important group of fauna in Sumbawa and other islands in Nusa Tenggara is birds. Megafauna (having body weight of more than 46 kg or 100 lb) of mammal and reptile is absent in Sumbawa. Meanwhile, many herpetofauna (reptiles and amphibians) can be found in Sumbawa, but for herpetofauna there has been no global (and national) intensive study related to conservation status compared to birds. Therefore, attention and effort to manage and conserve wildlife in Sumbawa need to be focused on birds.

- Sumbawa Island is also part of Nusa Tenggara islands chain, where endemicity of bird community has been identified. The area having many endemic birds (birds that distributed only on a certain area, cannot be found elsewhere) was named Endemic Bird Area (EBA). In Nusa Tenggara 3 EBAs has already recognized, namely Northern Nusa Tenggara (EBA 162), Sumba Island (EBA 163), and Timor-Wetar Islands (EBA 164) (**Figure 1**).

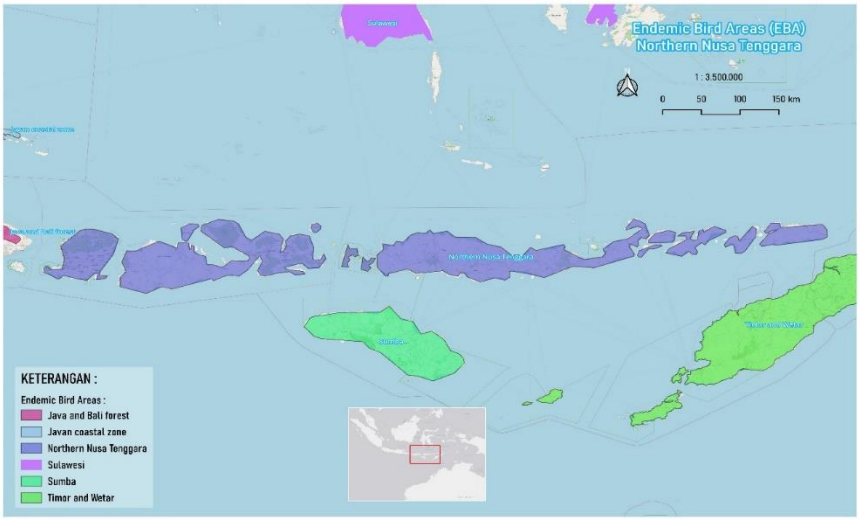

Figure 1. Distribution of three Endemic Bird Areas (EBAs) in Nusa Tenggara: Northern Nusa Tenggara (EBA 162, purple), Sumba Island (EBA 163, blue-green), and Timor-Wetar Islands (EBA 164, green), map provided by Burung Indonesia.

- The entire area of SJR is within the EBA of Northern Nusa Tenggara (EBA 162; 39,000 km^2). Although called 'northern', all Sumbawa Island is included in the EBA 162, because in term of the geographic position there are two other EBAs ('southern'), namely Sumba Island (EBA 163), and Timor-Wetar Islands (EBA 164).
- Within EBA, there are other smaller areas identified as Important Bird and Biodiversity Areas (IBAs, formerly known as Important Bird Area). In other areas, some IBAs could also located outside EBAs. However, as the EBA of Northern Nusa Tenggara covers the whole island of Sumbawa, all IBAs automatically are within EBA. One of the IBA in the Northern Nusa Tenggara's EBAs is overlapped with SJR area, namely Dodo Jaranpusang (NID05).
- Unlike EBA which was delineated based in the occurrence endemic birds, IBAs are basically determined by the number of bird population. Areas contain rare birds and threatened to extinction, or areas where birds aggregated in huge number (during migration, for example), and areas for certain bird species which required a specific habitat component are good candidates for IBAs. IBAs basically are important areas that are essential to be conserved and managed due to the rarity (or highly abundance) of bird species, while EBAs are more or less similar, but determined based on the endemicity of birds. EBAs encompass larger areas (total 228 EBAs in the world, Indonesia has 23 EBAs, Nusa Tenggara has 3 EBAs), of which within the EBAs might contained many smaller sizes of IBAs.
- The area managed by SJR is fully overlapped with IBA Dodo Jaranpusang (IBA NID05) is located at the coordinates 9^{o}00'S, 117^{o}21'E; having an altitude 0-1,200 m asl and coverage of 61,000 ha). The Dodo Jaranpusang was designated as an IBA because of 2 reasons: (1) the site regularly holds significant numbers of a globally threatened species, or other species of global conservation concern (code A1 - species of global conservation concern) and (2) the site forms one of a set selected to ensure that all restricted-range species of an Endemic Bird Area (EBA) or a Secondary Area (SA)[1] are present in significant numbers in at least one site and preferably more (code A2 - restricted-range species).
- In Sumbawa Island, there are 6 IBAs (**Figure 2**). Some IBAs are considered outstanding due to the existence of the many species need to be conserved. However, Dodo Jaranpusang (NID05) is **not** considered as the outstanding IBAs for threatened birds in Nusa Tenggara[2].

[1]An EBA has two or more restricted-range species. If only one restricted-ranged species is found, it will be classified as 'Secondary Area'

[2]Outstanding IBAs for threatened birds in Nusa Tenggara were Komodo, Mbeliling (Tanjung Karita Mese), Ruteng, Wolo Tado, Manupeu-Tanadaru, Laiwanggi-Wanggameti and Gunung Mutis.

