



Wildlife Trade in East Nusa Tenggara Province based on Facebook Social Media Groups

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Abstract

Wildlife conservation is fundamental to mitigating extinction due to wildlife trade. Thus, various conservation policies have been used as a reference: IUCN, CITES, and Government Policy P.106/2018. This research aims to record Facebook-based wildlife trade, identify the traded wildlife conservation status, and estimate the economic value. Data was taken from when the group was formed until 1 July 2023 with various keywords. The results reveal that 107 species belonging to 53 families were recorded in 31 trading groups, comprising 82 species of the aves class, 17 species of the reptilia class, and 8 species of the mammalia class. Among the traded wildlife, based on P.106/2018, 80 species are unprotected, while 27 are protected. Based on the IUCN, most traded wildlife is categorized as LC, with 77 species. Some species are categorized as CR with 4 species, EN with 9 species, VU with 8 species, NT with 8 species, and NE with one species. Referring to CITES, 73 species classified as non-appendices dominate the trading groups, followed by 24 species of Appendix II, 9 of Appendix I, and 1 of Appendix III. This study observed that over half (41.12%) of the traded species were encompassed inside at least one wildlife protection policy. The estimated economic value of all traded wildlife is approximately IDR317,125,000 (USD19,248.92). The prices of high-value species correlate positively with the level of protection those species receive under existing conservation policies. Governments and other conservation bodies must pay more attention to the growing Facebook-based wildlife trade, especially for protected and endangered species.

Keywords: conservation, East Nusa Tenggara, online trade, social media, wildlife trade

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Introduction

Living creatures, including wildlife animals, are crucial in ecosystem balance (Fryxell et al., 2014; Holtmeier, 2015; Lele, 2021; Alagona, 2022). Each species has a different important role and is irreplaceable by other species (Wardle et al., 2011). The extinction of a species impacts predator-prey populations and can damage natural ecosystems and cause several losses, including economic value and derived environmental services (Frezina & Rozarina, 2012; Isbell et al., 2015; Valiente-Banuet et al., 2015; Sol, 2019; Lehtinen, 2021). Species conservation activities are fundamental for preventing extinction and the various impacts that will occur (Mittermeier et al., 2011; Adams, 2013; Pimm et al., 2014; Cuckston, 2018). Various conservation policies have been implemented at the national (Indonesian) and international (global) levels for prevention, including through the regulation of the Minister of Environment and Forestry of the Republic of Indonesia (Kementerian Lingkungan Hidup dan Kehutanan, 2018), concerning plant and animal species protected at the national level, the International Union for Conservation of Nature and Natural Resources (IUCN) Red List which classifies plant and wildlife animal species of

natural threat (International Union for Conservation of Nature and Natural Resources, 2024), and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) which classifies plant and wildlife animal species based on vulnerability to trade (UN Environment Programme World Conservation Monitoring Centre, 2024). Despite this, the practice of hunting wildlife animals as food, medicine, or for trade still occurs massively on a national and global scale (Rao et al., 2011; LuiSeLLi, 2015; Scheffers et al., 2019; Fukushima et al., 2020; Hughes, 2021; Fa et al., 2022; Amalia, 2024).

Wildlife trade activities are carried out in various ways, including traditional markets (Whiting et al., 2013; Gbogbo & Daniels, 2019; Taogan et al., 2020; Liana & Witno, 2021; Koutchoro et al., 2024; Ruitan et al., 2024), black markets according to market demand (McNamara et al., 2016; van Uhm, 2016; Brown, 2017), and wildlife smuggling (Bruwer, 2020; van Uhm et al., 2021). In the current era of globalization, trade is carried out easily via e-commerce and various social media platforms (Nguyen & Willemsen, 2016; Chaber et al., 2021; Wyatt et al., 2022; Mutiaradita et al., 2023; Salas-Picazo et al., 2023; Toomes et al., 2023). It is

straightforward for perpetrators of wildlife trade activities to access and carry out transactions without conventional markets (Harrison et al., 2016; Sung & Fong, 2018). However, traditional market trading practices remain (Nijman et al., 2022). E-commerce and social media are currently the leading media platforms for wildlife trade (Lavorgna, 2014). This media is straightforward to access for anyone without time and regional restrictions (Alalwan et al., 2017; Appel et al., 2020; Evans et al., 2021; Tuten, 2023). Some examples of e-commerce in Indonesia include Shopee and Tokopedia, while many social media platforms are via Facebook (Gunawan et al., 2017; Nijman et al., 2021; Nijman, 2022; Mutiaradita et al., 2023). Traders can efficiently conduct transactions because social media is private, which leads to personal communication between sellers and buyers (Siriwat & Nijman, 2018). Seller posts will be used for discussion, which may continue in private messaging when ordering or offering to buy and sell protected species without being listed in the social media posting (Siriwat & Nijman, 2018; Rinne et al., 2025). The protected species under Indonesian regulations, threatened species based on the IUCN Red List, and Appendix species based on CITES are subjected to trade (Morgan & Chng, 2018; Siriwat & Nijman, 2018; Spee et al., 2019).

