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Study of the Threat Status of 56 Bird Species Have Received Little Attention in Java

Wahju Widodo, Eko Sulistyadi, Yossa Istiadi

National Research and Innovation Agency
email: pakw14359@gmail.com

Abstract

The rapid and vast development of the regions in Java is considered to adversely affect an estimated of 56 endemic, data deficient, nearly extinct bird species. This paper aims to provide up-to-date information on the status and distribution of these species. As many as 56 species's specimens from Zoologicum Bogorienses Museum (MZB-BRIN, Cibinong) were used in this study. Additionally, this study used the on-site observation and a literature study on previous available references. This study found that 4 species were critical, 9 species were threatened, 6 species were vulnerable, 9 species were near threatened, 27 species were least concern and 1 species was data deficient. Based on the CITES's list two species of birds were included in Appendix I, eleven species in Appendix II, and forty-three species in Non Appendix. Nationwide, 18 species of birds were protected and 38 species were not protected. Despite of these species importance in Indonesian biodiversity, they are perceived to be of lesser value and there has been increasingly limited distribution of birds. This condition is also exacerbated by poaching, birdkeeping, pets, trading, logging, changes in land use, leading to habitat loss. Policy makers are therefore urged to be wiser and to prioritize the management of bird habitats in Java. Arrangement of bird habitats in nature and concern for reforestation activities should continue to be carried out regularly, including by planting various vegetation sources and safe recovery trees.

Keywords: Bird, distribution, threat status, protection measures, Java.

In Java, the number of bird species recorded increased from 488 species in the 1990's (MacKinnon 1990) to 507 species in 2019 (Prawiradilaga 2016). Moreover, there had been an increase in the nuber of studies on birds by research institutes, non government organizations (NGOs), and academicians. Most studies, however, largely focused on the bird community instead of the bird species. Only few iconic species, namely Java Eagles, Peacocks, and Starlings received more significant attention, leading to 56 species become endemic, lacking in scientific data, and improperly conserved to the brink of extreme rarity (MacKinnon et al. 1998). This was, additionally, worsened by the degradation of environmental and habitat quality for birds.

Taking the severe condition of the 56 species into account, this study focuses on reviewing the existing literatures as well as investigating the specimens and current local/international status of these species. The results of the study are expected to provide a scientific update on the current status of and enrich the number of literatures on the endangered species. Additionally, this study aims to be used as a guideline for the authorities in taking further actions to conserve, manage, and ensuring the

sustainability the birds' populations and ecosystems, a significant part of Indonesian biodiversity, in Java and other parts of Indonesia.

METHODS

Samples

This study used 56 bird specimens obtained from the collection of the Biosystemic Laboratory of the Zoologicum Bogorienses Museum (MZB-BRIN, Cibinong). The specimens were mostly collected from various parts of Java. The species chosen were also understudied.

The Procedures

This study was conducted using a qualitative method. The authors recorded the specimens' names, year of collection, distribution, habitats (if there is any), and specific morphological features. Some of the unique specimens were documented in photographs. Earlier between 2009 and 2018, the authors had performed a direct observation from several conservation sites, namely Mt.Pancar, Mt.Selamet, Mt. Sawal, Mt. Galunggung, Mt. Telaga Bodas, Mt. Wilis, Mt.Merapi, Alas Purwo forest, and Petung Kriyono forest. A literature study on various journal articles was also conducted to collect the data.

The conservation status listed on the table follows the "The IUCN Red List of Threatened Species-2001 Categories & Criteria (v.3.1)". The lists are: [1].Extinct (EX) is the status given to a species that the last member of the species has perished. [2].Critically endangered (CR) is the status given to a species that are at the highest risk of extinction in short time; [3]. Endangered (EN) is the status given to a species facing an extremely high risk of extinction in the wild; [4].Vulnerable (VU) is the status given to a species considered to be facing a risk of extinction in the wild in near future; [5].Near threatened (NT) is the status given to a species which population or distribution size may become smaller or is likely to decline; [6].Least concern (LC), is the status given to a species which do not appear to face imminent threats; [7].Data deficient (DD), is the status given to a species without sufficient information for a proper assessment of conservation status to be made; [8].Not evaluated (NE), is the status given to a species that has not been evaluated by International Union for Conservation of Nature (IUCN).