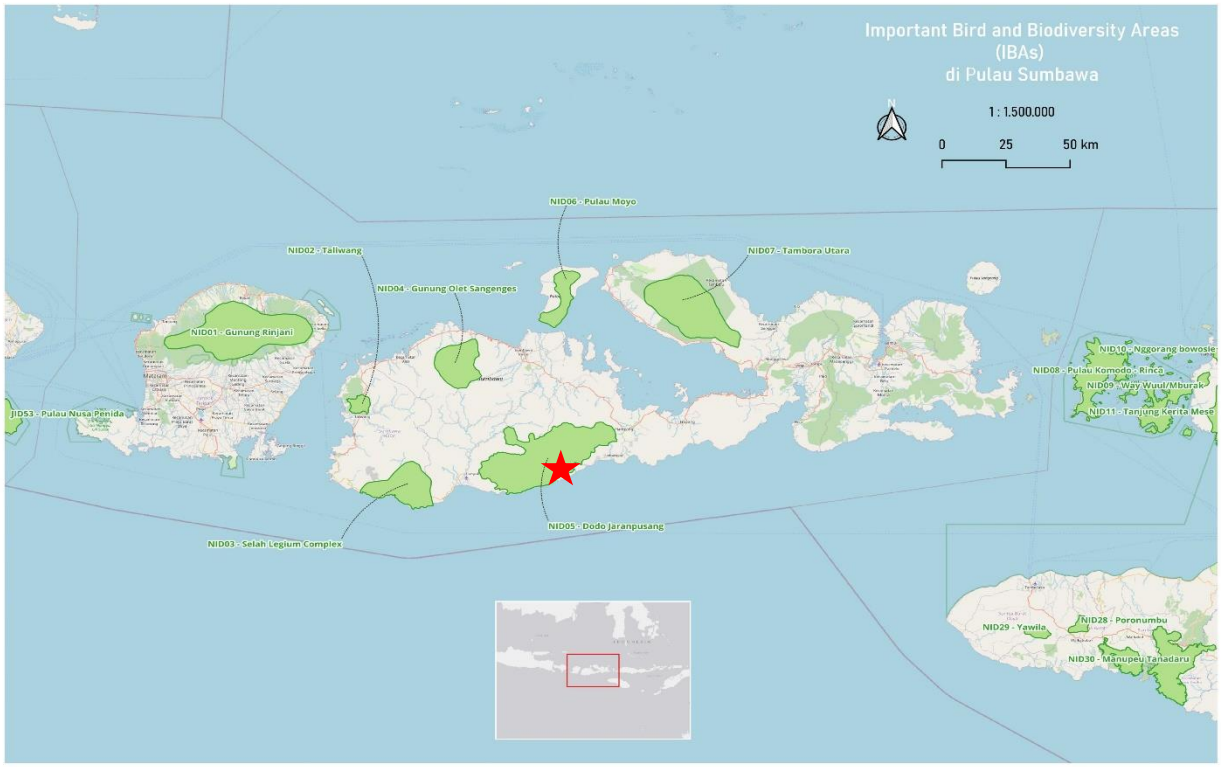

Figure 2. Map of Important Bird and Biodiversity Area (IBAs) in Sumbawa Island; areal of PT SJR (red star) is fully overlapped with IBA Dodo Jaranpusang (NID05, formerly called IBA 121- Dodo Jarangpusang). Other IBAs in Sumbawa Island are Taliwang (NID02/IBA 118), Selah Legium Complex (NID03; former name was Tatar Sepang, IBA 119), Gunung Olet Sangenges (NID04/IBA 120), Pulau Moyo (NID06/IBA 122), and Tambora Utara (NID07; former name was Gunung Tambora, IBA 123); map provided by Burung Indonesia.

- As EBAs and IBAs were determined based on birds, another approach which include other taxa, encompass both terrestrial and marine biotas, was also commonly used. The approach is called Key Biodiversity Areas (KBAs). Considering birds is a part of terrestrial biota, it is understandable that KBA would be overlapped with EBAs and IBAs.
- KBAs for Wallacean Region has already identified. The IBA Dodo Jaranpusang (NID05) is also identified as a Key Biodiversity Area. The name of the KBA is also Dodo Jaranpusang, code number IDN242, covering an area of 93,299 ha (**Figure 3**).