The Lesser Sunda Islands are part of the Wallacea region, which has unique biodiversity (Yuni & Yuda, 2020). The regions is a part of the Lesser Sunda Island, which possesses the potential for endemic and threatened species biodiversity such as yellow-crested cockatoo (*Cacatua sulphurea*), citron-crested cockatoo (*C. citrinocristata*), flores-hawk eagle (*Nisaetus floris*), sumba eclectus (*Eclectus cornelia*), sumba hornbill (*Aceros everetti*), sumba buttonquail (*Turnix everetti*), timor green-pigeon (*Treron psittaceus*), red-naped fruit-dove (*Ptilinopus dohertyi*), flores scops-owl (*Otus alfredi*), flores green-pigeon (*T. floris*), flores monarch (*Symposiachrus sacerdotum*), flores crow (*Corvus florensis*), flores hanging-parrot (*Loriculus flosculus*), tenggara hill myna (*Gracula venerata*), komodo dragon (*Varanus komodoensis*), auffenberg's monitor (*V. auffenbergi*), timor python (*Malayopython timoriensis*), roti island snake-necked turtle (*Chelodina mccordi*), flores cross frog (*Oreophryne rookmaakeri*), nusa tenggara komodomys (*Komodomys rintjanus*), javan deer (*Rusa timorensis*), flores shrew (*Suncus mertensi*), and flores woolly bat (*Kerivoula flora*) (Hidayat & Pramata, 2022). Furthermore, Hidayat and Pramata (2022) reported that the province's endemic wildlife trade is a threat with high levels of exploitation as pets. Information regarding wildlife trade in East Nusa Tenggara Province is crucial to increase awareness and control of wildlife trade through social media. This research aims to record and identify the conservation status of wildlife traded via Facebook social media and estimate the economic value of wildlife trade transactions. This study can demonstrate that extensive wildlife trade practices exist even without physical storefronts, posing a threat to species populations due to supply dynamics and the economic ramifications for sellers (Marshall et al., 2020; Stringham et al., 2023).

Methods

The research was conducted on Facebook by searching

for wildlife trade groups within East Nusa Tenggara Province with various keywords including “jual beli”, “burung”, “ular”, “python”, “kura-kura”, “kura-kura brazil”, “kura-kura darat”, “katak”, “kodok”, “buaya”, “paus”, “kadal”, “soa”, “kakatua”, “iguana”, “biawak”, “elang”, “jual beli burung”, “jual beli hewan”, “jual beli ular”, “daging paus”, “daging rusa”, “rusa”, “tanduk rusa”, “penyu”, “gelang penyu”, “burung mania”, “kicau”, “kicau mania”, “hewan eksotis”, “pecinta hewan”, “burung berkicau”, “lovebird”, “kenari”, “murai”, “cucak rawa”, “cucak hijau”, “cucak ijo”, “pleci”, “pet shop”, “hewan ternak”, “komunitas hewan”, and “hobi burung”. Each keyword is appended with the last term, specifically “NTT”, “Nusa Tenggara Timur”, the designation of each regency, and its capital (22 regions). When a related group is found, all data in the post is documented from the group's creation until the posting deadline of July 1, 2023, which is expected to capture and show the entire data since the group was first formed. Only the information posted throughout the data collection period was included in the documentation of our research. A few things could have happened, such as the presence of fake posts or posts that might have been removed before the data collection. We also cannot verify any sales that may have been conducted through private communications sent to sellers. The available data tends to be local names, which are confirmed in several field guides (de Lang, 2011; Arlott, 2018; Maryanto et al., 2019; Eaton et al., 2021; James et al., 2022) and websites (<https://www.iucnredlist.org/>; <https://reptile-database.reptarium.cz/>; <https://www.inaturalist.org/>; <https://www.macaulaylibrary.org/oriental-bird-images/>; <https://ebird.org/home>) to confirm the species. The recorded information includes the names of the species, which will be classified based on IUCN conservation status, CITES trade status, and protection status in Indonesian Regulation (P.106). Additionally, statistics are documented regarding the number of individuals traded and the price paid for each individual. This study records only what is provided in the posting; the prices are not categorized according to age structure. Quantity and price data for each species is recorded to determine the economic value (EV) of wildlife trade using Equation [1] (Hughes, 2021; Tow et al., 2021; Mutiaradita et al., 2023):

$$EV = \sum \text{Quantity} \cdot \text{Price (IDR)} \quad [1]$$

Results and Discussion

Number and distribution of wildlife trading Facebook groups in East Nusa Tenggara As many as 31 animal trade groups, including wildlife, have been recorded on Facebook in East Nusa Tenggara Province (Table 1). It is noted that the oldest group was formed on October 27, 2014, and the latest on February 15, 2023, allowing for the creation of more wildlife trade groups in the future. To uphold ethical standards, we refrain from displaying group names and seller accounts, ensuring anonymity in our reporting of illegal wildlife trade violations. Kupang, including the city and regency, has the most significant number of groups, with 15 groups (Figure 1). Having a role as the provincial capital, Kupang, as a regional economic center, has many open accesses, including access by land, sea, and air transportation (Yudhistira & Sofiyandi, 2018; Hasibuan & Mulyani, 2022; Zainal et al., 2023).