The status was also given in line with the Convention of international trade in wild fauna (The CITES Appendices 2022). CITES (Convention on International Trade of Endangered Species of Wild Fauna and Flora) classifies the endangered species of wild fauna and flora into three appendices. Appendix I contains the list of all species of wild animals and plants that are prohibited in any international trade. Appendix II contains the list of species that may be endangered if it is traded without supervision. Appendix III is the list on protected wild faunas and floras within their habitats, and the status of their extinction can be escalated to Appendix II or Appendix I.

The systematic scientific naming follows the Birds of the Indonesian Archipelago (Eaton et al. 2016). This study used descriptive qualitative method by collecting, processing and analyzing the data through specimens and photographs to obtain characteristics of each species (Ghozali 2016). The data were presented in the forms of table of frequency, photographs and diagrams.

RESULTS AND DISCUSSION

The results showed distribution and the conservation status of the 56 species specimens of the 28 bird families in Java. The species were classified as critical, endangered, near threatened, vulnerable, least concern and data deficient. The details are shown in Table 1.

Tabel 1. Bird species in Java with little new data studied and their conservation status

Family	Species Name	The Previous Distribution	Conservation Status

		English Name	in Java			
Ciconiidae	*Mycteria cinerea*	Milky stork	Segara Anakan, Trianggulasi Alas Purwo (MacKinnon 1990, Grantham 2000); Bungko, Cirebon (Indrawan et al. 1993).	EN	I	P
Ciconiidae	*Leptoptilos javanicus*	Lesser Adjutant	Mudflat Bedul and Savanna Sadengan, Alas Purwo (Grantham 2000; Widodo 2016[a]); Segara Anakan Cilacap (Febrianti et al. 2018).	VU		P
Anatidae	*Aythya australis*	Australian Pochard	Yang Highland (MacKinnon et al. 1998)	LC		
Anatidae	*Cairina scutulata*	Wood Duack	No Data. Possibly extinct in Java (MacKinnon et al. 1998).	EN	I	P
Accipitridae	*Ichthyophaga ichthyaetus*	Grey-headed Fish-eagle	Prapat and Pancur Alas Purwo (Balen 1991); Ujung Kulon (MacKinnon 1998).	NT	II	P
Accipitridae	Spizaetus bartelsi	Javan Hawk-eagle	Sadengan Alas Purwo (Grantham 2000) Gedangan Alas Purwo (Widodo 2009), G Slamet (Widodo 2012), Bromo Tengger (Prasetya, Siswoyo 2018), Mt.Merapi (Ashari et al. 2018), Besowo Nature Reserve, Kediri (Wulandari, Kuntjoro 2019), Girimanik, Wonogiri (Mubarik et al. 2020); Kamojang, Bandung (Kartikasari et al. 2018); Leuweng Sancang NR Garut (Kenria et a.l 2018); Telaga Warna, Bogor (Ekowari et al. 2016).	EN	II	P
Phasianidae	*Arborophila orientalis*	Grey-bellied Partridge	Yang and Ijen Highland (MacKinnon 1990)	VU		
Phasianidae	*Pavo muticus*	Green Peafowl	Baluran and Alas Purwo (Balen et al. 1995, Hernowo et al. 2006, Grantham 2000); Sadengan (Widodo 2009) and Pancur, Alas Purwo (Widodo 2016[a]; Mariani et al. 2018); G Argopuro, Probolinggo (Aryanti et al. 2018); Pangandaran NR (Kurniawan et al. 2019).	EN	II	P
Rallidae	*Fulica atra lugubris*	Comon Coot	Kroya (MZB 1922), Yang Highland (1937), Kamojang (MacKinnon et al. 1998).	NT		
Jacanidae	*Hydrophasianus chirurgus*	Pheasant-tailed Jacana	Kedungbelis, Ciamis (Indrawan 1991); Tahang River, Jakarta (MZB 1909, 1937, 1940), Krawang (MZB 1931), Kutoarjo (MZB 1932), Rawa Jombor (MZB 1934, 1935).	LC		
Jacanidae	*Metopedius indicus*	Bronze-winged Jacana	Rawa Besar, Jakarta (MZB 1909); Kayu Agung and Rejotangan, Blitar (MZB 1918), Rawa Jombor, Klaten (MZB 1934).	LC		