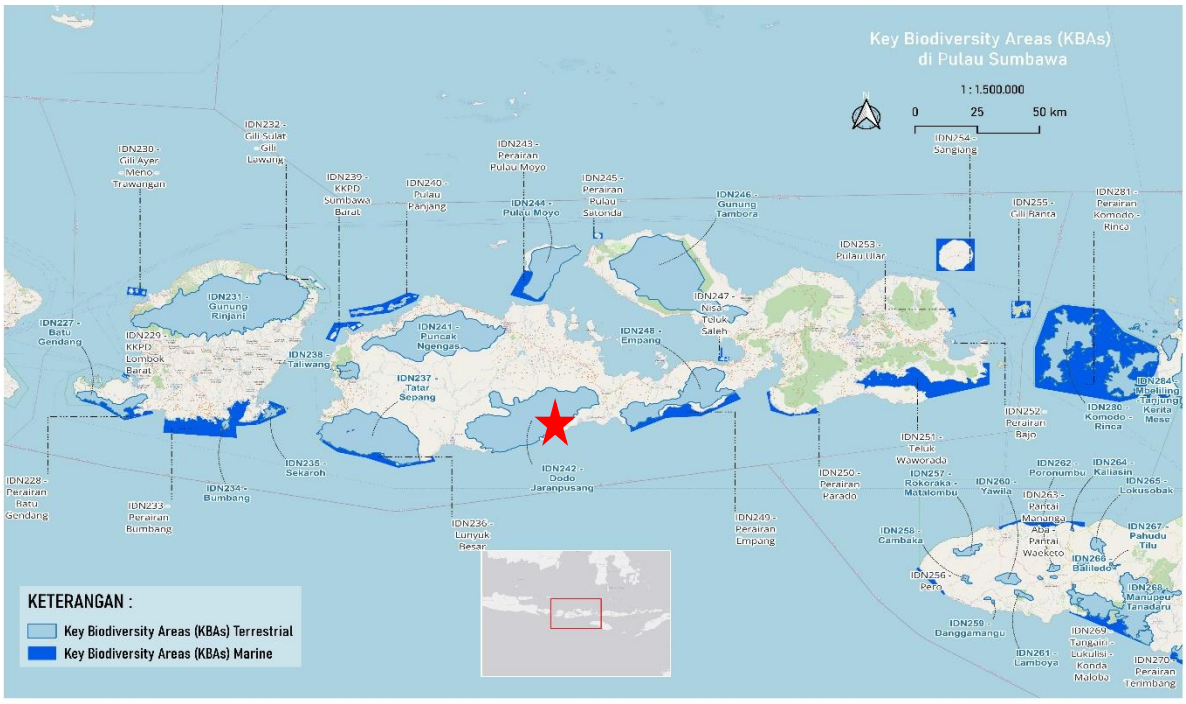

Figure 3. Map of Key Biodiversity Area (KBA) in Nusa Tenggara; areal of PT SJR (red star) is fully overlapped with KBA Dodo Jaranpusang (IDN242) (as well as IBA Dodo Jaranpusang, NID05, see Figure 2). The neighboring KBAs are Tatar Sepang to the west (IDN237; 70,303 ha), Puncak Ngengas to the north (IDN241; 76,224 ha), also Empang to the east (IDN248; 42,331 ha) and Perairan Empang (marine KBA, IDN 249; 15,231 ha); map provided by Burung Indonesia.

- Of the 24 terrestrial KBAs identified as of highest biological priority (i.e., they support critically endangered species and species not known to occur at any other sites), KBA Dodo Jaranpusang (IDN242) is **not** included.

III. Review and Evaluation of the Biodiversity and Critical Habitat Assessment

a. General comments on the documents of Biodiversity Assessment

The document of biodiversity assessment (document entitled "Biodiversity and Critical Habitat Assessment of PT Sumbawa Jutaraya") was well written and contained many useful data on biodiversity and critical habitat. Procedures to produce a document related to assessment of biodiversity and habitat (i.e., desk-based, field-based, expert opinions) were valid and followed an international standard (i.e., point count for bird survey, transect for mammal survey, and Visual Encounter Survey for herpetofauna survey). Methods used for surveying terrestrial and marine flora and fauna were also standard methods. Efforts (in term of time spent in the field as well as numbers of points and transects) were sufficient and valid.

All species mentioned in the biodiversity assessment seemed to be correct, without any doubtful species. If there were some insects and marine species that were unable to be identified to the species level (i.e., only genera were listed), it is understandable because of the difficulties of the identification of lower taxa.

In term of the completeness of the assessment, the document of biodiversity assessment has provided a complete approach, including:

- Related to areas: Key Biodiversity Areas (KBAs), Endemic Bird Areas (EBAs), Important Bird and Biodiversity Areas (formerly called Important Bird Areas; IBAs), Alliance for Zero Extinction sites, Ramsar Sites, World Heritage Convention, conservation and protection area set by Indonesian Government;
- Related to species: IUCN Red List, protection status by the Indonesian Government (corresponded with IUCN's Protected Area Categories);
- Related to critical habitat: all 5 required criterions were assessed.

Suggestions for improvements:

- The resume (or final results) of the critical habitat assessment was not clearly stated to answer the question whether the SJR area is qualified for critical habitat. Based on the analysis, the area should be qualified for a critical habitat. There are 12 bird species that trigger the thresholds for a critical habitat (under Criterion 2), and thus necessary actions need to be taken before the initiation of the mining operation.
- The document does not have an Executive Summary to assist a fast reading. Also, for readers who do not have a biodiversity/ecology background, it would be quite challenging to interpret the results (especially the Critical Habitat Assessment) without a clear explanation of 'interpretation' of various ecological metric results.

- Quantitative data, especially the number of individuals (especially birds) for each transects should be presented (can be attached in the Annex section) for a future reference in the monitoring activity.
- Some errors are found, but most of them are considered minor, for example mis-numbering of KBA in Table 5-1 (page 4) of the biodiversity assessment document, and some inconsistency of the species names.

b. Species present and to be prioritized for conservation

The field survey conducted on 4-15 October 2022 used 7 terrestrial transects to observe the terrestrial fauna (and 5 transects to observe marine biota). There were four habitat covers, namely mixed plantation, secondary forest, coastal area, and shrubland. The number of species observed during the survey was 152 plant species (of which 29 species were categorized as invasive), 13 mammals, 50 birds, and 27 herpetafauna (consisted of 18 species of reptiles and 9 species of amphibians).

It is worth to note that the Shannon-Wiener diversity indices were calculated for each transect for all taxa. However, the overall indices for each taxa (combining all 7 transects) was unavailable. Richness indices and evenness were also calculated for each transects, but not for all taxa in all transects.

Among the wildlife species (mammals, birds, herpetofauna), almost all of them are not including in the IUCN Red List of threatened category, namely Critical Endangered (CR), Endangered (EN), or Vulnerable (VU)[3], with a few exception on two mammals which until now still in dispute (Long-tailed Macaques – EN and Javan Deer - VU) and one species of amphibian, the Flores Oriental Frog *Occidozyga floresiana* (VU). Almost all other species are categorized as LC (Least Concern).

Although almost all species are categorized as 'safe' by IUCN, there are other criteria that need to be analyzed as well. These criteria are (1) protection status by the Indonesian Government (Indonesian Law, P 106), and (2) endemicity. The three criteria (i.e., IUCN, Protection Status, and endemicity) has its own set of rules, independent to each other.

Endemicity, mainly for bird species, is very crucial for the biodiversity management of SJR. Endemic species (or bird in this matter) is designated through the restricted, small-size natural distribution of a bird species. The bird that has a small distribution (50,000 km^2) is categorized as a restricted-range species.