Table 1 List and creation date of wildlife trade Facebook groups in Nusa Tenggara

Region	Wildlife Facebook group	Since
Kupang	Group 1	October 27, 2014
	Group 2	May 15, 2022
	Group 3	October 30, 2015
	Group 4	October 27, 2021
	Group 5	May 15, 2022
	Group 6	March 20, 2021
	Group 7	January 20, 2015
	Group 8	July 8, 2016
	Group 9	September 13, 2020
	Group 10	December 1, 2020
	Group 11	October 13, 2017
	Group 12	February 15, 2023
	Group 13	October 29, 2018
	Group 14	July 17, 2020
	Group 15	October 2, 2016
Belu	Group 1	August 23, 2017
	Group 2	September 17, 2017
	Group 3	October 7, 2022
	Group 4	August 3, 2020
Alor	Group 1	January 21, 2021
	Group 2	February 19, 2022
Ende	Group 1	January 10, 2017
	Group 2	August 22, 2020
Sikka	Group 1	December 1, 2018
	Group 2	May 28, 2020
Malaka	Group 1	November 6, 2020
North Central Timor	Group 1	March 26, 2017
South Central Timor	Group 1	January 20, 2019
Sumba Island	Group 1	February 2, 2016
East Flores	Group 1	April 25, 2020
West Manggarai	Group 1	August 16, 2021

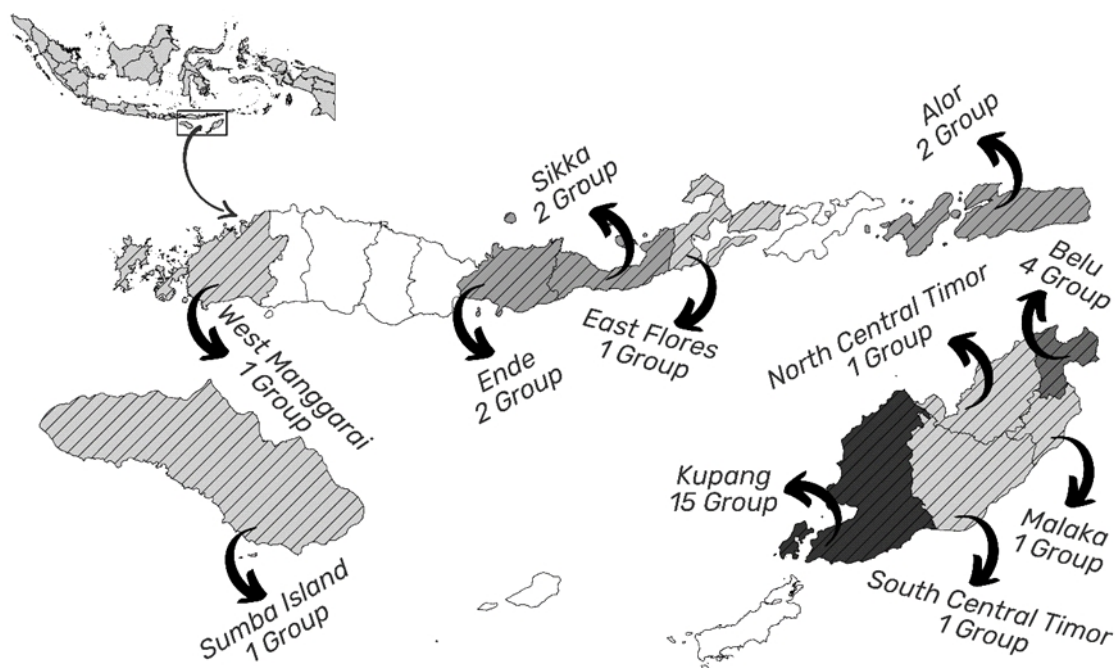


Figure 1 Number and distribution of wildlife trading on Facebook.

Based on the number of groups, the second location with the largest group is Belu Regency, with four animal trade groups. Belu Regency is one of the border areas with Timor-Leste by land and sea border. Accessibility is one of the supporting factors for wildlife trade practices (Pires et al., 2021a). The ease of transactions and fulfilling demand for wildlife is greatly supported by accessibility. The building and the convenience of roads can enhance access to wildlife hunting activities as commodities to be traded (Bennett, 2017). Expanding accessibility also makes it easier for wildlife trade logistics to reach a wider buyer, allowing for faster online purchases in terms of transportation, even from far-flung locations (Guo et al., 2024). Economic needs in urban areas challenge residents to meet their daily needs and can also trigger hunting and trade in wildlife animals (Fitri & Kamrullah, 2023).

Big cities tend to become epicenters of the wildlife trade because they are the center of various human activities, including animal communities and animal lovers, and are the venue for various pet events, including exotic animals. For example, in the big city of Makassar, Maulany et al. (2021) reported 13 distribution points and 27 wildlife suppliers. In a span of seven months in 2018, wildlife trade in Makassar city was recorded at 62 species, including the aves, mammalia, and reptilia classes, with 50% of them being native Indonesian species and 18% being species endemic to the island of Sulawesi (Maulany et al., 2021). Mutiaradita et al. (2023) further reported in a similar study regarding herpetofauna trade via e-commerce in Indonesia, describing that there were 74 sellers from eight provinces, including Banten, DKI Jakarta, West Java, Central Java, Yogyakarta, East Java, South Kalimantan, and West Kalimantan, with the

most significant number of sellers coming from West Java and DKI Jakarta. Nijman et al. (2022) used several methods to survey illegal wildlife trade, and one of the results was a survey of traditional markets that reported that in the 2016–2021 period, there were at least 40 bird markets in Java, Bali, and Lombok. Nijman et al. (2022) noted that the 12 intensively surveyed markets were in big cities, including Jakarta, Bogor, Bandung, Garut, Tasikmalaya, Cirebon, Yogyakarta, Surakarta, Denpasar, and Mataram.