			Last recorded in the West and South-eastern of Java 1930 and 1940 (MacKinnon et al. 1998).	CR		P
Charadriidae	*Vanellus macropterus*	Javan Lapwing				
Columbidae	*Treron bicincta javanica*	Orange-breasted Green Pigeon	Baluran and Bali Barat NP (MacKinnon et al. 1998).	LC		
Columbidae	*Treron capellei capellei*	Large Green Pigeon	Kalipucang and Majengklak, Banyumas (MZB 1921, 1923); Ujung Kulon NP (MacKinnon et al. 1998)	VU		
Columbidae	*Treron curvirostra*	Thick-billed Green Pigeon	Pulau Tinjil and Deli (MZB 1955), Holmes and Balen (1990)	LC		
Columbidae	*Treron oxyura*	Yellow-bellied Pigeon	Gunung Gede (Andrew 1985).	NT		
Columbidae	*Ducula badia badia*	Mountain Imperial Pigeon	Ciampea, Bogor (MZB 1955); G Dieng, G.Aseupan and G Halimun (MacKinnon et al. 1998).	LC		
Cuculidae	*Chrysococcyx minutilus*	Little Bronze-Cuckoo	No definite record (MacKinnon et al. 1998).	LC		
Cuculidae	*Phaenicophaeus tristis*	Green-billed Malkoha	Batuputih, Buyutan, Paliat, Kangean (Irham et al. .2009).	EN		
Cuculidae	*Centropus nigrorufus*	Javan Coucal	Ujung Kulon, Karawang, Indramayu, Muara Brantas (MacKinnon et a.l 1998); G Kidul and Kulonprogo, Yogyakarta (Taufiqurrahman 2015); Segara Anakan Cilacap (Febrianti et al. 2018); Girimanik, Wonogiri (Mubarik et al 2020).	VU		P
Strigidae	*Phodilus badius badius*	Bay Owl	Kebun Raya Cibodas and Kedung Badak (Andrew 1985).	LC	II	
Strigidae	*Otus angelinae*	Javan Scops-Owl	G Halimun Salak (Prawiradilaga 2016).	VU LC	II II	P P
Strigidae	*Otus brokii javensis*	Rajah Scops-Owl	Sendang Jero, Ijen, Banyuwangi 1916.			
Strigidae	*Ninox scutulata*	Brown Hawk Owl	Carita, Dieng, Meru Betiri and Sadengan, Pancur and Plengkung (Grantham 2000)	LC	II	
Caprimulgidae	*Caprimulgus pulchellus*	Salvadori's Nightjar	G Salak, G Selamet, G Bromo. Cibereum (Andrew 1985)	NT		
Alcedinidae	*Alcedo euryzona euryzona*	Blue-banded Kingfisher	G Halimun Salak (Prawiradilaga 2016).	CR		P
Alcedinidae	*Pelargopsis capensis capensis*	Stork-billed Kingfisher	Segara Anakan Cilacap (Febrianti et al. 2018); Karimunjawa (Susmiati et al. 2018); Telaga Warna Bogor (Ekowati et al 2016).	LC		
Alcedinidae	*Halcyon coromanda minor*	Ruddy Kingfisher	Ujung Kulon and Segara Anakan (MacKinnon et al. 1998)	LC		
Picidae	*Meiglyptes tristis tristis*	Buff-rumped Woodpecker	Bromo Tengger (Prasetya, Siswoyo 2018); Nusakambangan Island (Suripto et al. 2006); G Halimun Salak (Prawiradilaga 2016); Kamojang, Bandung (Kartikasari et al. 2018).	EN		
Picidae	*Reinwardtipicus validus validus*	Orange-backed Woodpecker	Baluran, G Gede and Ujung Kulon NP (MacKinnon 1990).	LC		
Pycnonotidae	*Pycnonotus zeylanicus*	Straw-headed Bulbul	Formerly found in West of Java (MacKinnon et al. 1998).	CR	II	

