Ateneo de Manila University

Archīum Ateneo

Biology Faculty Publications | Biology Department

4-28-2021

The Big Picture: Consolidating National Government and CITES Records of Animal Trade in the Philippines from 1975 to 2019

Ronald Allan L. Cruz
Ateneo de Manila University

Catherine Genevieve B. Lagunzad
Ateneo de Manila University

Follow this and additional works at: https://archium.ateneo.edu/biology-faculty-pubs

 Part of the Biodiversity Commons, and the Biology Commons

Custom Citation

Cruz, R. A. L., & Lagunzad, C. G. B. (2021). The big picture: Consolidating national government and CITES records of animal trade in the Philippines from 1975 to 2019. Philippine Science Letters, 14, 79-100. https://www.philsciletters.net/2021-79/

This Article is brought to you for free and open access by the Biology Department at Archīum Ateneo. It has been accepted for inclusion in Biology Faculty Publications by an authorized administrator of Archīum Ateneo. For more information, please contact oadrcw.ls@ateneo.edu.

ARTICLE

The big picture: Consolidating national government and CITES records of animal trade in the Philippines from 1975 to 2019

Ronald Allan L. Cruz*,[1] and Catherine Genevieve B. Lagunzad[1]

[1]Department of Biology, School of Science and Engineering, Ateneo de Manila University, Katipunan Avenue, Loyola Heights, Quezon City 1107, Philippines

ABSTRACT

The Philippines is a biodiversity hotspot. It is a recognized source, destination, and transit point for the global wildlife trade, which drives biodiversity loss. There is an abundance of data from the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) on the Philippines, but this data has not been assessed for historical trends. Confiscation data reflecting the illegal trade is scarcer, coming from recent (2008 onward) records of the Department of Environment and Natural Resources – Biodiversity Management Bureau (DENR-BMB) and the Palawan Council for Sustainable Development (PCSD). CITES data from 1975 to 2018 include over 16 million units of animals or animal parts from 20,728 trade records. Birds are the most traded taxon at 43.92% of all trade records, and the USA has been the largest importer of wildlife from the Philippines. DENR-BMB and PCSD records show that birds and reptiles each account for 36.46% of confiscated species. Reptiles, particularly sea turtles, are the most frequently traded in the illegal markets. Many species of animals that appear in all three databases are endemic to the Philippines but not afforded enough protection by CITES or national laws and documents such as the Philippine Red List. Temporal trends in both legal and illegal wildlife trade should strongly influence conservation strategies and policies aimed at controlling the trade of wildlife from the Philippines, including reassessment of the conservation status and possible inclusion in CITES Appendices of problematic endemic species.

KEYWORDS

biology, biodiversity, conservation, wildlife trade, confiscations, endemic, Red List

INRODUCTION

The Philippines is one of the megadiversity countries of the world that altogether account for two thirds of the biological diversity on the planet (Posa et al. 2008; DENR-BMB 2014). It is also considered to be one of the three most biodiverse regions of Southeast Asia (Keong 2015). The archipelago, whose total land and water area measures 300,000 sq. km., is characterized by a high level of endemism; nearly half of its terrestrial vertebrates and from 45 to 60% of its vascular plants are unique to its islands (Posa et al. 2008). However, it also exemplifies the pervasive problems in the region as a primary biodiversity

*Corresponding author
Email Address: rcruz@ateneo.edu
Date received: January 18, 2021
Date revised: March 10, 2021
Date accepted: April 16, 2021

hotspot. Southeast Asia has the highest rate of habitat loss (greater than 70%) among all tropical regions (Sodhi et al. 2010). Dense and impoverished human populations that are rapidly growing typify a region under threat of biodiversity loss, and the Philippines clearly displays these characteristics (Posa et al. 2008).

Unsustainable wildlife trade is one of the most significant threats to biodiversity in the region (TRAFFIC 2008) and in the rest of Asia (Nijman 2010). This global exchange of wild plants and animals (or parts derived from them) is driven by the economic and social need for pharmaceuticals, food, building materials, cultural items, clothing and decorations, and pets. In 2008, the combined global value of legal wildlife trade was US$24.5 billion (TRAFFIC Southeast Asia and van Asch 2013). Among the most traded animals or animal products in East Asia and the Pacific are bear bile and gall bladder, rhinoceros horns, pangolins, reptiles, and marine wildlife in general. Wildlife trafficking is now largely considered to be a specialized area of organized crime, and so the United Nations Office on Drugs and Crime (UNODC) was mandated to build a Global Programme on Wildlife and Forest Crime and keep track of the trade, particularly in the form of seizures (UNODC 2016). Their World Wildlife Seizures (World WISE) database, which is generated from data submitted by parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), currently contains records of over 164,000 seizures from 120 countries. The Philippines is recognized as importer, exporter, and transit point for illegal animal trade (Nijman 2010; TRAFFIC Southeast Asia and van Asch 2013; UNODC 2016). Online trading through social media platforms like Facebook has also become more common, especially for the reptile trade (Sy 2018).

It is clear from historical records that the Philippines has been involved in animal trade since before the Spanish colonial period (1521-1898). Thallasocracies on the archipelago that appeared in the 10th century became involved early in maritime trade with the Chinese and mainland Southeast Asians particularly in beeswax, pearls, and culinary delicacies like birds' nest, which are edible nests of swiftlets (Dizon 1998). Later on, during the colonial era, the islands would export civet cats for their musk (Arcilla 1998), sea cucumbers, carabao horns, tortoise shells, sharks' fins, and other marine biological resources (Diokno 1998), all primarily to China. These reports constitute secondary sources based on historical documents created during those pre-colonial and colonial times; no consolidation of data from the primary sources has been made for the purposes of tracing the history of animal trade in the country.

Since becoming party to CITES in 1981, the Philippines has reported their trade of animal and plant products. However, illegal trade is reflected in CITES data only through confiscated products, which are but a small percentage of those reported. Though CITES data are important in tracking trade and determining policies on trade (Bruckner 2001), there are natural limits to the coverage of CITES; it does not have jurisdiction over domestic markets and illegal harvesting such as poaching, and millions of other species are not listed by CITES (UNODC 2016). Also, there are discrepancies among reports generated by CITES and local government agencies (Blundell and Mascia 2005) as well as non-government organizations like TRAFFIC. Additionally, the regulation of trade in certain animals implies that the illegal trade on such animals, if it exists, is done outside the open market and so is not tracked and counted except when confiscated. Market surveys have been done for specific taxa, namely reptiles (Sy 2015), but not for others and mostly only in Metro Manila, Cebu, and Davao.

The potential of the wildlife trade for starting human disease outbreaks has been clearly identified (Karesh et al. 2005), but the current pandemic of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the causative agent of the COVID-19 disease, has shed a spotlight on the importance of curbing the practice. The outbreak has been associated with the sale and consumption of wild animals in a market in Wuhan, China (Lam et al. 2020, Xu et al. 2020). Malayan pangolins *Manis javanica* Desmarest, 1822 may in particular be vectors for novel coronaviruses.

This study assesses records of animal wildlife export involving the Philippines. Temporal trends in terms of animal taxa, specific animal derivatives, volume of trade, and trade destination are assessed. Reports of illegal trading are gathered from records from CITES, the Department of Environment and Natural Resources-Biodiversity Management Bureau (DENR-BMB), and the Palawan Council for Sustainable Development (PCSD) to provide a comprehensive survey of this practice and to observe the consistency (or lack thereof) among these sources of data. No attempt was made to compare the three sources by any measure of effectivity, as their scope, methodology, and level of detail are quite different. Also, while it is recognized that other sources of illegal wildlife capture exist and are of considerable importance, such as TRAFFIC and the various works of Emerson Sy (Sy 2013, Sy 2018, Gomez and Sy 2018, Shepherd and Sy 2018, etc.), these were not included since the focus is on official government records. By highlighting the illegal activities (i.e. from confiscations and wild captures) in the CITES records and consolidating these with the local government records, taxa with historically high levels of exploitation through the illegal wildlife trade (IWT) can be identified and appropriate measures can be proposed.