Social media has emerged as a prominent venue for wildlife trade, creating substantial worries regarding its implications for animal conservation and biodiversity. Numerous investigations have highlighted that social media is the primary instrument in the illicit wildlife trade. This approach offers numerous benefits, particularly the direct connection it facilitates between sellers and buyers, significantly influencing the demand for various species (Shan et al., 2022; Song et al., 2022; Lestari et al., 2023). Social media offers traffickers a broad platform, enabling them to promote and sell wildlife products while maintaining a degree of anonymity, which in turn complicates enforcement and regulatory initiatives (Harrison et al., 2016; Alfino & Roberts, 2020). The rapid and extensive nature of transactions on social media frequently eludes the oversight and regulations governing wildlife trade, thereby exposing threatened species to considerable risk (Hinsley et al., 2016; Vaglica et al., 2017).

Species Identification and conservation status of wildlife traded on Facebook groups One hundred-seven species from 53 families were identified and traded through Facebook groups within East Nusa Tenggara (Table 2). It was

Table 2 Checklist and conservation status of species traded on Facebook groups

Class	Family	Scientific name	Conservation status		
			P. 106	IUCN	CITES
Mammalia	Petauridae	<i>Petaurus breviceps</i>	NP	LC	-
	Mustelidae	<i>Aonyx cinereus</i>	NP	VU	I
	Viverridae	<i>Paradoxurus hermaphroditus</i>	NP	LC	III
	Felidae	<i>Prionailurus viverrinus</i>	P	VU	II
		<i>Prionailurus bengalensis</i>	NP	LC	I
	Balaenopteridae	<i>Balaenoptera musculus</i>	P	EN	I
	Cervidae	<i>Rusa timorensis</i>	P	VU	-
	Erinaceidae	<i>Atelerix albiventris</i>	NP	LC	-
Aves	Phasianidae	<i>Gallus varius</i>	NP	LC	-
	Columbidae	<i>Treron olax</i>	NP	LC	-
		<i>Macropygia phasianella</i>	NP	LC	-
		<i>Geopelia cuneata</i>	NP	LC	-
		<i>Spilopelia chinensis</i>	NP	LC	-
		<i>Geopelia striata</i>	NP	LC	-
		<i>Ptilinopus regina</i>	NP	LC	-
		<i>Chalcophaps indica</i>	NP	LC	-
		<i>Streptopelia roseogrisea</i>	NP	LC	-
		<i>Amaurornis phoenicurus</i>	NP	LC	-
	Rallidae	<i>Turnix maculosus</i>	NP	LC	-
	Accipitridae	<i>Accipiter fasciatus</i>	P	LC	II
	Picidae	<i>Micropternus brachyurus</i>	NP	LC	-
	Alcedinidae	<i>Todiramphus sanctus</i>	NP	LC	-
	Cacatuidae	<i>Cacatua alba</i>	P	EN	II
		<i>Cacatua galerita</i>	P	LC	II
		<i>Cacatua moluccensis</i>	P	VU	I
		<i>Nymphicus hollandicus</i>	NP	LC	-
		<i>Cacatua sulphurea</i>	P	CR	I

Table 2 Checklist and conservation status of species traded on Facebook groups (continued)

Class	Family	Scientific name	Conservation status		
			P. 106	IUCN	CITES
	Psittacidae	<i>Eos reticulata</i>	P	NT	II
		<i>Trichoglossus euteles</i>	P	LC	II
		<i>Agapornis fischeri</i>	NP	NT	II
		<i>Lorius lory</i>	P	LC	II
		<i>Trichoglossus haematodus</i>	P	LC	II
		<i>Tanygnathus lucionensis</i>	P	NT	II
		<i>Lorius garrulus</i>	P	VU	II
		<i>Tanygnathus megalorhynchus</i>	P	LC	II
		<i>Trichoglossus ornatus</i>	P	LC	II
		<i>Eos squamata</i>	P	LC	II
		<i>Melopsittacus undulatus</i>	NP	LC	-
		<i>Loriculus galgulus</i>	P	LC	II
		<i>Pitta nympha</i>	P	VU	II
	Pittidae	<i>Hydrornis guajanus</i>	NP	LC	II
	Meliphagidae	<i>Philemon buceroides</i>	NP	LC	-
		<i>Lichmera flavicans</i>	NP	LC	-
	Oriolidae	<i>Oriolus chinensis</i>	NP	LC	-
		<i>Oriolus szalayii</i>	NP	LC	-
		<i>Sphecotheres viridis</i>	NP	LC	-
	Pachycephalidae	<i>Pachycephala cinerea</i>	NP	LC	-
		<i>Pachycephala pectoralis</i>	NP	LC	-
	Artamidae	<i>Cracticus cassicus</i>	NP	LC	-
	Campephagidae	<i>Lalage nigra</i>	NP	LC	-
		<i>Pericrocotus miniatus</i>	NP	LC	-
	Laniidae	<i>Lanius schach</i>	NP	LC	-
	Pycnonotidae	<i>Pycnonotus zeylanicus</i>	NP	CR	I
		<i>Pycnonotus goiavier</i>	NP	LC	-
		<i>Brachypodius atriceps</i>	NP	LC	-
		<i>Alophoixus bres</i>	NP	EN	-
		<i>Pycnonotus aurigaster</i>	NP	LC	-
	Zosteropidae	<i>Zosterops flavus</i>	P	EN	-
		<i>Zosterops japonicus</i>	NP	LC	-
	Locustellidae	<i>Megalurus palustris</i>	NP	LC	-
	Cisticolidae	<i>Prinia familiaris</i>	NP	NT	-
	Sittidae	<i>Sitta azurea</i>	NP	LC	-
	Sturnidae	<i>Gracupica contra</i>	NP	LC	-
		<i>Acridotheres javanicus</i>	NP	VU	-
		<i>Aplonis metallica</i>	NP	LC	-
		<i>Mino dumontii</i>	NP	LC	-
		<i>Gracula religiosa</i>	P	LC	II
	Turdidae	<i>Acridotheres melanopterus</i>	P	EN	-
		<i>Geokichla peronii</i>	NP	NT	-
		<i>Geokichla interpres</i>	NP	EN	-
		<i>Geokichla citrina</i>	NP	LC	-
	Muscicapidae	<i>Copsychus saularis</i>	NP	LC	-
		<i>Copsychus malabaricus</i>	NP	LC	II
		<i>Saxicola caprata</i>	NP	LC	-
	Chloropseidae	<i>Cyornis banyumas</i>	NP	CR	-
		<i>Chloropsis cyanopogon</i>	P	NT	-
		<i>Chloropsis sonnerati</i>	P	EN	-
	Irenidae	<i>Irena puella</i>	NP	LC	-
	Dicaeidae	<i>Dicaeum rhodopygale</i>	NP	LC	-
		<i>Dicaeum hirundinaceum</i>	NP	LC	-
	Nectariniidae	<i>Cinnyris solaris</i>	NP	LC	-
		<i>Leptocoma aspasia</i>	NP	LC	-
	Ploceidae	<i>Ploceus philippinus</i>	NP	LC	-
	Estrildidae	<i>Erythrura tricolor</i>	NP	LC	-
		<i>Lonchura punctulata</i>	NP	LC	-
		<i>Padda fuscata</i>	NP	NT	-
		<i>Amandava amandava</i>	NP	LC	-
		<i>Taeniopygia castanotis</i>	NP	LC	-
	Passeridae	<i>Passer montanus</i>	NP	LC	-
	Fringillidae	<i>Serinus canaria</i>	NP	LC	-