Among the fauna observed during the survey, some of them need to be given more attention for conservation actions based on several criteria. The biodiversity assessment already provided a complete long list. To make an easier reading, the list is re-written and summarized in **Table 1.**

[3]The IUCN Red List threatened category from the highest to the lowest are: Critically Endangered (CR; denoted by red color), Endangered (EN, denoted by orange color), and Vulnerable (VU, denoted by yellow color). Others (non-threatened category) are Near Threatened (NT) and Least Concern (LC).

Table 1. List of fauna found during the field survey which falls under some conservation criteria, re-written from the biodiversity assessment document.

Criteria	Remarks on Criteria	Species
Mammals (terrestrial and aerial/bats)		
○ IUCN Criteria	Identified as CR (Critically Endangered, Endangered (EN), or Vulnerable (VU)	Long-tailed Macaques (EN), Javan Deer (VU)
○ Protection status	Indonesian Law no. 106	None
○ Endemicity	Endemic to Nusa Tenggara	Nusatenggara Short-nosed Fruit-bat
Birds		
○ IUCN Criteria	Identified as CR (Critically Endangered, Endangered (EN), or Vulnerable (VU)	None
○ Protection status	Indonesian Law no. 106	**Shorebirds and Seabirds:** Javan Plover, Long-billed Plover, Eurasian Curlew, Eurasian Whimbrel, Great-crested Tern **Raptors**: Black-winged Kite, Black Kite, Brahminy Kite, Spotted Kestrel, Varied Goshawk **Parrots**: Red-cheeked Parrot **Other**: Yellow-spectacled White-eye, Sunda Pygmy-woodpecker
○ Endemicity	Endemic to Nusa Tenggara	**Nectar feeder birds**: Golden-rumped Flowerpecker**, Black-fronted Flowerpecker**, Flame-breasted Sunbird **Kingfisher:** White-rumped Kingfisher** **Flycatchers and drongo**: Russet-back Jungle-flycatcher, Tenggara Paradise-flycatcher, Wallacean Drongo **White-eyes**: Crested White-eye**, Thick-billed Heleia**, Yellow-spectacled White-eye **Friarbird:** Tenggara (Helmeted) Friarbird **Woodpecker**: Sunda Pygmy Woodpecker **Other Passerines**: Bare-throated Whistler**, Flores Minivet**, Russel-capped Tesia**, Trumpeting Fantail, Elegant Pita
Reptiles		
○ IUCN Criteria	Identified as CR (Critically Endangered, Endangered (EN), or Vulnerable (VU)	None
○ Protection status	Indonesian Law no. 106	None
○ Endemicity	Endemic to Nusa Tenggara	**Gecko and lizards**: Darmandville Bow-fingered Gecko, Bocshma's Gliding Lizard **Snakes**: Lesser Sunda Bronzeback,
Amphibians		
○ IUCN Criteria	Identified as CR (Critically Endangered, Endangered (EN), or Vulnerable (VU)	Flores Oriental Frog (VU)
○ Protection status	Indonesian Law no. 106	None
○ Endemicity	Endemic to Nusa Tenggara	Flores Oriental Frog, Komodo Cross Frog, Floresian Frog, *Limnonected kadarsani* (Bangkong kadarsan; no official English name yet)

**listed as restricted-range species for IBA Dodo Jaranpusang (NID05; see next section)

Clearly the SJR areas is a habitat for various endemic birds (i.e., endemic to Nusa Tenggara). This is in line with the EBA assessment, which designated the entire Sumbawa and other Northern Nusa Tenggara (EBA 162) as an Endemic Bird Area (EBA). IBAs assessment would strengthen the analysis. As mentioned previously, the SJR site lays within IBA Jaranpusang (NID05).

As the biodiversity assessment did not mention about bird species found in IBA Jarangpusang (NID05), some additional information will be added in **Table 2**. The information would be needed to strengthen the baseline data.

Table 2. Birds identified as restricted-range species in IBA Dodo Jaranpusang (NID05; formerly coded as IBA 121)[4].

No	Common Name	Latin Name	Indonesian Name
1	Flores Green-pigeon	*Treron floris*	Punai flores
2	White-rumped Kingfisher	*Caridonax fulgidus*	Cekakak tunggir-putih
3	Flores Minivet	*Pericrocortus lansbergii*	Sepah kerdil
4	Chestnut-backed Thrush	*Zoothera dohertyi*	Anis nusa-tenggara
5	Russet-capped Tessia	*Tessia everetti*	Tesia timur
6	Brown-capped Fantail	*Rhipidura dilluta*	Kipasan flores
7	Bare-throated Whistler	*Pachycephala nudigula*	Kancilan flores
8	Golden-rumped Flowerpecker	*Dicaeum annae*	Cabai emas
9	Black-fronted Flowerpecker	*Dicaeum igniferum*	Cabai dahi-hitam
10	Wallace's White-eye	*Zosterops wallacei*	Kacamata wallacea
11	Crested White-eye	*Lophozosterops dohertyi*	Opior jambul
12	Thick-billed Heleia	*Helaeia crassirostris*	Opior paruh-tebal

Note: Restricted-range species: landbird species having a breeding range of not more than 50,000 km^2 since 1800, or approximately 3 times of Sumbawa Island area)

The globally threatened species of IBA Jaranpusang (NID05) is Flores Green-pigeon (*Treron floris*, punai Flores), categorized as VU (Vulnerable) by IUCN Red List. So far, this is the highest conservation category among all restricted-range species found in IBA Dodo Jaranpusang. All other species are listed as LC (Least Concern). However, the Flores Green-pigeon was not found during the field survey. There is a possibility that this green-pigeon can be found also in the SJR site, considering the wide distribution of this species (**Figure 4**). Knowledge about the conservation status of a certain species would be helpful in formulating management plan, especially related to offset.