MATERIALS AND METHODS

Data were obtained from the CITES Trade Database (http://trade.cites.org), which currently includes all reports by party states of imports and exports (including re-exports) of CITES-listed species. The search was limited to trade (imports, exports, and re-exports) of animals and animal products from the Philippines from 1975 to 2018 to determine the role of the country as an origin of wildlife trafficking. The data for 2019 were not yet available as of 25 February 2020. Among the pertinent data that were analyzed are taxa, importing countries, source countries (in cases of re-exports, where the Philippines is not the source), export purpose, and export source (i.e. whether wild-caught, born in captivity, captive-bred, or ranch-raised), with emphasis on the last. Using the coding system of CITES, the export source code I ("confiscated or seized specimens") corresponds to illegal trade and the code W corresponds to specimens harvested from the wild, and so these incidents were highlighted.

Data on illegal animal trade were obtained from three sources: 1) the CITES database (from entries identified with export source code I), 2) DENR-BMB, and 3) PCSD (for trade involving Palawan and its species). The DENR-BMB and PCSD databases covered the period from 2008 to 2019 and provided information on species, amounts, and confiscation sites. The data from PCSD were acquired through a Gratuitous Permit.

RESULTS AND DISCUSSION

Export and import records involving the Philippines from 1975 to 2018 have a combined total of 20,728. Exports make up 14,498 or 69.94% of these. Figure 1 shows temporal trends in imports and exports during this time period. The spike in 1992

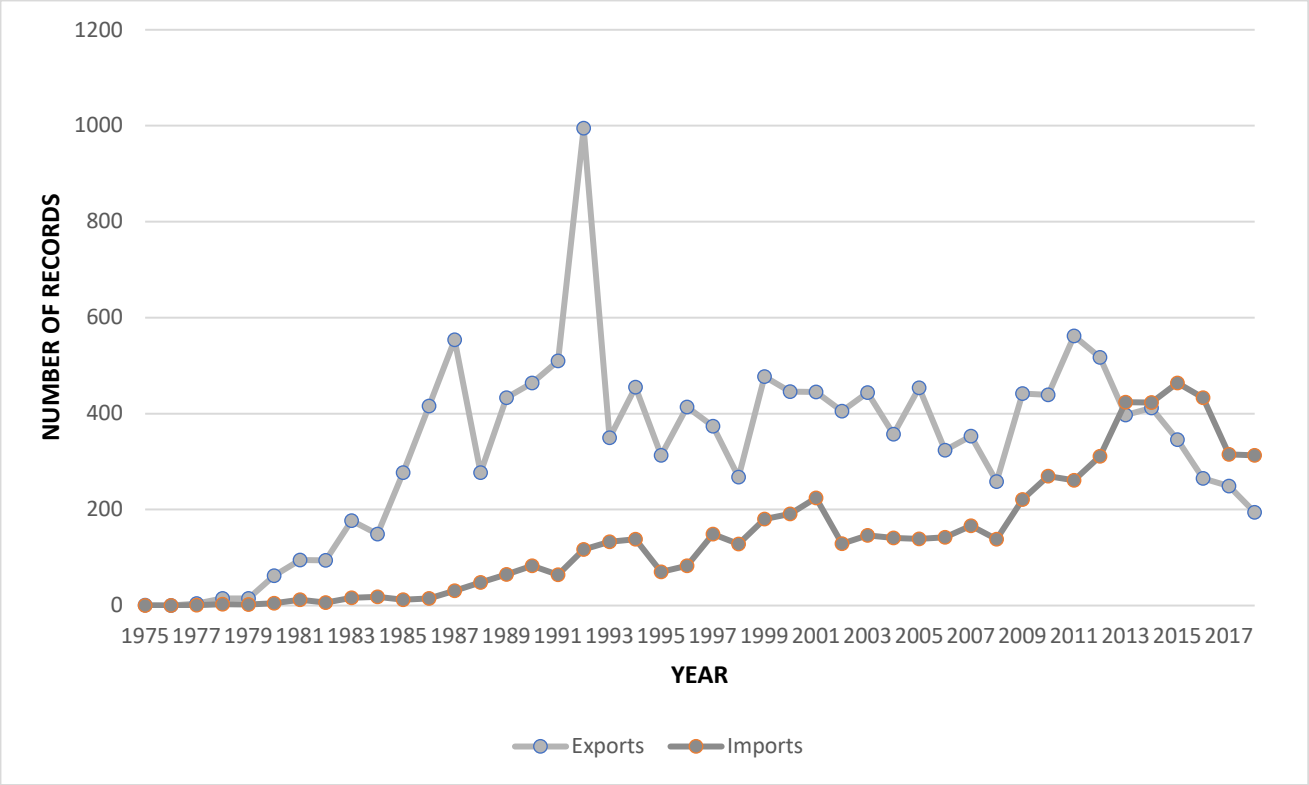


Figure 1: Numbers of animal exports and imports (records) involving the Philippines from 1975 to 2018 based on CITES records (http://trade.cites.org).

Table 1: Exported animals of the Philippines from 1975 to 2018 arranged by taxa and with the top three importers, according to CITES records (http://trade.cites.org).

Taxon	Number of Trade Records	Top Importers (with number of records)	Proportion (%) of Trade Records for Taxon
VERTEBRATES			
Actinopterygii (ray-finned fishes)	214	Germany (50)	23.36
		Italy (37)	17.29
		USA (37)	17.29
Amphibia (frogs)	2	USA (2)	100.00
"Aves" (birds, e.g. parrots, cockatoos, etc.)	6,368	Japan (1,101)	17.29
		Germany (1,001)	15.72
		USA (818)	12.85
Elasmobranchii (sharks)	12	USA (9)	75.00
		Mexico (1)	8.33
		Sri Lanka (1)	8.33
		United Kingdom (1)	8.33
Mammalia (mammals, e.g. monkeys, elephants, cats, etc.)	1,328	USA (697)	52.48
		Japan (215)	16.19
		United Kingdom (78)	5.87

Reptilia (snakes, lizards, crocodilians)	2,123	USA (1,190)	56.05
		Japan (151)	7.11
		France (115)	5.42
INVERTEBRATES			
Anthozoa (true corals, anemones)	1,920	USA (1,222)	63.65
		Japan (96)	5.00
		Spain (69)	3.59
Bivalvia (clams, mussels)	1,931	USA (740)	38.32
		Japan (170)	8.80
		Germany (114)	5.90
Cephalopoda (nautiloids)	11	USA (8)	72.73
		Italy (2)	18.18
		Germany (1)	9.09
Gastropoda (snails)	34	USA (17)	50.00
		Netherlands (4)	11.76
		New Zealand (3)	8.82
Hydrozoa (fire corals)	59	USA (39)	66.10
		Japan (3)	5.08
		United Kingdom (3)	5.08
Insecta (insects, e.g. butterflies)	496	USA (158)	31.85
		New Zealand (38)	7.66
		Canada (34)	6.85
ALL	**14,498**	**USA (4,935)**	**34.04**
		Japan (1,763)	**12.16**
		Germany (1,374)	**9.48**

is very evident particularly for exports. This peak is mostly due to trade in corals (577 export records); in that year, the trade ban was temporarily lifted (Green and Hendry 1999).

Table 1 shows the 11 major taxa of animals exported by the Philippines during the period from 1975 to 2018. The most traded among these taxa is "Aves" (i.e. birds), accounting for 6,368 of 14,498 records (34.04%) (Fig. 2). Most (93.62%) of these birds are reported to have been bred in captivity (Fig. 3). For all but two (Actinopterygii and Aves) of the taxa, the United States of America is the top importer. Across all taxa, the USA recorded 4,935 (34.04%) total imports from the country, the highest number.

Birds began to appear in the CITES Philippine export records in 1975, when nine live blue-naped parrots (*T. lucionensis*) were exported to Switzerland. Since then, there have been 6,367 other records of exports from the country, with the bulk (4,262, 66.93%) being for members of the family Psittacidae or the true parrots. Based solely on the number of export records from CITES, Psittacidae is the most traded family among all animals. A very large number of exports (5,456, 93.62%) are supposedly captive-bred, with only 25 being confiscations and 315 having been caught in the wild.