Table 2 Checklist and conservation status of species traded on Facebook groups (continued)

Class	Family	Scientific name	Conservation status		
			P. 106	IUCN	CITES
Reptilia	Agamidae	<i>Hydrosaurus amboinensis</i>	NP	LC	-
		<i>Hydrosaurus weberi</i>	NP	VU	-
		<i>Pogona henrylawsoni</i>	NP	LC	-
	Eublepharidae	<i>Eublepharis macularius</i>	NP	LC	-
		<i>Tiliqua gigas</i>	NP	LC	-
	Scincidae	<i>Iguana iguana</i>	NP	LC	II
	Varanidae	<i>Varanus exanthematicus</i>	NP	LC	II
		<i>Varanus timorensis</i>	P	LC	II
		<i>Ahaetulla mycterizans</i>	NP	LC	-
	Boidae	<i>Boa constrictor</i>	NP	LC	I
	Crocodylidae	<i>Crocodylus porosus</i>	P	LC	I
	Chelidae	<i>Chelodina oblonga</i>	NP	NT	-
	Cheloniidae	<i>Eretmochelys imbricata</i>	P	CR	I
	Geoemydidae	<i>Cuora amboinensis</i>	NP	EN	II
	Testudinidae	<i>Centrochelys sulcata</i>	NP	EN	II
	Emydidae	<i>Trachemys scripta</i>	NP	LC	-
		<i>Trachemys emolli</i>	NP	NE	-

recorded that 104 species were traded as live animals, and three species were derivative products from animal body parts. These derivative products include deer antlers, rings, bracelets, necklaces, and meat, usually used as souvenirs, accessories, or wall decorations. The traded species are divided into three classes: aves, mammalia, and reptilia. The aves class stands out as the most traded due to its aesthetic appeal, vocal abilities, and cultural significance. The diverse hues of their feathers and their harmonious vocalizations contribute to the popularity of birds as pets and for ornamental uses (Davies et al., 2022; Nazim et al., 2023). Aves is also a prevalent class in many circles of society, including hobbyists as pets, communities, and various bird competitions.

As many as 27 species protected by P.106 Regulation have been identified; 21 species are included in the threatened species according to IUCN (VU, EN, and CR); one is included in the CITES Appendices III; 24 are included in the CITES Appendices II; and nine are included in the CITES Appendices I, including asian small-clawed otter (*Aonyx cinereus*), mainland leopard cat (*Prionailurus bengalensis*), blue whale (*Balaenoptera musculus*), salmon-crested cockatoo (*C. moluccensis*), yellow-crested cockatoo (*C. sulphurea*), straw-headed bulbul (*Pycnonotus zeylanicus*), red-tailed boa (*Boa constrictor*), saltwater crocodile (*Crocodylus porosus*), and hawksbill turtle (*Eretmochelys imbricata*). These results show that wildlife trade is a real threat to species conservation in Indonesia. Nijman et al. (2022) reported that the traded bird species are classified as IUCN red lists (LC, NT, and EN), with 50% protected animals. Mutiaradita et al. (2023) also report that there are threatened species according to the IUCN Red List (VU, EN, and CR), CITES Appendices, and P.106 protected species that are traded in turtle species: 24 species (IUCN), 29 species (CITES), and one species (P.106); snake species: two species (IUCN), nine species (CITES), and two species (P.106); lizard species: five species (CITES) and two species (P.106); amphibians species: one species (IUCN) and one species (CITES). Wildlife trade in Bali (Nijman & Nekaris, 2014) identified ten species classified as threatened species (VU, EN, and CR) according to the IUCN, 14 species are included in the CITES appendices, and 17 are protected

animals. Maulany et al. (2021) reported on the wildlife trade in Makassar, identifying 32 species included in the IUCN threatened species red list, 24 species included in the CITES appendices, and 10 species protected by P.106 Regulation. There are at least eight species included in these three policies, including the fishing cat (*P. viverrinus*), blue whale (*B. musculus*), white cockatoo (*C. alba*), salmon-crested cockatoo (*C. moluccensis*), yellow-crested cockatoo (*C. sulphurea*), chattering lory (*Lorius garrulus*), fairy pitta (*Pitta nympha*), and hawksbill turtle (*E. imbricata*).