[4]Taken from Rombang WM, Trainor C, Lesmana D. 2022. Daerah Penting bagi Burung: Nusa Tenggara. PHKA/BirdLife Indonesia. Bogor.

Figure 4. Distribution of Flores Green-pigeon (*Treron floris*, punai Flores; shown in green), a bird species categorized as VU (Vulnerable) by IUCN Red List; this species actually might be present in the SJR site (red star), although this species was not observed during the field survey. Map was taken from BirdLife International Data Zone, https://datazone.birdlife.org.

Meanwhile, for other taxa (mammalia, reptiles, amhibians), the global and national assessment linked to geographic areas is not available yet. Therefore, assessment based on birds is commonly used to determine the critical habitat.

c. Critical Habitat Assessment

Part of the biodiversity assessment contained the critical habitat assessment, which constituted the most important finding for further management. The approach and procedures for determining the critical habitat assessment was correct and following an international standard, supported with sufficient data presented in the previous section (i.e., biodiversity assessment section).

Twelve endemic bird species (**Table 3**) were suggested for the desktop assessment as high priority to determine if the habitat types where they occur can be considered Critical Habitat according to PS6. No mammals, reptiles, or amphibians is included in the list.

Table 3. Species qualified as high priority to determine if the habitat in the SJR can be considered as Critical Habitat; pictures of these birds are presented in ***Annex 1***.

No	Common Name	Latin Name	Local Name	Criterion
	Birds			
1	White-rumped Kingfisher	*Caridonax fulgidus*	Cekakak tunggir-putih	2
2	Russet-backed Jungle-flycatcher	*Cyornis oscillans**	Sikatan flores	2
3	Golden-rumped Flowerpecker	*Dicaeum annae*	Cabai emas	2
4	Black-fronted Flowerpecker	*Dicaeum igniferum*	Cabai dahi-hitam	2
5	Thick-billed Heleia	*Heleia crassirostris*	Opior paruh-tebal	2
6	Crested White-eye	*Heleia dohertyi*	Opior jambul	2
7	Yellow-spectacled White-eye	*Heleia wallacei*	Kacamata wallacea	2
8	Bare-throated Whistler	*Pachycephala nudigula*	Kancilan flores	2
9	Flores Minivet	*Pericrocortus lansberei*	Sepah kerdil	2
10	Brown-capped Fantail	*Rhipidura dilluta*	Kipasan flores	2
11	Tenggara Paradise-flycatcher	*Terpsiphone floris*	Seriwang nusatenggara	2
12	Russet-capped Tessia	*Tessia everetti*	Tesia timor	2
	Mammals, Reptiles, and Amphibian			
	None			

Note: Criterion 2 - Endemic or restricted-range species (natural distribution of less than 50,000 km^2)
*also known as *Rhinomyias oscillans*, Sikatan-rimba ayun

Unfortunately, the resume (or final results) of the critical habitat assessment was not clearly stated, to answer the question whether the SJR area is qualified for critical habitat. It should be mentioned in the report that based on the analysis, the SJR area is **qualified for critical habitat** (under Criterion 2), and thus necessary actions need to be taken before the initiation of the mining operation.

There are 5 Criteria in determining the critical habitat, and a site can be designated as critical habitat if it falls into at least one Criterion. Criterion 1 is about the existence of IUCN Red List species (Critically Endangered/CR or Endangered/EN). As there is no CR or EN species in the SJR area, Criterion 1 is not applicable for SJR area. Criterion 2 is about habitat for endemic or restricted-range species. Previous analysis showed that the SJR area has many endemic or restricted-range birds. In fact, there are 12 bird restricted-range birds in the SJR area, and thus these 12 restricted-range birds triggered the area to be qualified as a critical habitat. Criterion 3 is about the existence of habitat for migratory birds, for example wetland area or a vast mudflat, which does not exist in the SJR area. Criterion 4 is related to a unique ecosystem, which again does not exist in the SJR. The last criterion, Criterion 5 is areas associated with key evolutionary process, which most likely also does not exist in SJR.

When a mining area is categorized as a critical habitat based in the critical habitat assessment, certain actions need to be taken to ensure that all of the activities within the cycles of mining operations will not harm the species that triggered the critical habitat. The plans and actions need to be taken by the mining company has already guided by the International Finance Corporation's (IFC), listed under the Guidance Note 6 on the Biodiversity Conservation and

Sustainable Management of Living Natural Resources. Further recommendations based on the IFC Guiding Note 6 is presented in the next section related to the BMP.

IV. Review and Evaluation of the Biodiversity Management Plan

a. General Comments and Suggestions on the Documents of Biodiversity Assessment

The BMP summarized the existing biodiversity based on the biodiversity assessment, and identified key biodiversity issues. The BMP document also highlighted that the main issue for the SJR, namely the critical habitat, as identified based on the critical habitat assessment. All 12 bird species triggered for the critical habitat were also presented, along with other species with conservation significance.

Some suggestion to improve the BMP:

1. The **scope** of the BMP should be clearly stated, including policy, commitment, stages of mining, project boundary, and the time period. At the stage of development (i.e., assuming that the exploration phase has finished), BMP might provide general and broad guidelines, as the umbrella of other more specific guidelines along the cycle of the mining (i.e., operation, decommissioning, post-closure). Other aspects of management plan could be included in the BMP or written in a separated document(s) as part of the main/umbrella BMP.

2. As the BMP would be the first document related to biodiversity management for SJR, general **policy**, commitment in biodiversity management, and other governance related to biodiversity as advised by the International Council on Mining and Metals (ICMM) and World Gold Council (see ***Annex 2***). Furthermore, a more detailed plan and action directed by The World Bank's International Finance Corporation (IFC) Performance Standard (PS) 6 on Biodiversity Conservation and Sustainable Natural Resource Management also need to be fulfilled.