Parrots (Psittacidae) are being poached worldwide (Weston and Memon 2009, Pires 2012). The largest area of trade is the neotropics, where the trade has been occurring for over a thousand years. Parrots may in fact be the taxon of wildlife that has had the longest history of being kept in captivity for purposes other than consumption, with records in Egypt from as far back as 4000 BC indicating this (Mitchell 2009). Worldwide attention was brought to the wild capture of these birds in the 1980s and 1990s when thousands of parrots were being exported to the

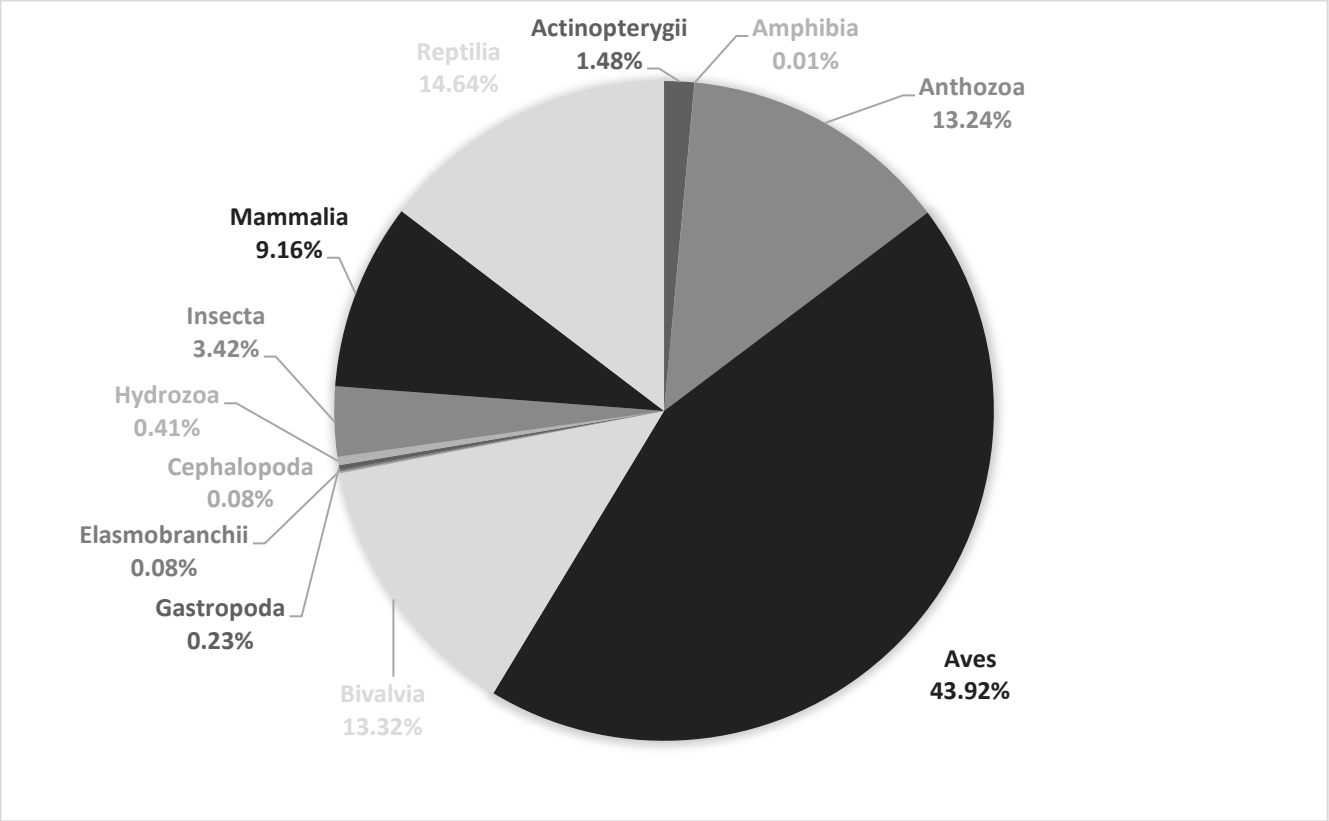


Figure 2: Proportions (i.e. number of records of representatives of these taxa out of 14,498 total records) of the 12 major taxa of animals exported by the Philippines from 1975 to 2018 based on CITES records (http://trade.cites.org).

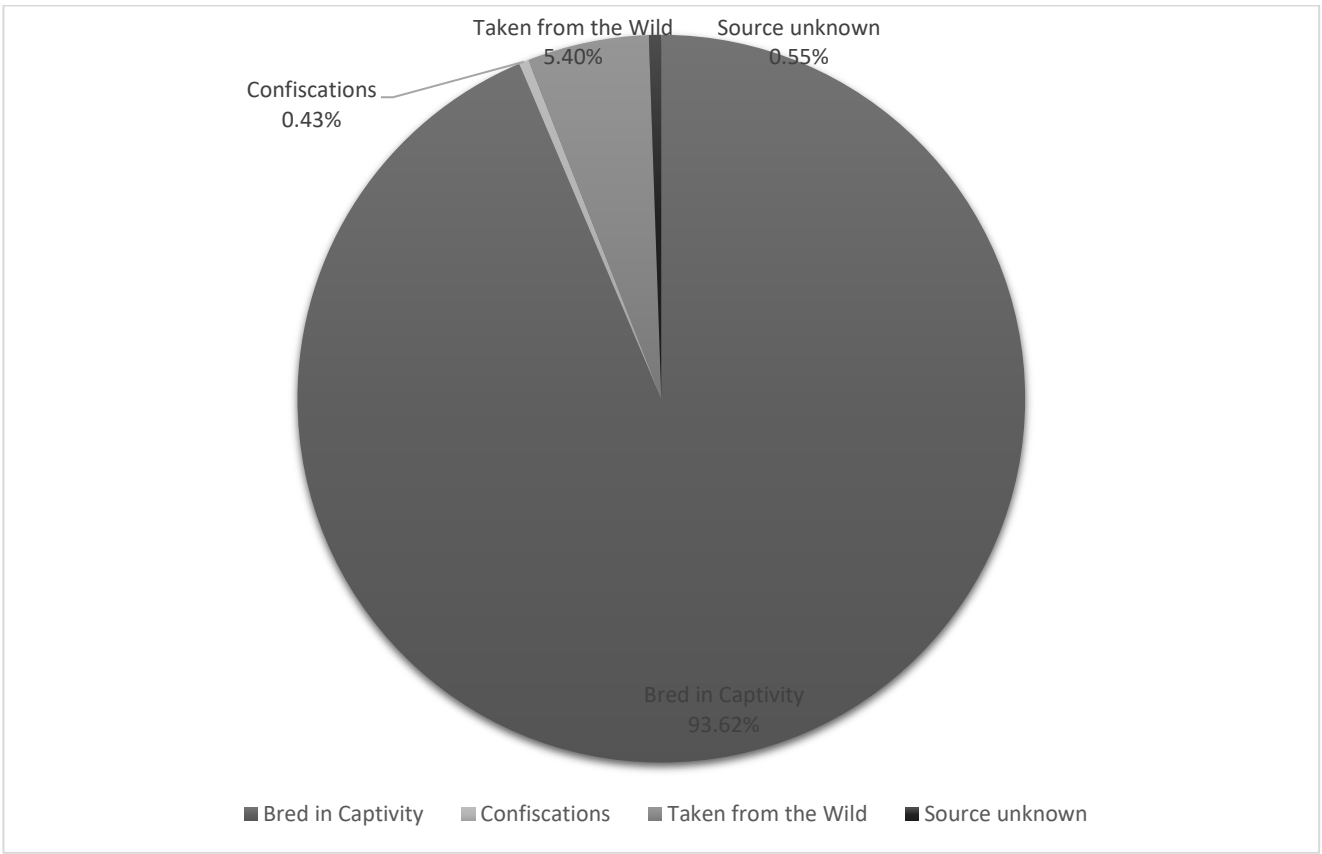


Figure 3: Reported sources of traded birds in the Philippines in the CITES records, covering the period 1975-2018 (http://trade.cites.org).