Pycnonotidae	*Pycnonotus squamatus squamatus*	Scaly-breasted Bulbul	G Halimun Salak (Prawiradilaga 2016).	NT	
Turdidae	*Cochoa azurea azurea*	Javan Cochoa	G Gede (Andrew 1985), G. Selamet (Widodo 2012); G Merapi (Taufiqurrahman 2012), G Halimun Salak (Prawiradilaga 2016, Hardina et al. 2019); Kamojang, Bandung (Kartiksari et al. 2018); Cangar, Malang (Rachmawati et al. 2019).	VU	P
Turdidae	*Zoothera andromedae*	Sunda Thrush	Kedung Halang Bogor (MZB 1932), G Gede (Andrew 1985), G Kancana Halimun (MZB 1996), Bayah Forest, Banten (Heriyanto et al. 2008); Rowo Bayu Forest, Banyuwangi (El-Arif et al. 2016); Bromo Tengger (Prasetya, Siswoyo 2018).	LC	
Timaliidae	*Stachyris grammiceps*	White-breasted Tree-Babbler	Malang Selatan (MacKinnon et al. 1998); G Halimun (Balen et al. 2005); Telaga Warna, Bogor (Ekowati et al. 2016)	NT	P
Muscicapidae	*Ficedula dumetoria*	Rufous-chested Flycatcher	G. Salak and Puncak (MacKinnon et al. 1998); Nusakambangan Island (Suripto et al. 2006).	LC	
Muscicapidae	*Cyornis rufigastra rhizophorae*	Mangrove Blue Flycatcher	Krakatau, Segara Anakan and Baluran (MacKinnon et al. 1998).	LC	
Platysteiridae	*Philentoma velatum*	Maroon -breasted Philentoma	Ujung Kulon, Meru Betiri and Bamboo forest Alas Purwo 1998 (Grantham 2000); Nusakambangan Island (Suripto et al. 2006).	NT	
Monarchidae	*Tersiphone paradisi australis*	Asian Paradise Flycatcher	Southern of Java Island (MacKinnon et al. 1998).	LC	
Dicaeidae	*Dicaeum agile absoletum*	Thick-billed Flowerpecker	Meru Betiri, Kawi, Anjasmoro, Trawas, Plengkung, Alas Purwo (Grantham 2000).	LC	
Dicaeidae	*Dicaeum chrysorrheum chrysorrheum*	Yellow-vented Flowerpecker	Rawa Danau Nature Reserve and Meru Betiri (MacKinnon 1998).	LC	
Nectariniidae	*Nectarinia chalcostetha chalcostetha*	Copper throated Sunbird	Nusakambangan Island (Suripto et al. 2006); Menjangan Besar, Karimunjawa. Since 1955 was not found there (Rahayuningsih et al. 2007).	LC	
Nectariniidae	*Aethopyga siparaja*	Crimson Sunbird	Nusakambangan Island (Suripto et al. 2006); Jasinga, Bogor (MZB 1924; MZB 1925); Sumur, Banten (MZB 1982); Kaliwadas, Brebes (2009) and G Halimun Salak (Prawiradilaga 2016).	LC	P
Nectariniidae	*Arachnothera chrysogenys chrysogenys*	Yelloe-eared Spiderhunter	Nusakambangan Island (Suripto et al. 2006).	LC	
Zosteropidae	*Zosterops flavus*	Javan White-eye	Sungai Buntu, Jakarta, 1924-1940. Karimunjawa Islands (PAU-UGM	EN	P

			1991); Nusakambangan (Suripto et al. 2006).			
Zosteropidae	*Zosterops chloris maxi*	Mangrove White-eye	Burung Island, Karimunjawa (Rahayuningsih et al. 2007, Susmiati et al. 2018); Karimunjawa and Sangiang Islands (MZB 23807 and MZB 23829)	LC		
Fringillidae	*Amandava amandava*	Red Avadavat	Cibodas, and Ciloto (Balen1984)	LC		
Estrildidae	*Lonchura oryzivora*	Java Sparrow	Pasar Anyar, Alas Purwo (Grantham 2000); Tuban, East Java (Paramita et al. 2015); a pair was found to build the nest in the hole of trees of teak in Alas Purwo (Widodo 2016[a]).	EN	II	P
Ploceidae	*Ploceus hypoxanthus hypoxanthus*	Asian Golden Weaver	The nesting sites were recorded nearly to the "paddy fields" in several area of Java (MacKinnon 1998).	NT		
Ploceidae	*Ploceus philippinus infortunatus*	Baya Weaver	Not many notes (MacKinnon et al. 1998).	LC		
Sturnidae	*Sturnus contra jalla*	Asian Pied Starling	Last about 1970, this starling nested in the teak holes of trees; Mount Lawu (Sari et al. 2015).	LC		
Sturnidae	*Sturnus melanopterus*	Black-winged Starling	Sadengan Alas Purwo (Grantham 2000); Bekol, Baluran (Widyaningrum 2015).	EN		P
Oriolidae	*Oriolus cruentus cruentus*	Black-and-Crimson Oriole	Only found in West and East Java mountains (MacKinnon et al. 1998); Telaga Warna, Bogor (Ekowati et al. 2016).	DD		
Corvidae	*Cissa thalassina thalassina*	Short-tailedGreen-Magpie	West Java mountains (G Kamojan, Cibodas, G Salak, G Gede, Telaga Warna), and Central Java, namely G Selamet) (Balen et al. 2013).	CR		P