3. For the **existing/baseline** biodiversity condition, data derived from the document entitled "Biodiversity and critical Habitat Assessment of PT Sumbawa Jutaraya" need to be used in an optimum way. However, the data for number of individuals of each species (mainly birds) for each transect, as well as diversity indices for the whole transects need to be made available. Al of these data will be needed to measure the success of the future biodiversity program/activities.

4. In line with the mining operation plan, some sort of **zonation** need to be designated, in order to make further plan for managing possible impact. At this point, SJR should already

had the planning for the displaced due to mining extraction (i.e., areal that need to be replaced), intensive-used areal for gold processing, housing, transportation and others (i.e., need to be restored or reclaimed), and areas to be kept for wilderness area (i.e., need to be monitored for its biodiversity).

5. In each zone, **impact analysis** and its related **mitigation plan** for each mining cycle need to be formulated, employing the options of the mitigation hierarchy. The impact should be categorized into direct and indirect impact, as suggested by the IFC PS 6, and encompass within the taxa/species and habitat/ecosystem level.

6. Based on the zonation, impact analysis and mitigation plan mentioned in the previous points, specific **objectives** need to be formulated for each zones and each mitigation hierarchy. Each objective should also set a measurable target.

7. Guidance for **monitoring, inspection and reporting** plan also need to be included in the BMP. Roles and responsibility for each activity also need to be assigned.

8. In line with **other related management plans** based on IFC Performance Standard Guiding Notes, which might include IFG Guiding Note 1 (mainly on environment), Guiding Note 3 (pollution prevention), Guiding Note 4 (health), Guiding Note 5 (land acquisition), assuming there is no indigenous people (Guiding Note 7) and cultural heritage (Guiding Note 8).

9. A special attention to **manage the critical habitat** should be written in a separate document (preferred) or, alternatively, incorporated within the BMP. Some thought and suggestions related to the biodiversity management in the critical habitat is provided below.

b. Biodiversity Management in a Critical Habitat

As mentioned previously, the most crucial issue in the SJR's BMP is managing the entire SJR area which fall into category 'critical habitat', following the analysis of critical habitat. Earlier analysis has shown that there are 12 birds species that likely trigger the SJR area as critical habitat.

Bear in mind that all areas in Sumbawa Island is an Endemic Bird Area (EBA 162), and most area of the EBA 162, including SJR area are fully overlap with IBA Dodo Jaranpusang (NID05). In addition, the IBA Dodo Jaranpusang turned out to be important for other species as well (not only birds), and designated as Key Biodiversity Area (KBA) Dodo Jaranpusang (IDN242). Based on the three conservation approach (i.e., EBA, IBA, KBA), all area under the management of SJR no doubt would be categorized as 'critical habitat'.

When a mining site is located in the critical habitat, it does not mean that the area is prohibited to be mined. The International Finance Corporation's (IFC) Guidance Note 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources has already provided guidance related to the management of the critical habitat as stated in Guiding Note GN83, paragraph 17-19 as follows:

17. In areas of critical habitat, the client will not implement any project activities unless all of the following are demonstrated:

- *No other viable alternatives within the region exist for development of the project on modified or natural habitats that are not critical;*
- *The project does not lead to measurable adverse impacts on those biodiversity values for which the critical habitat was designated, and on the ecological processes supporting those biodiversity values;[12]*
- *The project does not lead to a net reduction in the global and/or national/regional population[13] of any Critically Endangered or Endangered species over a reasonable period of time;[14] and*
- *A robust, appropriately designed, and long-term biodiversity monitoring and evaluation program is integrated into the client's management program.*

18. In such cases where a client is able to meet the requirements defined in paragraph 17, the project's mitigation strategy will be described in a Biodiversity Action Plan and will be designed to achieve net gains[15] of those biodiversity values for which the critical habitat was designated.

19. In instances where biodiversity offsets are proposed as part of the mitigation strategy, the client must demonstrate through an assessment that the project's significant residual impacts on biodiversity will be adequately mitigated to meet the requirements of paragraph 17.

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[12] Biodiversity values and their supporting ecological processes will be determined on an ecologically relevant scale.

[13] Net reduction is a singular or cumulative loss of individuals that impacts on the species' ability to persist at the global and/or regional/national scales for many generations or over a long period of time. The scale (i.e., global and/or regional/national) of the potential net reduction is determined based on the species' listing on either the (global) IUCN Red List and/or on regional/national lists. For species listed on both the (global) IUCN Red List and the national/regional lists, the net reduction will be based on the national/regional population.

[14] The timeframe in which clients must demonstrate "no net reduction" of Critically Endangered and Endangered species will be determined on a case-by-case basis in consultation with external experts.

[15] Net gains are additional conservation outcomes that can be achieved for the biodiversity values for which the critical habitat was designated. Net gains may be achieved through the development of a biodiversity offset and/or, in instances where the client could meet the requirements of paragraph 17 of this Performance Standard without a biodiversity offset, the client should achieve net gains through the implementation of programs that could be implemented in situ (on-the-ground) to enhance habitat, and protect and conserve biodiversity.

As directed by IFC Guidance Note 6 paragraph 17, in the BMP for the critical habitat, SJR should:

(1) provide information and **good reason** that there is no other alternative of utilizing the land, considering that all SJR areas (awarded by the Government of Indonesia) happened to be in the entire KBA/IBA/EBA;
(2) has a **commitment** that the mining activity would not have an adverse impact, mainly to the 12 birds identified as restricted-range species, including reducing their population number (over a reasonable period of time);
(3) if only some bird species would be selected to represent all 12 bird species, there should be a materiality assessment to **select focal species** by combining bio-ecological, conservation, and legal/protection reasons;
(4) formulate/produce a long-term and robust **biodiversity monitoring** plan focusing on the species concerned, as well as plan for evaluation of conservation to be implemented;
(5) formulate/produce the **mitigation strategy** that will be designed to achieve an increase of population number compare to the baseline study ('net gains') on the 12 bird species (or some of them, which represented all 12 species) being concerned;
(6) the **monitoring and evaluation plan**, as well as **mitigation strategy** need to be integrated into the **Biodiversity Management Plan** (BMP) and preferably Biodiversity Protocol (BD Protocol) as well;
(7) if offset is needed as the last option for the mitigation strategy, a special **assessment** is needed to make sure that residual impacts on biodiversity will be adequately mitigated.