United States and Europe as an organized business (Pires 2012). Some 36% of the over 300 species of parrots in the world are threatened with extinction to some extent. Based on estimates, the amount of trade worldwide may be 333,000 parrots per year. Certain species have disappeared from their historical ranges. As with seahorses, turtles, and other reptiles in East Asian IWT, the trade in parrots usually consists of a multi-level chain including

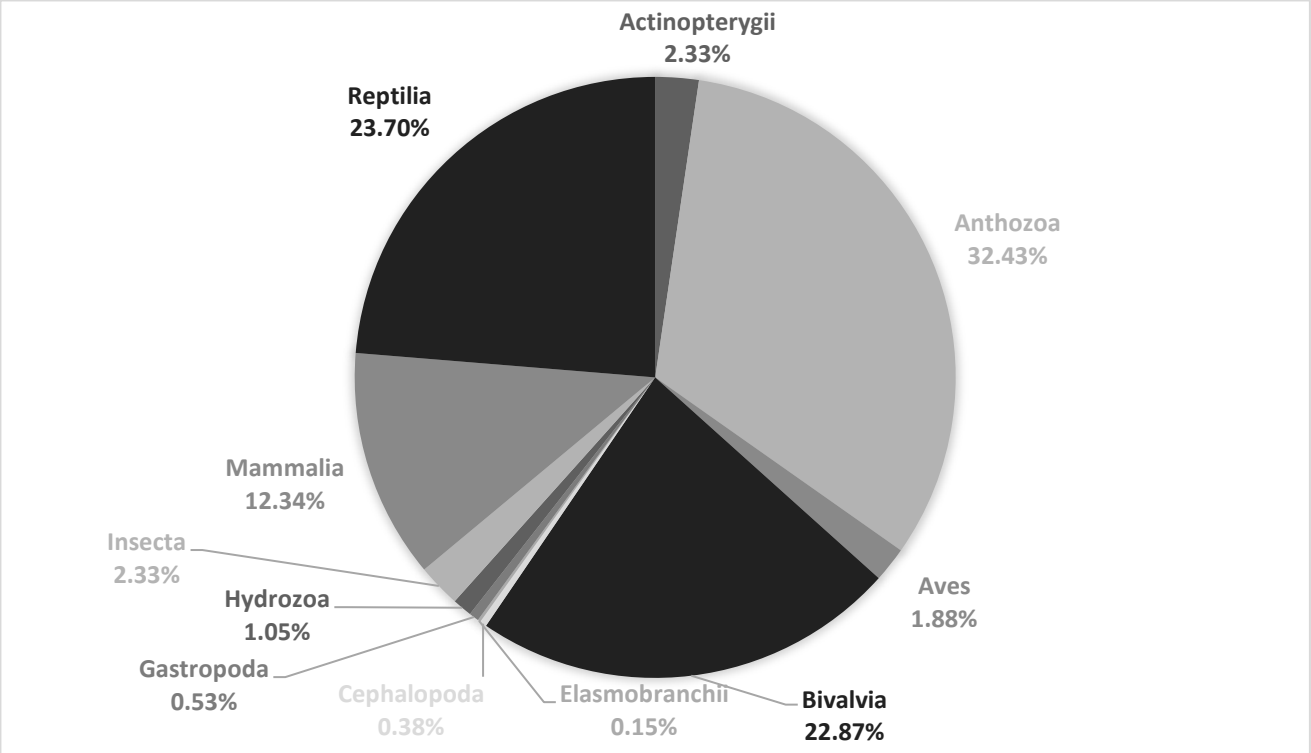


Figure 4: Proportions of confiscation/seizure records among the animal taxa in the Philippines per CITES records covering the period 1975-2018 (http://trade.cites.org).

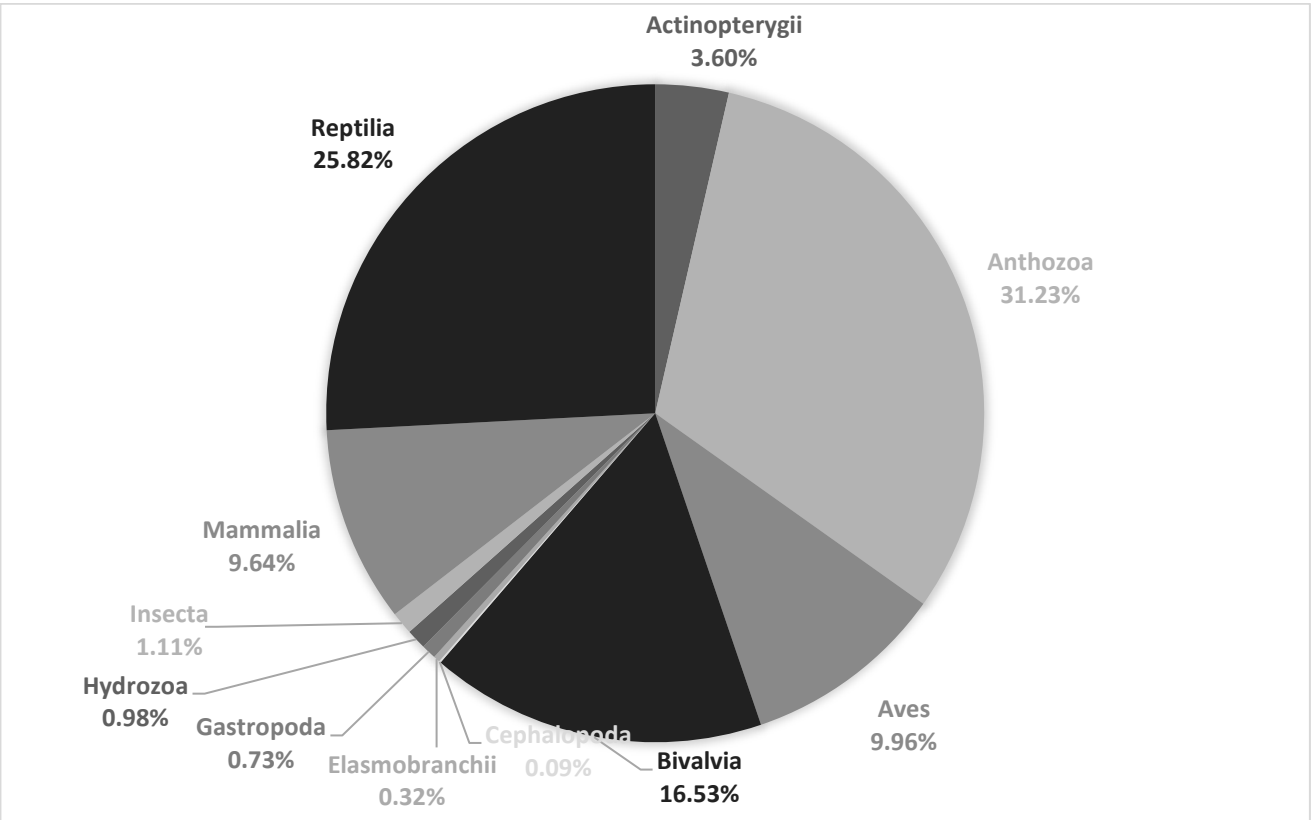


Figure 5: Proportions of records of capture from the wild among the animal taxa in the Philippines per CITES records covering the period 1975-2018 (http://trade.cites.org).

poachers (i.e. peasants, local villagers), middlemen, processing centers, and markets.

Of all records, 1,329 (9.17%) are confiscations or seizures, with the largest number of such occurrences (431) being among anthozoans or true corals followed by reptiles and bivalves (Fig. 4). A total of 3,164 records (21.82%) are reported as specimens taken from the wild. Anthozoans, reptiles, and bivalves are also the most harvested from the wild (Fig. 5). There are 259 records whose source is unknown.

A significant threat to marine wildlife, particularly reef animals, is harvesting for the aquarium trade. Millions of marine organisms are removed from their habitats every year so as to fill aquariums worldwide; the global industry is estimated to now be worth some US$200-330 million annually (Wabnitz et

al. 2003). Much of the harvesting occurs within the "Coral Triangle" (Rhyne et al. 2012), accounting for 85% of trade volume. The Philippines had an early start in aquarium trade, issuing permits for the collection of species destined for the trade in the 1950s, just two decades after the practice began on a very small scale in Sri Lanka (Wabnitz et al. 2003). The biggest markets for the trade are the USA, the European Union, and Japan. The country is recognized as the top exporter of marine aquarium fish and invertebrates to the United States during the period of 2008 to 2011 (Rhyne et al. 2017).

All trades of bivalves in the database involve organisms of the giant clam family Tridacnidae. Aside from being traded as a food item (thus their high frequency under the trade term "meat"), giant clams are also used as ornamentation and their shells utilized as soap dishes, floor tiles, and salad bowls (bin Othman et al. 2010), as well as holy water fonts in churches. Mollusc shell trade has often been classified into four categories: ornamental shells, specimens or rare shells, commercial shells, and shellcrafts or handicrafts (Floren 2003). Trade in molluscs (whole animals and products) has been active since the early Spanish colonial period, particularly in pearls and the snail called siguey, which is a type of cowrie shell that was used as currency in trade with certain partners such as Siam (now Thailand) (Blair and Robertson 1903). In the period from 1901 to 1905, mother of pearl had a total value of US$461,254.00, making it the most valuable export of the Philippines (The Philippine Commission 1905, 1906).