P. viverrinus is reportedly widely hunted for consumption and traded for skin or other body parts of economic value. They are also often seen being traded as live species for pets on the island of Java (Mukherjee et al., 2016). The *B. musculus* species in this study was traded in the form of meat for consumption and another body part for souvenirs. *B. musculus* experiences much pressure and is very vulnerable to illegal hunting (de Vos et al., 2016; Robards & Reeves, 2011). *B. musculus* was the target of mass hunting at the international level and has been a protected animal since 1966 (Allison, 2017; Rockwood et al., 2017; Cooke, 2018). For the Aves taxa, the five species classified in these three policies are vulnerable to hunting for trade (BirdLife International, 2016, 2017a, 2017b, 2021a, 2021b). Often, the catch quota intended for ex-situ conservation far exceeds what it should be (BirdLife International, 2021a). Species tend to have a high selling value because of their beauty as pets (Mulawka, 2014; Nandika et al., 2021; Pires et al., 2021b). The ever-increasing demand for this species, both nationally and internationally, threatens its extinction (Cardador et al., 2021; Chan et al., 2021). Apart from that, habitat degradation and fragmentation are a severe threat and continue to increase yearly (BirdLife International, 2016; 2017a; 2017b; 2021a; 2021b). The last species of the reptile class is *E. imbricata*. In this research, sales of this species were recorded in the form of souvenir bracelets. This species has been recorded as being widely hunted for its shells as jewelry and other souvenir products (Mortimer et al., 2008; Senko et al., 2022; Jeethvendra et al., 2023). This species plays a crucial role in the balance of the marine ecosystem and can become a tourism object to add value and generate profits (Hemelikova et al., 2021). Since ancient times,

tortoiseshells have been valued and are a luxury item due to the influence of the people involved in the trade (Mortimer et al., 2008). *E. imbricata* shells were considered a significant treasure and booty for more than 2000 years until CITES included it in the appendix list in 1975 (Mortimer et al., 2008).

Economic value of wildlife trade As many as 612 individual species and 145 products were recorded on Facebook groups within the East Nusa Tenggara Province (Table 3). The price of each species refers to the year of data collection (2023), with the lowest price of IDR25,000 (USD1.52) (*Passer montanus*) and the highest price of IDR5,000,000 (USD303.56) (*P. zeylanicus*) (USD price refers to May 8, 2025). Regarding quantity, jewelry products from the *E. imbricata* species are the most prevalent, with a record of 78 items. Conversely, regarding economic value, the *P. zeylanicus* species holds the highest worth; four individuals were recorded, yielding an economic value of IDR20,000,000 (USD1,213.96). If classified based on the regulation, the mean selling price for each conservation status class is presented in Figure 2.

The price of individual species seems to be getting higher and is linear to policy protection for that species. Species protected by regulation P.106/2018, species with the CR class, and species in Appendix I have a higher average price than other species in each regulatory category. As hobbyists or collectors, buyers choose wild and rare species rarely found on the market, so they are willing to pay high amounts of money to acquire them (Sung & Fong, 2018). The economic value of the entire wildlife trade in this study is IDR317,125,000 (USD19,248.92). This is quite fantastic, considering that the data was collected from only one social media source and was only within one province over several years. According to Tow et al. (2021), the economic value of the wildlife trade entering the USA reached USD3.2 billion year⁻¹. Another example is China's illegal wildlife trade, as traditional Chinese medicine reached USD43.7 billion in 2010 and is estimated to reach USD114.1 billion in 2025 (McConkie, 2021). In Indonesia, Mutiaradita et al. (2023) reported that the wildlife trade via e-commerce in the amphibian and reptile class during the 2017–2022 period had an economic value of IDR3.3 billion. Another example is in Sulawesi, Indonesia. During certain seasons, flying fox