Considering that the BMP for the critical habitat is part of the overall/general BMP, all plans, programs and activities of these two plans (as two separated documents or one comprehensive document) need to be in-line and harmonized. Later on, the overall BMP and the BMP for the critical habitat need to be broken down into five-year plan (Strategic Plan) and corresponding Annual Plan.

V. Some Suggestions on Biodiversity Protocol

Lately there is an international-standard document that formulated protocol for biodiversity management, called the "Biodiversity Protocol" or the "BD Protocol"[5]. The BD Protocol was developed through close collaboration with a wide range of stakeholders. It is a tool that provides a standardized approach to help any organization account for and consolidate all its net impacts on ecosystems and species. The aim of the Protocol is to enable any organization to identify, measure, account for and manage its impacts on biodiversity, from site management and internal reporting to external mandatory and/or voluntary disclosures.

[5]Endangered Wildlife Trust. 2020. The Biological Diversity Protocol (BD Protocol). National Biodiversity and Business Network - South Africa.

The BD Protocol provide guidance of an accounting and reporting framework which helps consolidate biodiversity impact data in a standardized, comparable, credible and unbiased manner. The framework is based on accounting of biodiversity, i.e., how much biodiversity is presence at the beginning (baseline), how much the mining operation might lead to the loss of the biodiversity, and how much the conservation actions might gain biodiversity. The BD Protocol is designed to support (and not replace) existing impact measurement approaches so that biodiversity impact disclosure becomes comparable across industries and companies.

Biodiversity accounting framework is based on adaptations to Double-Entry BookKeeping (DEBK), namely (1) statement of biodiversity position (or biodiversity balance sheet), and (2) statement of biodiversity performance (or biodiversity net impact statement). Considering that the BD Protocol is very new (released in 2020), examples and lessons learned from other companies related to the Double-Entry BookKeepng has not available yet. Biodiversity parameters that need to be collected and analyzed, however, seemed more or less similar to requirement for the Biodiversity Management Plan, with some additional data to allow for accounting analysis.

Some basic principles of the BD Protocol are as follows:

- Biodiversity impact is a measurement of the negative or positive effect of a business activity on the state of biodiversity, which includes the change in the extent and condition/integrity of ecosystems, the target and actual population/habitat sizes of taxa;
- The biodiversity impact data is collected and analyzed across value chains and jurisdictions;
- The inventory of the biodiversity impact will be linked to the Statements of Biodiversity Position and Performance;
- BD Protocol draws from two main biodiversity concepts, namely the ecosystems (areal) and taxa (species), and thus it does not cover genetic resources, biodiversity dependencies, and the associated ecosystem functions, processes and services;
- BD Protocol focuses on measuring and consolidating the biodiversity impacts of the whole company, according to the chosen company (if consists of several companies) and value chain boundaries; and thus the biodiversity impact inventory records all its material impacts on ecosystems and taxa within the selected organizational and value chain boundaries;
- BD Protocol focuses its guidance on accounting for/consolidating impacts on biodiversity (i.e. changes in the state of biodiversity caused by business);
- In the BD Protocol, net impact accounting recognizes the notion of equity in the type of biodiversity lost or gained (i.e. ecological equivalency or like-for-like): i.e. biodiversity losses (negative impacts) and gains (positive impacts) can only be aggregated for equivalent biodiversity components;

Some important activities to prepare the BD Protocol:

1. Setting organizational boundaries of a biodiversity impact inventory
   This step is crucial for companies with joint entities. For SJR which has a full control on their operational and financial matters, the boundary should be the entire contract of work of the SJR company.

2. Setting value chain boundaries
   There are three major parts of the value chain (1) direct operations (gate-to-gate), which cover activities over which your business holds ownership or control; (2) upstream (cradle-to-gate), which covers the activities of suppliers; and (3) downstream (gate-to-grave), which covers activities linked to the clients (i.e., purchase, use, re-use, recovery, recycling, and final disposal of the business' products and services). For mining company such as SJR, the relative magnitude of expected biodiversity impacts across the value chain would be in the company itself (direct operations), while the other two (suppliers and clients) contribute in a medium to small scale only.

3. Identifying and determining material impacts on ecosystem and taxa (species)
   Activity in this step is basically listing the ecosystem types and taxa (species and sub-species, if any) that SJR interacts with within its selected organizational and value chain boundaries. For ecosystem types, so far there are four terrestrial ecosystem identified based on the previous biodiversity assessment (mixed plantation, secondary forest, coastal area, and shrubland). For taxa, the results of the critical habitat assessment on bird species (12 species) can be used to select candidates for focal species, if necessary.

4. Segregating direct impacts from indirect impacts
   Direct impacts constitute changes in the state of biodiversity which are caused directly by SJR's mining activities, having a direct causal link between SJR's actions (e.g. land clearing or ecosystem restoration measures) and a change in the state of ecosystems or taxa (e.g. decrease/increase in ecosystem condition, habitat loss/gain for several species). These impacts may be temporary (short-term or long-term), recurrent (e.g. seasonal, every time a specific activity is undertaken) or permanent impacts (e.g. built-up properties, such as office buildings or parking areas). Indirect impacts are defined as changes in the state of biodiversity which cannot be traced to specific business activities, involve the various impact drivers to which no specific change in biodiversity can be attributed (e.g. degradation of the condition of the secondary forest, loss of species in a specific location). Cumulative impact also need to be analyzed. Cumulative impacts include direct and indirect impacts, past, present and future, resulting from the actions of all actors, not just the target organization or project assessed.