Marine turtle shells were a significant commodity during this period, with trade in these being reported in all decades throughout the Spanish colonial period (Blair and Robertson 1903, DA-BFAR 2004). Today, the primary trade in turtles is due to ornamental purposes, particularly with polished shells and products made from the shell, with a whole turtle shell averaging between US$400.00 and US$600.00 in the market (UNODC 2016). International trade in turtles for food and traditional medicine, particularly in China, Hong Kong, and Taiwan, are a significant threat to Asian turtle populations and may in fact be the greatest (Ades et al. 2000, Gong et al. 2009). The Palawan forest turtle *Siebenrockiella leytensis* (Taylor, 1920), one of the most traded animals from the Philippines, is being primarily threatened by the illegal pet trade (Sy et al. 2020). The World WISE database of the UNODC reports the seizures of some 3,600 turtles and 31,500 of their eggs between 2005 and 2014. Poaching is most problematic in the "Coral Triangle," particularly in the waters of Indonesia, Malaysia, and the Philippines. This is consistent with the confiscation data from DENR-BMB, PCSD, and CITES. The CITES Trade Database has only one record of China being an importer, which strongly suggests that much of the trade in turtles involving China does not involve permits and so is illegal. While *Eretmochelys imbricata* (Linnaeus, 1766) does feature prominently in the CITES database of export records, there is only one mention of *Cuora amboinensis* (Riche in Daudin, 1801). It was given the VU status by the IUCN Red List (ATTWG 2000) and so has not been added to CITES.

The global trade in reptile scales is significant. Per CITES, 24 million individual reptile skins were traded from 2005 to 2013 (UNODC 2016). Millions of reptiles are killed, processed, and manufactured into leather goods every year (Arroyo-Quiroz et al. 2007). Reptile skins that are exported from Southeast Asia are typically sourced from the wild (Arroyo-Quiroz et al. 2007, UNODC 2016). However, the Philippines is not considered a top exporter of such products (UNODC 2016).

Table 2 shows the 10 most exported species regardless of taxa, based on number of records. The three most exported species

Table 2: The 10 most exported animal species in the Philippines from 1975 to 2018 based on number of records in the CITES database (http://trade.cites.org).

Species	Group	Number of Records
Macaca fascicularis (Raffles, 1821)	Mammalia	715
Hippopus hippoppus (Linnaeus, 1758)	Bivalvia	475
Cerberus rynchops (Schneider, 1799)	Reptilia	370
Tridacna squamosa Lamarck, 1819	Bivalvia	363
Malayopython reticulatus (Schneider, 1801)	Reptilia	355
Troides rhadamantus (H. Lucas, 1835)	Insecta	323
Varanus salvator (Laurenti, 1768)	Reptilia	270
Scleractinia spp.	Anthozoa	267
Hippopus porcellanus Rosewater, 1982	Bivalva	260
Ara ararauna (Linnaeus, 1758)	Aves	253

regardless of taxa are: the crab-eating macaque *Macaca fascicularis* (Raffles, 1821) (715 records), the bear paw clam *Hippopus hippopus* (Linnaeus, 1758) (475), and the dog-faced water snake *Cerberus rynchops* (Schneider, 1799) (370).

Figure 6 shows the numbers of species confiscated by government agencies based on records of DENR-BMB and PCSD from the period of 2008 to 2019 across taxa, with emphasis on birds, mammals, and reptiles. These are not counts of unique species confiscations; there are many instances here of certain animal species being seized several times. Also, a few of these individual records are of assorted, unidentified species, usually of shells. This graph shows 927 species confiscated from over 326 operations. The number of operations is not exact because PCSD did not report how many operations were conducted in 2019; the count of 326 covers all operations reported by DENR-BMB and PCSD from 2008 to 2018 and those in the BMB records in 2019. Birds and reptiles each account for 338 (36.46%) of these confiscated species. In 2016, 42 records were of various fishes, accounting for the high number of animals from other taxa. In 2017, 23 were arthropods, particularly various spider species confiscated in one operation in Manila in February.

Out of the 189 operations that were carried out outside of Palawan, 76 (40.21%) were done in the National Capital Region (NCR). Of these, 11 were seizures made in Cartimar Market in Pasay City. A total of 683 individual specimens were collected from these 11 operations. Two hundred ninety nine (43.78%) were birds, followed closely by non-avian reptiles at 295 (43.19%; Fig. 7). Across regions, including Palawan, 22 confiscations were done in airports. Meanwhile, 24 apprehensions were made at ports or in the open sea.

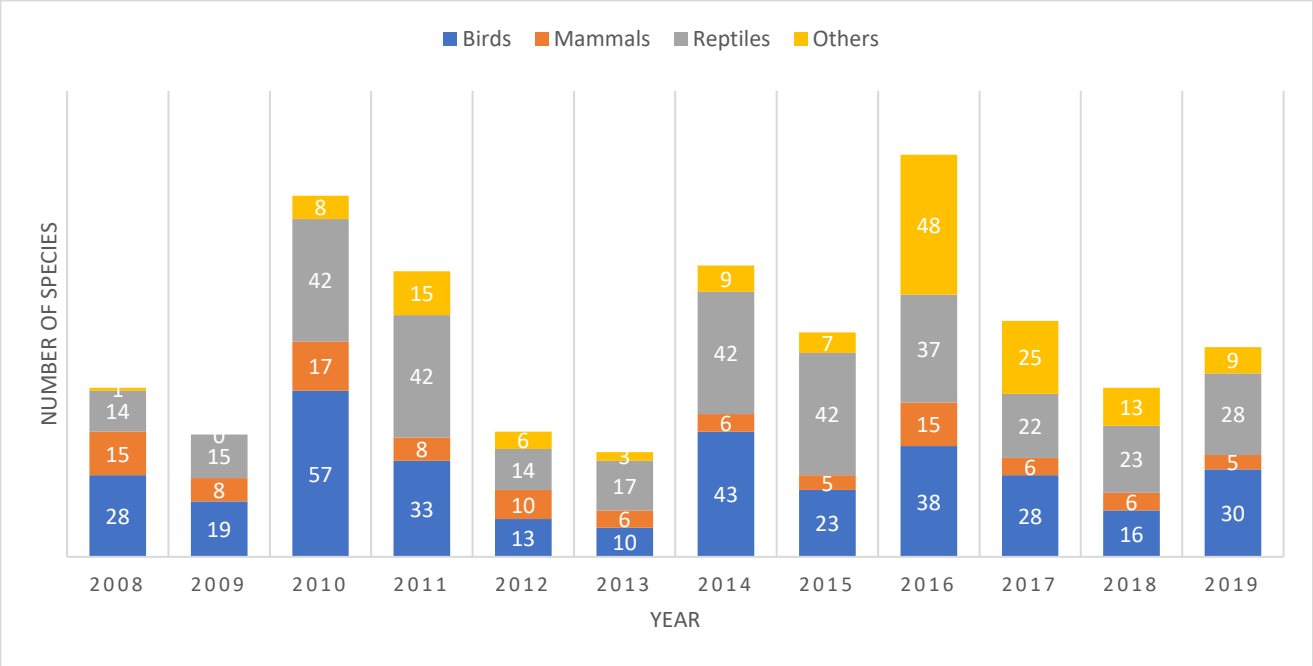


Figure 6: Numbers of species (non-unique; i.e. several species appear repeatedly in confiscation records across the years) confiscated by government agencies based on DENR-BMB and PCSD databases covering the period of 2008 to 2019. These counts do not include confiscation records where the number of species cannot be determined.