Table 3 Checklist and conservation status of species traded on Facebook groups

Class	Scientific name	Type		Price (IDR)	Q	EC (IDR)
		I	P			
Mammalia	<i>Petaurus breviceps</i>	√		500,000	15	7,500,000
	<i>Aonyx cinereus</i>	√		650,000	9	5,850,000
	<i>Paradoxurus hermaphroditus</i>	√		350,000	2	700,000
	<i>Prionailurus viverrinus</i>	√		1,000,000	5	5,000,000
	<i>Prionailurus bengalensis</i>	√		2,500,000	2	5,000,000
	<i>Balaenoptera musculus</i>		√	57,000	60	3,420,000
	<i>Rusa timorensis</i>		√	1,125,000	7	7,875,000
	<i>Atelerix albiventris</i>	√		275,000	6	1,650,000
Aves	<i>Gallus varius</i>	√		625,000	4	2,500,000
	<i>Treron olax</i>	√		120,000	2	240,000
	<i>Macropygia phasianella</i>	√		100,000	3	300,000
	<i>Geopelia cuneata</i>	√		250,000	6	1,500,000
	<i>Spilopelia chinensis</i>	√		250,000	4	1,000,000
	<i>Geopelia striata</i>	√		200,000	2	400,000
	<i>Ptilinopus regina</i>	√		250,000	2	500,000
	<i>Chalcophaps indica</i>	√		50,000	4	200,000
	<i>Streptopelia roseogrisea</i>	√		50,000	6	300,000
	<i>Amaurornis phoenicurus</i>	√		30,000	3	90,000
	<i>Turnix maculosus</i>	√		30,000	6	180,000
	<i>Accipiter fasciatus</i>	√		500,000	3	1,500,000
	<i>Micropternus brachyurus</i>	√		115,000	5	575,000
	<i>Todiramphus sanctus</i>	√		150,000	6	900,000
	<i>Cacatua alba</i>	√		2,500,000	2	5,000,000
	<i>Cacatua galerita</i>	√		2,500,000	2	5,000,000
	<i>Cacatua moluccensis</i>	√		2,300,000	2	4,600,000
	<i>Nymphicus hollandicus</i>	√		600,000	4	2,400,000
	<i>Cacatua sulphurea</i>	√		1,900,000	5	9,500,000
	<i>Eos reticulata</i>	√		500,000	12	6,000,000
	<i>Trichoglossus euteles</i>	√		375,000	8	3,000,000
	<i>Agapornis fischeri</i>	√		400,000	48	19,200,000
	<i>Lorius lory</i>	√		2,500,000	5	12,500,000
	<i>Trichoglossus haematodus</i>	√		1,450,000	2	2,900,000
	<i>Tanygnathus lucionensis</i>	√		500,000	2	1,000,000
	<i>Lorius garrulus</i>	√		1,000,000	3	3,000,000
	<i>Tanygnathus megalorynchos</i>	√		500,000	6	3,000,000
	<i>Trichoglossus ornatus</i>	√		450,000	2	900,000
	<i>Eos squamata</i>	√		1,150,000	10	11,500,000
	<i>Melopsittacus undulatus</i>	√		175,000	3	525,000
	<i>Loriculus galgulus</i>	√		125,000	4	500,000
	<i>Pitta nympha</i>	√		460,000	2	920,000

Table 3 Checklist and conservation status of species traded on Facebook groups (continued)

Class	Scientific name	Type		Price (IDR)	Q	EC (IDR)
		I	P			
	<i>Hydrornis guajanus</i>	√		120,000	9	1,080,000
	<i>Philemon buceroides</i>	√		450,000	4	1,800,000
	<i>Lichmera flavicans</i>	√		250,000	10	2,500,000
	<i>Oriolus chinensis</i>	√		475,000	6	2,850,000
	<i>Oriolus szalayi</i>	√		250,000	3	750,000
	<i>Sphecotheres viridis</i>	√		2,250,000	8	18,000,000
	<i>Pachycephala cinerea</i>	√		165,000	7	1,155,000
	<i>Pachycephala pectoralis</i>	√		250,000	2	500,000
	<i>Cracticus cassicus</i>	√		2,500,000	1	2,500,000
	<i>Lalage nigra</i>	√		35,000	7	245,000
	<i>Pericrocotus miniatus</i>	√		150,000	4	600,000
	<i>Lanius schach</i>	√		400,000	2	800,000
	<i>Pycnonotus zeylanicus</i>	√		5,000,000	4	20,000,000
	<i>Pycnonotus goiavier</i>	√		50,000	3	150,000
	<i>Brachypodius atriceps</i>	√		115,000	6	690,000
	<i>Alophoixus bres</i>	√		600,000	4	2,400,000
	<i>Pycnonotus aurigaster</i>	√		100,000	2	200,000
	<i>Zosterops flavus</i>	√		35,000	7	245,000
	<i>Zosterops japonicus</i>	√		50,000	3	150,000
	<i>Megalurus palustris</i>	√		100,000	3	300,000
	<i>Prinia familiaris</i>	√		100,000	5	500,000
	<i>Sitta azurea</i>	√		150,000	3	450,000
	<i>Gracupica contra</i>	√		425,000	5	2,125,000
	<i>Acridotheres javanicus</i>	√		130,000	10	1,300,000
	<i>Aplonis metallica</i>	√		200,000	3	600,000
	<i>Mino dumontii</i>	√		2,500,000	1	2,500,000
	<i>Gracula religiosa</i>	√		875,000	1	875,000
	<i>Acridotheres melanopterus</i>	√		850,000	5	4,250,000
	<i>Geokichla peronii</i>	√		400,000	18	7,200,000
	<i>Geokichla interpres</i>	√		500,000	10	5,000,000
	<i>Geokichla citrina</i>	√		650,000	4	2,600,000
	<i>Copsychus saularis</i>	√		250,000	2	500,000
	<i>Copsychus malabaricus</i>	√		1,300,000	8	10,400,000
	<i>Saxicola caprata</i>	√		200,000	6	1,200,000
	<i>Cyornis banyumas</i>	√		350,000	3	1,050,000
	<i>Chloropsis cyanopogon</i>	√		875,000	3	2,625,000
	<i>Chloropsis sonnerati</i>	√		400,000	2	800,000
	<i>Irena puella</i>	√		400,000	2	800,000
	<i>Dicaeum rhodopygiale</i>	√		200,000	3	600,000
	<i>Dicaeum hirundinaceum</i>	√		65,000	5	325,000
	<i>Cinnyris solaris</i>	√		50,000	3	150,000
	<i>Leptocoma aspasia</i>	√		350,000	2	700,000
	<i>Ploceus philippinus</i>	√		35,000	4	140,000
	<i>Erythrura tricolor</i>	√		450,000	1	450,000
	<i>Lonchura punctulata</i>	√		40,000	7	280,000
	<i>Padda fuscata</i>	√		475,000	2	950,000
	<i>Amandava amandava</i>	√		325,000	3	975,000
	<i>Taeniopygia castanotis</i>	√		50,000	2	100,000
	<i>Passer montanus</i>	√		25,000	5	125,000
	<i>Serinus canaria</i>	√		600,000	5	3,000,000
Reptilia	<i>Hydrosaurus amboinensis</i>	√		350,000	25	8,750,000
	<i>Hydrosaurus weberi</i>	√		1,750,000	5	8,750,000
	<i>Pogona henrylawsoni</i>	√		500,000	10	5,000,000
	<i>Eublepharis macularius</i>	√		70,000	15	1,050,000
	<i>Tiliqua gigas</i>	√		750,000	8	6,000,000
	<i>Iguana iguana</i>	√		400,000	13	5,200,000
	<i>Varanus exanthematicus</i>	√		50,000	2	100,000
	<i>Varanus timorensis</i>	√		150,000	2	300,000
	<i>Ahaetulla mycterizans</i>	√		50,000	3	150,000
	<i>Boa constrictor</i>	√		625,000	1	625,000
	<i>Crocodylus porosus</i>	√		250,000	2	500,000
	<i>Chelodina oblonga</i>	√		225,000	10	2,250,000
	<i>Eretmochelys imbricata</i>		√	30,000	78	2,340,000
	<i>Cuora amboinensis</i>	√		375,000	30	11,250,000
	<i>Centrochelys sulcata</i>	√		750,000	21	15,750,000
	<i>Trachemys scripta</i>	√		50,000	10	500,000
	<i>Trachemys emolli</i>	√		50,000	10	500,000
Total		104	3		757	317,125,000