Remarks: P=protected, I=Appendix I; II=Appendix II CITES

Table I showed that the species 6 receiving the most attention were the birds of Strigidae and Columbidae families, with 6and 5 species, respectively. Out of 6 Strigidae (owls), 4 were classified as LC, 1 VU and 1 NT. Other familes have an average of 1-3 species. The observed species of Strigidae family which nearly doubled than that of the other families can be contributed to the reduced amount of forest in Java, causing decreased amount of their foraging territories and preys. Additionally, there is a lack of data on Strigidae's species as they mostly reside in mountainous areas. Only one of its members Otus rufescens can be found in lowland Java forests, while two of the members namely Otus angelinae and Otus brookii are classified as protected fauna. Thus, higher number of Strigidae family is being studied intensively than the others (P.106).

On the other hand, the five species of wood pigeons (Columbidae) became the second most observed family. A member of Columbidae family Treron capellei is classified as vulnerable species (V) which faces high risk of extinction in the wild in imminent future, whereas Treron oxyura is a near threatened (NT) species whose population number is likely to decline. Three of its species classified least concern species (LC)

are Treron bicinta, Treron curvirostra, and Ducula badia. This situation stems from reduced in their food supplies in the woods, particulary the Ficus fruits. Out of these fve species, Treron curvirostra can only be found on Java's satellite islands of Tinjil and of Deli (Holmes, Balen 1990). Meanwhile, Ducula badia is the large-sized pigeon often poached for its meat by hunters.

Additionally, Rahayuningsih and Kartijono (2013) stated that the loss of habitat is a serious threat for the existence of birds on Java. Habitat conditions including habitat profile and vegetation diversity are also very important. It was further stated that large fruit trees such as Ficus which are the main source of food for birds are generally targeted for illegal loggers to cut down.The quality and quantity of feed sources are important inimproving the success of regeneration of a bird species. Sources of food will be closely related to vegetation structure and bird species diversity. If the availability of food sources is small, then the bird species tend to be few (Sari et al. 2015).

Mainland Java now has been developed dynamically for various purposes. The factors such as the growing number of population, together with the development of infrastructure in an area such as the development of highways carried out by the government, have greatly reduced the amount of green space.Consequently, there is a higher number of bird populations that lose their habitats, source of food and breeding grounds especially in Java. Additionally, commercial logging and fragmentation also threaten the population status of birds in lowland forests, particularly woodpeckers (Picidae) as their nests are mainly built in trees in these forests (Collar, Lambert 2002) althoughother woodpeckers' nests are found in community forests planted with Sengon and Pinus (Widodo 2013; Widodo 2016b). Fragmentation, furthermore,which has been carried out continuously can also threaten the survival rate of forest birds in Java. It is suspected that the condition of the forest will change if it is increasingly fragmented and the distance between fragmented forests increases, causing the mobility and variety of bird food sources is limited. Fragmentation affects not only the omnivore group, but also insectivores, frugivores and nectarivores. Collar and Lambert (2002) further stated that among the bird species, the ones that are at greater risk from the effects of fragmentation are Alcedo euryzona (Alcedinidae), Treron capellei (Columbidae), Tersiphone paradisi and Philentoma velatum (Muscicapidae), Aethopyga siparaja (Nectariniidae), Meiglyptes tristis (Picidae) and Pycnonotus squamatus (Pycnonotidae).