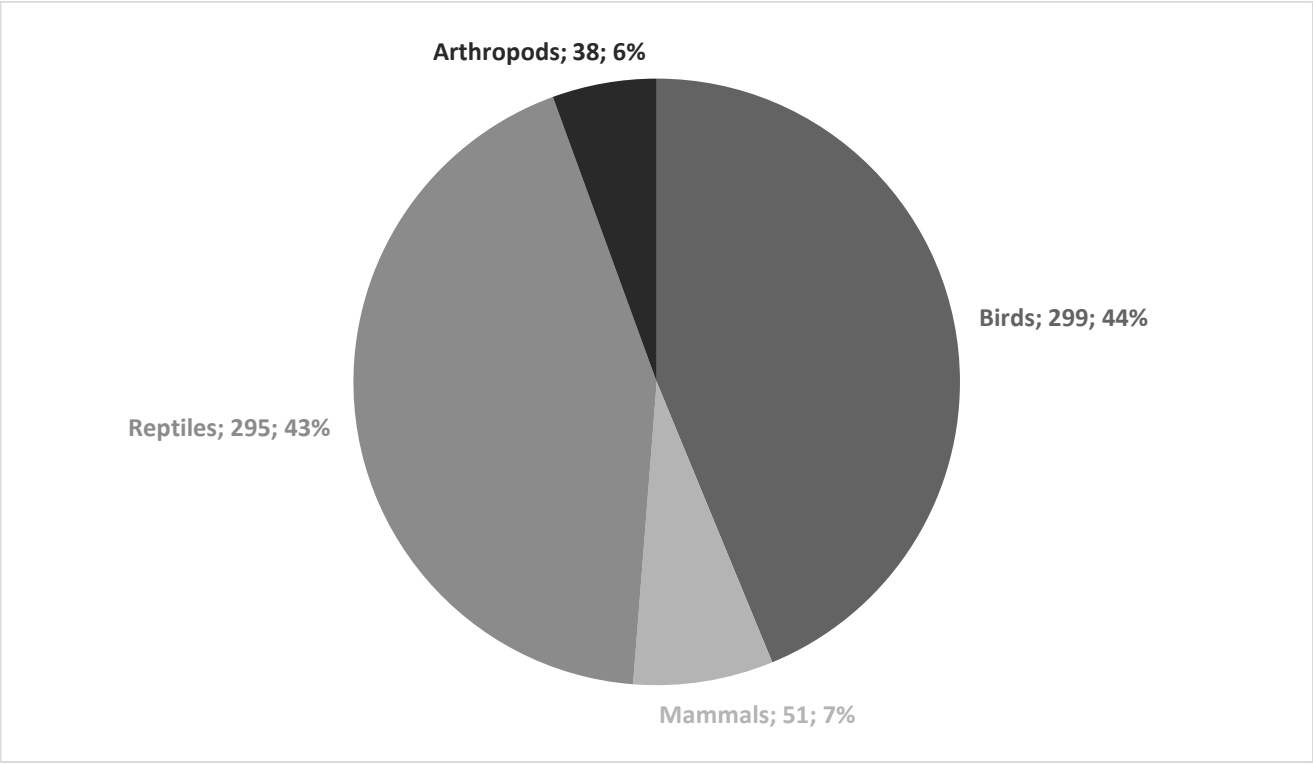


Figure 7: Proportions of animal taxa to which belong the 683 individual animal specimens confiscated in 11 operations in Cartimar Market, Pasay City from 2008 to 2019, based on records of DENR-BMB.

Figure 8 shows all the taxa that were confiscated per the records of CITES, DENR-BMB, and PCSD. One family of Actinopterygii (Sygnathidae), two orders of Anthozoa (Scleractinia and Antipatharia), six families of birds (Accipitridae, Bucerotidae, Cacatuidae, Phasianidae, Psittacidae, Psittaculidae), one family of Bivalvia (Tridactidae), possibly one family of Gastropoda (Strombidae), four families of Mammalia (Cercopithecidae, Felidae, Manidae, Viverridae), and four families of non-avian reptiles (Cheloniidae, Crocodylidae, Geoemydidae, Pythonidae, and Varanidae) are represented in the datasets of all three institutions. Exclusive to PCSD records are many fish species whose trade is regulated under specific policies in Palawan. CITES-exclusive records tend to be re-exports using the Philippines as a transit point; many of these are not normally found in the Philippines. DENR-BMB records exclusively include several groups such as spiders, amphibians, and mammalian and reptilian families that are each represented by one or a few species that are rare confiscations.

Table 3 shows all the species that are listed in the CITES database of 1975-2018 records as captured from the wild. It shows which animals are endemic to the Philippines and what their statuses are in CITES, the IUCN Red List, and the Philippine Red List. Several endemic species are harvested from

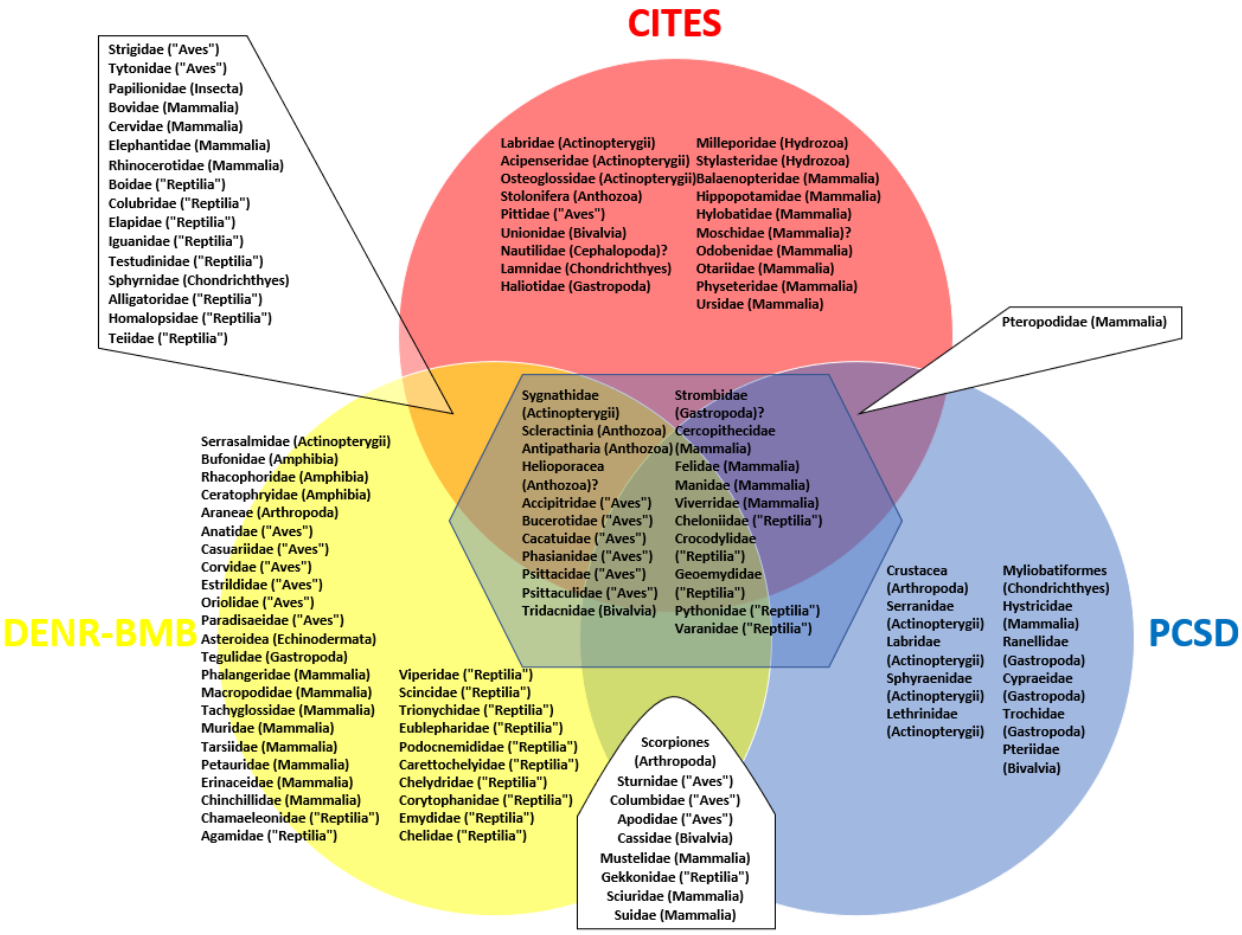


Figure 8: Confiscated species that are unique and shared in the three databases. Those with question marks are possibly found in the other databases but this cannot be confirmed due to lack of clarity on specimen names.

the wild and are recognized to have decreasing populations, and so perhaps require a reassessment of their current status in the Red Lists. These are the Mindanao wrinkled hornbill, Luzon bleeding-heart, Philippine falconet, giant scops owl, Philippine cobra, Luzon hawk-owl, Luzon highland scops owl, Luzon lowland scops owl, Mindoro scops owl, Mindanao highland scops owl, whiskered pitta, blue-headed racket-tail, white-winged flying fox, Philippine tarsier, Mindanao lorikeet, yellow-headed water monitor, and Gray's monitor. The Northern Sierra Madre forest monitor has not been assessed by the IUCN and so there is no information on its population trend. Meanwhile, the Samar cobra, Palawan birdwing, and golden birdwing have entries in the IUCN Red List but there is no data on their population trends.