Notes: I = Individual (Live animals); P = Product; Q = Quantity; EC = Economic value

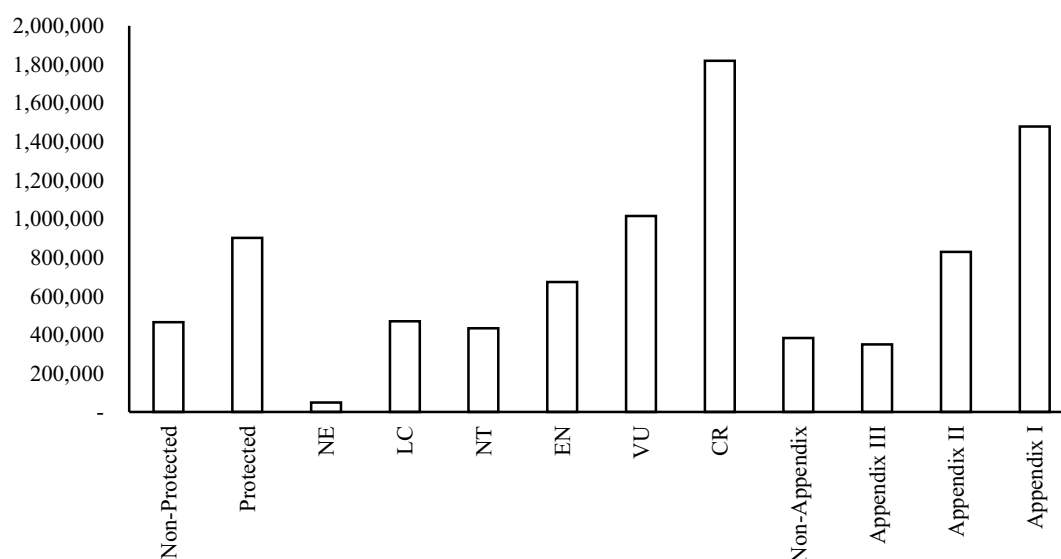


Figure 2 Mean species prices based on conservation status.

hunters earn up to IDR 20 million monthly from the illegal wildlife trade (Latinne et al., 2020).

The phenomenon of illicit wildlife trade is accurate, and social media use makes it easy to trace. If the case of wildlife trade is not considered and left untreated, it will increasingly impact population decline and even species extinction. All stakeholders must work together to eradicate wildlife trade, especially for protected and threatened species. Strengthening the investigation of illegal wildlife trade networks and providing punishment will help reduce this practice. Conservation strategies in online wildlife trade can offer a comprehensive overview of species information and distribution while elucidating the understanding of trade patterns. Collaborative approaches from various aspects are essential, incorporating technology, societal involvement, and thorough monitoring in the area of origin of the traded animal species (Xu et al., 2020; Mou et al., 2024). Collaboration in conservation is anticipated to yield sustainable ecological and economic advancements for local communities without engaging in trade activities (Gupta et al., 2023; 't Sas-Rolfes et al., 2019).

Conclusion

The existence of wildlife is necessary not only for wildlife but also for ecosystem balance. However, with the advancement of technology, social media appears to be one of the most dangerous threats to wildlife. Illegal wildlife trade is also emerging in the East Nusa Tenggara Region. This study observed that over half (41.12%) of the traded species were encompassed inside at least one wildlife protection policy (P. 106, threatened species per IUCN, and CITES appendices). Among the wildlife, most of the traded wildlife belongs to the Aves class, followed by the Reptilia and Mammalia classes. Following that, the estimated economic value of the trade from the trade group formed until July 2023 is approximately IDR317,125,000 (USD19,248.92). High species prices are linear with the protection of those species in existing conservation policies.

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