5. Applying accounting and reporting principles
   The BD Protocol is based on seven accounting and reporting principles: (1) relevance, (2) equivalency, (3) completeness, (4) consistency, (5) transparency, (6) accuracy, and (7) time period assumption. All of these principles need to be fulfilled in the biodiversity accounting and reporting.

6. Managing inventory quality
   The inventory basically aims to produce a biodiversity impact assessment that is both credible and unbiased. The BD Protocol recognizes that assessing, accounting for and monitoring biodiversity impacts requires significant biodiversity expertise and data, which may involve engaging significant resources.

VI. Recommendations

Biodiversity data

1. Detailed data on the biodiversity assessment need to be managed and properly stored, as the data will serve as the baseline data for future references, especially for regular and long-term monitoring. Data needed are species present, transects or plots for long term monitoring of fauna and flora, number of species observed (total number, number in each transects) with a special attention to the 12 bird species triggered the critical habitat. The data on individual number for each transect were not presented in the document of biodiversity assessment or BMP, although they should be available within the raw data.

2. In addition to the species presence and its number, data on Shannon-Wiener Diversity Indices also will be useful, including for PROPER which evaluates the success of conservation management through the increase of biodiversity indices of flora and fauna. Diversity indices data for all taxa of flora and fauna in each transects should be properly stored, and consistently used 3 digits.

Documents related to planning

3. Some important documents that need to be produced are:
   - Document 'Biodiversity Management Plan' – a revision of the existing BMP document - of the which also includes reasons why SJR has to operate in the KBA/IBA area, statement of commitment to manage biodiversity according to the existing regulations (mainly IFC Guidance Note 6), as well as plan for long-term monitoring and evaluation of biodiversity management/program;
   - Document 'Biodiversity Management Plan for the Critical Habitat', as a stand-alone document, or alternatively incorporated with the 'Biodiversity Management Plan' document;

- Document 'Biodiversity Offset Management Plan' containing mitigation strategy, if offset would be needed.
- Preferably also document 'BD Protocol'.

Additional information needed from SJR to produce documents related to planning

4. In order to obtain a more reliable planning related to the biodiversity management, these information is needed from SJR Management Team:
   - General policy of the company itself (i.e., SJR) and the company group (i.e., PAMA and Astra);
   - Land utilization plan of the mining operation; this information is needed to set up some kind of 'zonation' for biodiversity management purposes, as well as for impact assessment;
   - Mining cycles (specific area, timing) and general plan to for rehabilitation/ reclamation;
   - Identification of the area for mining operation (terrestrial, aquatic, marine) which might pose a significant disturbance (displacement, habitat fragmentation, noise, dust, other predicted sources) to the wildlife, especially bird species identified as the trigger for critical habitat;
   - Management plan for other environmental aspects, including water, soil, and environmental services.

BD Protocol

5. While SJR is still in the preparatory operation, baseline data and information should be collected and stored properly. All baseline/existing data will be important for the bookkeeping procedures to create a net positive results.

6. Considering that the BD Protocol is very new and still in a testing stage, further development on the procedures and guidelines need to be closely followed.

Acknowledgements. I would like to convey my gratitude to Burung Indonesia (BirdLife Indonesia) for their assistance in producing maps on EBA, IBA and KBA in this review.

Annex 1. Pictures of 12 bird species that triggered critical habitat in the PT Sumbawa Jutaraya area.

White-rumped Kingfisher
Cekakak tunggir-putih

Tenggara Paradise-flycatcher
Seriwang nusatenggara

Flores Minivet
Sepah kerdil

Golden-rumped Flowerpecker
Cabai emas

Black-fronted Flowerpecker
Cabai dahi-hitam

Russert-caped Tesia
Tesia timor

Thick-billed Heleia
Opior paruh-tebal

Crested White-eye
Opior jambul

Yellow-spectacled White-eye
Kacamata wallacea

Bare-throated Whistler
Kancilan flores

Brown-caped Fantail
Kipasan flores

Russet-backed Jungle-flycatcher
Sikatan flores

***Annex 2*.** ICMM and WGC Guidance on Biodiversity Management in the Mining Area

International Council on Mining and Metals (ICMM)

Strategy and Action Plan 2022-2024 - *Environmental Resilience*

Our work will focus on delivering current commitments, developing the metrics, standards and practices to maximize members' contribution, and those of others, towards a Nature Positive Agenda. We will be working closely with the Task Force on Nature Related Financial Disclosures (TNFD) in this regard – as well as with other nature conservation and management groups – to scale best practices on nature-based solutions

Principle 7: Conservation of Biodiversity

Performance expectation:

7.2 – Apply Mitigation Hierarchy with Ambition of No-Net-Loss

Assess and address risks and impacts to biodiversity and ecosystem services by implementing the mitigation hierarchy, with the ambition of **achieving no-net-loss of biodiversity.**

Notes: The ambition of no net loss applies to **new projects** and major expansions to existing projects that impact biodiversity and ecosystem services

The Responsible Gold Mining Principles (World Gold Council)

Principle 9 – Biodiversity, Land Use and Mine Closure

We will work to ensure that fragile ecosystems, habitats and endangered species are protected from damage, and will plan for responsible mine closure

9.1 We will implement biodiversity management plans. At a minimum, we will seek to ensure that **there is no net loss of critical habitat**. Where opportunities arise to do so, we will work with others to **produce a net gain for biodiversity**. We will incorporate both scientific and traditional knowledge in designing adaptation strategies in ecosystem management and environmental assessment.