Of the endemic species, the guaiabero, Philippine falconet, Luzon hawk-owl, Luzon lowland scops owl, Mindanao highland scops owl, Palawan birdwing, golden birdwing, Mindanao treeshrew, and Palawan treeshrew are not even included in the Philippine Red List (Gonzalez et al. 2018, BCSP 2020). Considering endemicity and history of confiscation from CITES, DENR-BMB, and PCSD, particularly problematic are the guaiabero (in CITES and DENR-BMB; status Least Concern), Palawan pangolin (in CITES, DENR-BMB, and PCSD; status Endangered), and Philippine cobra (in CITES and DENR-BMB; status Other Threatened Species). At Critically Endangered status, the IUCN places the Palawan pangolin at a higher threat category than the Philippine Red List.

CITES trade data may reflect economic and conservation effort trends. For example, there is a considerable drop in the number of exports of fish from 20 export permits in 2004 to only four in 2005. This likely corresponds with the legislation of national ban on seahorse trade in May 2004 following the inclusion of seahorses in Appendix II of CITES (Vincent et al. 2011, Yasue et al. 2015). Republic Act No. 8550, or the Philippine Fisheries Code of 1998 affords full protection (i.e. collection bans) on all species listed in Appendices I and II of CITES (DA-BFAR 2004). As Table 5 shows, Germany is the biggest importer of seahorses from the Philippines, accounting for 23.36% of all records. The Bureau of Fisheries and Aquatic Resources (BFAR) reported a 7.8-percent decrease in export volume of fish from 2004 to 2005 despite a 6.0-percent increase in total fish production (DA-BFAR 2006), so there may be other underlying factors like market forces influencing this trend, though it must be noted that 95.79% of the CITES records on fish exports are on seahorses. Of course, the possibility of the population having been overfished over this two-year period cannot be dismissed, as wild seahorse populations have been historically overfished in the country based on reported historical declines in catch-per-unit-effort (CPUE) leading to decreased and the high proportion of juveniles taken (Martin-Smith et al. 2004).

CITES data depend on trading permits that are processed by the involved countries. According to this source, the most traded taxa are birds, reptiles, and bivalves. This is consistent with confiscation data from DENR-BMB, except that mammals are among the most illegally traded. One of the distinct advantages

Table 3: Species identified by CITES as having been captured from the wild, with their statuses in CITES (http://trade.cites.org), the IUCN Red List (https://www.iucnredlist.org), and the Philippine Red List (Gonzalez et al. 2018, BCSP 2020). Names in bold are of those endemic to the Philippines. ↓ - population decreasing per IUCN records; ↔ - population stable per IUCN records; ? – population trend uncertain per IUCN records; † - appeared in confiscation records of CITES (†^{C}), DENR-BMB (†^{D}), or PCSD (†^{P}) (those with †$^{?}$ are uncertain, given that the confiscation records do not provide the complete common name or species epithet); * - these are global IUCN Red List statuses (some subspecies or populations have more threatened statuses). LC – Least Concern; VU – Vulnerable; NT – Near Threatened; EN – Endangered; CR – Critically Endangered; DD – Data Deficient; OTS – Other Threatened Species.

Species	Nomenclature Authority	Common Name	IUCN Red List	Philippine Red List	CITES Appendix
VERTEBRATES					
Accipiter gularis	(Temminck & Schlegel, 1844)	Japanese sparrowhawk	LC	--	II
Accipiter soloensis	(Horsfield, 1821)	Chinese sparrowhawk	LC	--	II
Accipiter trivirgatus	(Temminck, 1824)	crested goshawk	LC	--	II
Accipiter virgatus	(Temminck, 1822)	besra sparrowhawk	LC	--	II
Acerodon jubatus ↓ †^{D}	(Eschscholtz, 1831)	giant golden-crowned flying fox	EN	CR	I
Aceros corrugatus	(Temminck, 1832)	wrinkled hornbill	EN	--	II
Aceros leucocephalus ↓	(Vieillot, 1816)	Mindanao wrinkled hornbill	VU	VU	II
Aceros waldeni ↓	(Sharpe, 1877)	Visayan wrinkled hornbill	CR	CR	II
Acrochordus granulatus	(Schneider, 1799)	wart snake	LC	--	N
Agapornis personatus	Reichenow, 1887	yellow-collared lovebird	LC	--	II
Anorrhinus galeritus	(Temminck, 1831)	bushy-crested hornbill	NT	--	II
Anorrhinus tickelli	(Blyth, 1855)	Tickell's brown hornbill	NT	--	II
Anthracoceros malayanus	(Raffles, 1822)	black hornbill	VU	--	II
Anthracoceros marchei †^{DP}	Oustalet, 1885	Palawan hornbill	VU	VU	II
Anthracoceros montani	(Oustalet, 1880)	Sulu hornbill	CR	CR	II
Axis calamianensis ↓ †^{C}	(Heude, 1888)	Calamian deer	EN	EN	I
Balaenoptera edeni	(Anderson, 1879)	Bryde's whale	LC*	--	I
Balaenoptera physalus	(Linnaeus, 1758)	fin whale	VU*	--	I
Berenicornis comatus	(Raffles, 1822)	White-crowned hornbill	EN	--	II
Bolbopsittacus lunulatus ↔ †^{CD}	(Scopoli, 1786)	guaiabero	LC	--	II
Bothrochylus albertisii	(W. C. H. Peters and Doria, 1878)	northern white-lipped python	LC	--	II
Bubalus bubalis arnee †^{C}	(Kerr, 1792)	Indian water buffalo	EN	--	III
Bubo philippensis ↓ †^{D}	(Kaup, 1851)	Philippine eagle-owl	VU	EN	II
Bubulcus ibis	(Linnaeus, 1758)	western cattle egret	LC	--	III
Buceros hydrocorax ↓ †^{D}	(Linnaeus, 1766)	northern rufous hornbill	VU	EN	II
Butastur indicus	(Gmelin, 1788)	grey-faced buzzard	LC	--	II
Cacatua haematuropygia ↓ †^{DP}	(Statius Muller, 1776)	red-vented cockatoo	CR	CR	I
Carcharodon carcharias †^{C}	(Linnaeus, 1758)	great white shark	VU*	--	II
Caretta caretta †$^{?}$	(Linnaeus, 1758)	loggerhead sea turtle	VU*	EN	I
Carlito syrichta syrichta ↓ †^{D}	(Linnaeus, 1758)	Philippine tarsier	NT	OTS	II
Cerberus rynchops †^{CD}	(Schneider, 1799)	dog-faced water snake	LC	--	II
Cheilinus undulatus †^{CP}	(Rüppell, 1835)	humphead wrasse/tapiro	EN	--	II