Another factor to affect the lost of bird habitats is the occasional spills of fuel oil onto the seashore, such as on the coast of Cirebon which affected the food sources of bird's along the north coast of Java. The species affected were the Milky Stork Mycteria cinerea and other water birds. It is also suspected that the oil spill had reached areas of wetlands and mangrove forests in coastal areas. It is known that wetlands such as swamps that are bushy and muddy in coastal areas are very important for specific scaffolding birds, such as Vanellus macropterus (a relative of Charadriidae) which was declared extinct in 1940, migratory birds to the island of Java, including the Common Coot Fulica atra, Bronze-winged Jacana Metopedius indicus and Pheasant-tailed Jacana Hydrophasianus chirurgus. The wetlands are of significance to two aquatic Jacana species (Rut, Gupta 2020). The distribution of bird species that are in need of closer observation in Java can be seen in Figure 1.

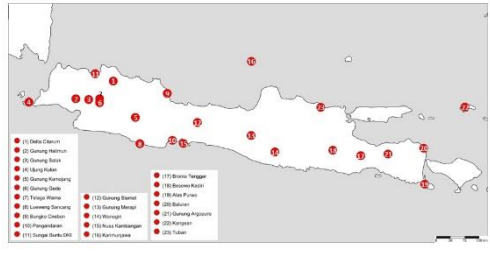

Figure 1. Map of the distribution of birds that need closer observation in Java.

Several areas in the northern and southern coastal areas of Java Island are also important distribution areas for several bird species (Figure 1), especially mangrove-dwelling birds. The roles of mangrove forests are as a habitat, a foraging site, and shelter and breeding grounds. The shrinking of mangrove forests coverage due to various human interests is thought to threaten the Javan Coucal Centropus nigrofurus that likes coastal area similar to typical mangrove vegetation, such as Avicennia marina (Desmawati 2015). It was stated that Javan Coucal makes use of Avicennia marina which is abundant with diverse and dense strata to perch on as they fly short distance. The presence of shrubs around the Avicennia marina supports the Javan Coucal to move in search of food and return to the branching section of that specific mangrove species. Meanwhile, the flowers of mangrove plants are specifically act as a source of nectar for birds belonging to the Zosteropidae, including the very rare Javan White-eye Zosterops flavus and Mangrove White-eye Zosterops chloris (MacKinnon 1990).

Another coastal bird species which also utilizes the mangrove forest is the Lesser Adjutant Leptoptilos javanicus. It utilizes the branching mangrove forest's canopy as an important breeding ground. Due to rapid loss of mangrove forest areas, both the Lesser Adjutant and Milky Stork Mycteria cinerea have become endangered.

The factor of excessive commercial use presumably has contributed to the status of certain birds in Java becoming increasingly endangered. At least, according to Eaton et al. (2015) there are five species of birds that are almost always used as pets, which of course can threaten the species and its subspecies. The five bird species are the Javan Hawk-Eagle Spizaetus bartelsi, Javan Green Magpie Cissa thalassina, Black-winged Myna Acridotheres melanopterus, Java White-eye Zosterops flavus) and Java Sparrow Lonchura oryzivora.

Another factor causing the declining diversity of birds in some villages of Java, especially in West Java is the use of pesticides (Iskandar et al. 2016). The problem of pesticides threatening the diversity of birds in Java can be linked to the control of insect pests in rice fields. The increased rise of pesticides is used by farmers to protect rice plants from pests. Since some types of insect-eating birds or grain-eating birds such as Padda (Lonchura) oryzivora, Ploceus hypoxanta, Ploceus phillipinus and Amandava amandavause rice fields as a foraging site, they too are lethally affected by pesticides. Apart from pesticides, these grain eaters are also threatened because they are used as poaching for trading commodities. Other commonly traded birds commonly are members of the starling group (Sturnidae), namely the Black-winged Starling Sturnus melanopterus and the Asian Pied Starling Sturnus contra jalla. These two species of starlings are commercialized because of their beautiful voices (Kurniawan et al. 2014; Pratiwi 2021).

The threat status according to the IUCN category is shown in Figure 2. Of 56 bird species that need attention, four species (7%) are classified as critically endangered (CR), sixspecies (11%) vulnerable (VU), ninespecies (16%) threatened (EN), nine species (16%) near threatened (NT), twenty-seven species (48%) least concern (LC), and one species (2%) data deficient (DD).

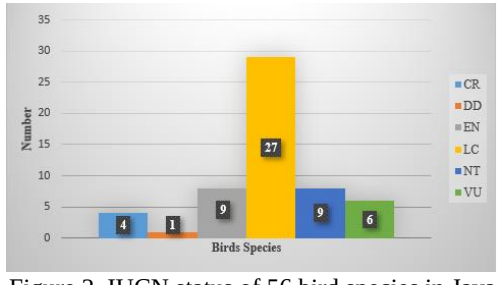

Figure 2. IUCN status of 56 bird species in Java

The results show that there are four bird species that have been categorized as Critically Endangered, meaning that they are facing a high risk of extinction. The four species are Vanellus macropterus, Alcedo euryzona, Cissa thalassina and Pycnonotus zeylanicus. It is suspected that habitat loss and poaching for commercial purposes have caused the species to become critical. In particular, the Straw-headed Bulbul Pycnonotus zeylanicus is of singing birds in Indonesia and the price on the market is also fantastic, reaching IDR 10 million/head. A research result shows that the number of Straw-headed Bulbul populations in nature is decreasing and it is proposed to be protected immediately (Bergin et al. 2017). This is due to high market demand from consumers.

Meanwhile others, namely 9 species are expected to go extinct in the near future (Endangered) and 9 other species are almost threatened with extinction (Near Threatened). Nine bird species are predicted to be at high risk of extinction (Endangered) in near future if they are unmanaged. These species are: Cairina scutulata, Mycteria cinerea, Spizaetus bartelsi, Pavo muticus, Phaenicophaeus tristis, Meiglyptes tristis, Lonchura oryzivora, Acridotheres melanopterus, and Zosterops flavus. The threat of extinction is possible due to habitat loss and commercial use. It is known that Lonchura oryzivora, Acridotheres melanopterus, and Zosterops flavus are people's favorite animals.

The other six bird species are in the Vulnerable category, that is, if they are not properly managed at present, they are likely to be vulnerable to extinction in the future. Among them are Leptoptilos javanicus, Centropus nigrorufus, Treron capellei, Cochoa azurea, Otus angelinae and Arborophila orientalis.

Only one species, namely Oriolus cruentus, is categorized as "data deficient" or lacking information from the field. This indicates that it is not yet possible to clearly estimate the risk of extinction based on their distribution and population status. Some recorded information is that Kepodang hitam (Black Oriole) only presents in the mountain forests of West Java and East Java of 1200-1800 m asl (MacKinnon et al. 1998).

On the other hand, the majority 27 (48%) of the 56 bird species studied, have Least Concern conservation status (low risk). Thus, this requires a more in-depth study, the current distribution, specific habitats and their populations in nature. Thus, the data obtained has information updates and is valid.

The classification of bird species protected status is based on CITES (Convention on International Trade of Endangered Species of Wild Fauna and Flora) and on Indonesian law as shown in Figures 3 and 4. This aims to control the status of the cause of the threat of the 56 bird species studied or researched.

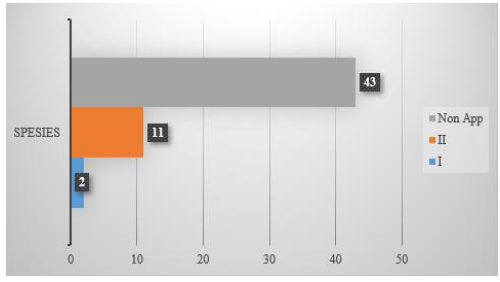

Figure 3. Appendix CITES

Figure 3 shows that internationally protected status is recorded for 2 species including Appendix I and 11 species including CITES Appendix II, and 43 species including Non-Appendix. This means that internationally only two species are 100% protected and may not be used commercially, namely: Mycteria cinerea Milky stork and Cairina scutulata Wood Duck. Meanwhile, 11 other species are included in the list that are not threatened with extinction. However, at any time it may be threatened with extinction, even if commercial use continues and without proper regulation or management (cultivation) efforts. Eleven bird species included in the CITES Appendix II category, namely: Icthyophaga icthyaetus, Spizaetus

bartelsi, Pavo muticus, Lonchura oryzivora, Pycnonotus zeylanicus, Phodilus badius, Otus angelinae, Otus brookii, Otus rufescens, Strix leptogrammica and Ninox scutulata.

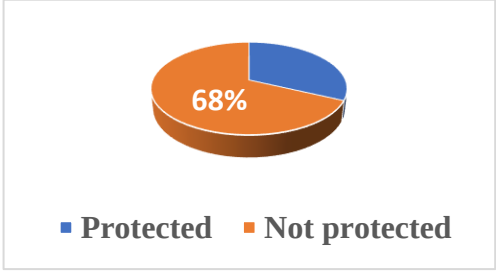

Figure 4. Republic of Indonesia protection status

Based on Figure 4,it is seen that there are 18 species (32%) including protected species (P) and 38 species (68%) not protected in Indonesia. Additionally, it is also determined based on Minister of Environment and Forestry Regulation No. P.106/Menlhk/Setjen/Kum.1/12/2018 concerning Types of Protected Wild Plants and Animals. Thus, this shows that birds whose field data information is still lacking nationally have been given signs for their utilization. This means that the condition has been seriously considered by the government. Thus, the actual status for the species that have not been protected nationally needs to be properly monitored. It is hoped that the status of being endangered will be increasingly controlled by various parties along with dynamic and sustainable development.

To promote the sustainability of diverse bird species in the long term, new policies are needed to diversify habitats and enrich food sources particularly through regular and continuous greening. Hence is the importance of choosing tree or plant commodities to be reforested as a cover crop to help birds have suitable nesting sites and is useful as a source of bird food. Additionally, greening is not only conducted on land but also on the seafront or coastal areas. A step that should be continued in several coastal areas of Java Island is mangroves and sea pine Colotropis gigantea planting for the preservation of birds in coastal areas, as has been done by PT LGI in the Randutatah area, Paiton village, Probolinggo, East Java. This has incurred satisfying year-to-year results and an increase in the diversity of birds in coastal areas and one of them is the Grey-bellied Partridge Arboporophila orientalis (Hasan, Razak 2018).

On the other hand, the community has to be educated not to continuously poach in the wild, but to try to cultivate it through captivity. In particular, the singing class birds and their companions that have "protected" status, are in 8 IUCN criteria,or are included in the CITES Appendix I and II lists. Furthermore, in order to reduce the number of endangered birds in Indonesia, the authoritieis can create a campaign to raise public awareness as well as to implement conservation breeding, conservation captive breeding, commercial wild breeding, conduct field, market and genetic surveys; in situ management; and activity coordination (Eaton et al. 2015)

Propaganda about the importance of the values of birds for an ecosystem in Java, both through print and electronic media (cell phones, radio and TV) should be carried out by various communities on a regular basis. Environmental education for school children at various levels would able to raise the awareness on the subject.

CONCLUSION

Lack of proper management can have an impact on a number of bird species in Java that are endemic to becoming rare, data deficient and even threatened with extinction. Based on research on a number of 56 bird species that need monitoring, it shows that 4 species (7%) are critical, 6 species (11%) are vulnerable, 9 species (16%) are threatened, 9 species (16%) are almost threatened, 27 species (48) are at low risk, and 1 species (2%) are data deficient. Meanwhile, the status of international protection recorded 2 species to be included in Appendix I, 11 species in CITES Appendix II, and 43 species in Non-

Appendix. In addition, nationally, there are 18 species (32%) classified as protected species (P) and 38 species (68%) as not protected ones.

The cause of the lack of attention to various bird species in Java can be linked to their low value in ecosystems as perceived by a group of individuals and the increasingly limited distribution of birds. This condition is also exacerbated by rampant poaching, birdkeeping, pets, trading, logging, changes in land use, and habitat shrinkage. Hence, it is recommended for stakeholders to be wiser and prioritize scientific considerations in the management framework of forest areas in Java. Structuring bird habitats in nature and concern for reforestation need to be continuously encouraged, including by planting various vegetation sources for bird feed and safe recovery trees. In this way, it is hoped that we can save various endangered bird species in Java from extinction and their populations and habitats can be maintained.

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