Chelonia mydas †[CDP]	(Linnaeus, 1758)	green sea turtle	EN	EN	I
Cordylus ukingensis	(Loveridge, 1932)	Ukinga girdled lizard	DD	--	II
Crocodylus mindorensis ↓ †[CD]	(Schmidt, 1935)	Philippine crocodile	CR	CR	I
Crocodylus siamensis †[C]	(Schneider, 1801)	Siamese crocodile	CR	--	I
Cuora amboinensis †[DP]	(Riche in Daudin, 1801)	southeast Asian box turtle	VU	OTS	II
Dermochelys coriacea †[D]	(Vandelli, 1761)	leatherback sea turtle	VU*	CR	I
Dryocopus javensis	(Horsfield, 1821)	white-bellied woodpecker	LC	--	I
Dugong dugon	(Müller, 1776)	dugong	VU*	CR	I
Eclectus roratus †[?]	(Statius Muller, 1776)	Moluccan eclectus parrot	LC	--	II
Egretta garzetta	(Linnaeus, 1766)	little egret	LC	--	III
Eos squamata †[D]	(Boddaert, 1783)	violet-necked lory	LC	--	II
Eretmochelys imbricata †[CDP]	(Linnaeus, 1766)	hawksbill sea turtle	CR	CR	I
Eunectes notaeus	(Cope, 1862)	yellow anaconda	--	--	II
Falco severus	(Horsfield, 1821)	Oriental hobby	LC	--	II
Feresa attenuata	Gray, 1874	pygmy killer whale	LC	--	II
Gallicolumba luzonica ↓ †[D]	(Scopoli, 1786)	Luzon bleeding-heart	NT	VU	II
Globicephala macrorhynchus	Gray, 1846	short-finned pilot whale	LC	--	II
Goura victoria †[D]	(Fraser, 1844)	Victoria crowned pigeon	NT	--	II
Gracula religiosa †[DP]	Linnaeus, 1758	common hill myna	LC**	VU	II
Grampus griseus	(G. Cuvier, 1812)	Risso's dolphin	LC	--	II
Haliastur indus †[D]	(Boddaert, 1783)	brahminy kite	LC	--	II
Hippocampus angustus †[?]	Günther, 1870	narrow-bellied seahorse	LC	--	N
Hippocampus bargibanti †[?]	Whitley, 1970	Bargibant's seahorse	DD	--	II
Hippocampus capensis †[?]	Boulenger, 1900	Knysna seahorse	EN	--	N
Hippocampus comes †[?]	Cantor, 1849	tiger tail seahorse	VU	--	N
Hippocampus coronatus †[?]	Temminck and Schlegel, 1850	high-crowned seahorse	DD	--	N
Hippocampus erectus †[?]	Perry, 1810	lined seahorse	VU	--	N
Hippocampus guttulatus †[?]	Cuvier, 1829	long-snouted seahorse	DD*	--	N
Hippocampus hippocampus †[C]	(Linnaeus, 1758)	short-snouted seahorse	DD*	--	II
Hippocampus histrix †[C]	Kaup, 1856	spiny seahorse	VU	--	II
Hippocampus kuda †[C]	Bleeker, 1852	spotted seahorse	VU	--	II
Hippocampus mohnikei †[?]	Bleeker, 1853	Japanese seahorse	VU	--	N
Hippocampus spinosissimus †[?]	Weber, 1913	hedgehog seahorse	VU	--	II
Hippocampus trimaculatus †[?]	Leach in Leach and Nodder, 1814	flat-faced seahorse	VU	--	N
Hippocampus zebra †[?]	Whitley, 1964	zebra seahorse	DD	--	N
Homalopsis buccata †[?]	(Linnaeus, 1758)	Linne's water snake	LC	--	N

Hydrophis spiralis	(Shaw, 1802)	yellow sea snake	LC	--	N
Kogia breviceps	(Blainville, 1838)	pygmy sperm whale	DD	--	II
Kogia sima	(Owen, 1866)	dwarf sperm whale	DD	--	II
Lagenodelphis hosei	Fraser, 1956	Fraser's dolphin	LC	--	II
Lepidochelys olivacea †[CD]	(Eschscholtz, 1829)	olive ridley sea turtle	VU	EN	I
Liasis mackloti	A. M. C. Duméril and Bibron, 1844	Macklot's python	--	--	II
Loriculus philippensis ↓ †[D]	(Statius Muller, 1776)	Philippine hanging parrot	LC	CR	II
Lorius garrulus †[D]	(Linnaeus, 1758)	chattering lory	VU	--	II
Macaca fascicularis †[CD]	(Raffles, 1821)	crab-eating macaque	LC**	--	II
Manis culionensis ↓ †[CDP]	(de Elera, 1915)	Philippine pangolin	CR	EN	II
Manta birostris	(Walbaum, 1792)	giant oceanic manta ray	VU	--	II
Megaptera novaeangliae	(Borowski, 1781)	humpback whale	LC*	--	I
Megascops ingens	(Salvin, 1897)	rufescent screech owl	LC	--	II
Microhierax erythrogenys ↓	(Vigors, 1831)	Philippine falconet	LC	--	II
Naja naja †	(Linnaeus, 1758)	Indian cobra	--	--	II
Naja philippinensis ↓ †[CD]	Taylor, 1922	Philippine cobra	NT	OTS	II
Naja samarensis ?	W. C. H. Peters, 1861	Samar cobra	LC	OTS	II
Ninox philippensis ↓ †[C]	Bonaparte, 1855	Luzon hawk-owl	LC	--	II
Ninox scutulata	(Raffles, 1822)	brown hawk-owl	LC	--	II
Ophiophagus hannah	(Cantor, 1836)	king cobra	VU	OTS	II
Orcaella brevirostris	(Owen in Gray, 1866)	Irrawaddy dolphin	EN*	--	I
Otus bakkamoena †[?]	Pennant, 1769	Indian scops owl	LC	--	II
Otus elegans †[?]	(Cassin, 1852)	Ryukyu scops owl	NT	OTS	II
Otus fuliginosus ↓ †[?]	(Sharpe, 1888)	Palawan scops owl	NT	EN	II
Otus gurneyi ↓ †[D]	(Tweeddale, 1879)	giant scops owl	VU	VU	I
Otus longicornis ↓ †[?]	(Ogilvie-Grant, 1894)	Luzon highland scops owl	NT	VU	II
Otus mantananensis †[?]	(Sharpe, 1892)	Mantanani scops owl	NT	VU	II
Otus megalotis ↓ †[C]	(Walden, 1875)	Luzon lowland scops owl	LC	--	II
Otus mindorensis ↓ †[?]	(J. Whitehead, 1899)	Mindoro scops owl	NT	VU	II
Otus mirus ↓ †[?]	Ripley & Rabor, 1968	Mindanao highland scops owl	NT	--	II
Otus scops †[?]	(Linnaeus, 1758)	Eurasian scops owl	LC	--	II
Paleosuchus trigonatus	(Schneider, 1801)	Schneider's smooth-fronted caiman	LC	--	II
Paradoxurus hermaphroditus †[CD]	(Pallas, 1777)	Asian palm civet	LC	--	II
Penelopides panini ↓ †[?]	(Boddaert, 1783)	Visayan hornbill	EN	CR	II
Peponocephala electra	(Gray, 1846)	melon-headed whale	LC	--	II
Pernis ptilorhynchus	(Temminck, 1821)	Oriental honey buzzard	LC	--	II
Physeter macrocephalus †[C]	Linnaeus, 1758	sperm whale	VU*	--	I

Pithecophaga jefferyi ↓	Ogilvie-Grant, 1896	Philippine eagle	CR	CR	I
Pitta kochi ↓ †[C]	Bruggemann, 1876	whiskered pitta	NT	VU	I
Polyplectron napoleonis ↓ †[C]	(Lesson, 1831)	Palawan peacock-pheasant	VU	EN	I
Prionailurus bengalensis †[CDP]	(Kerr, 1792)	leopard cat	LC	VU	II
Prioniturus discurus ↔ †[D]	(Vieillot, 1822)	blue-crowned racket-tail	LC	OTS	II
Prioniturus luconensis ↓	Steere, 1890	green racket-tail	EN	CR	II
Prioniturus montanus ↓	Ogilvie-Grant, 1895	montane racket-tail	NT	EN	II
Prioniturus platenae ↓ †[D]	W. Blasius, 1888	blue-headed racket-tail	VU	VU	II
Probosciger aterrimus †[CD]	(Gmelin, 1788)	palm cockatoo	LC	--	I
Pseudorca crassidens	(Owen, 1846)	false killer whale	NT	--	II
Pteropus dasymallus †[?]	Temminck, 1825	Ryukyu flying fox	VU	VU	II
Pteropus hypomelanus †[C]	Temminck, 1853	small flying fox	LC	--	II
Pteropus leucopterus ↓ †[C]	Temminck, 1853	white-winged flying fox	LC	VU	II
Pteropus pumilus †[?]	Miller, 1910	little golden-mantled flying fox	NT	--	II
Pteropus speciosus †[?]	K. Andersen, 1908	Philippine gray flying fox	DD	VU	II
Pteropus vampyrus †[C]	(Linnaeus, 1758)	large flying fox	NT	EN	II
Ptyas mucosa †[C]	(Linnaeus, 1758)	Oriental ratsnake	--	--	II
Python bivittatus †[CD]	Kuhl, 1820	Burmese python	VU	--	II
Python brongersmai †[?]	Stull, 1938	Brongersma's short-tailed python	LC	--	II
Python curtus †[?]	Schlegel, 1872	Sumatran short-tailed python	LC	--	II
Python reticulatus †[CDP]	(Schneider, 1801)	reticulated python	LC	OTS	II
Rhincodon typus	Smith, 1828	whale shark	EN	--	II
Rhinoplax vigil	(J. R. Forster, 1781)	helmeted hornbill	CR	--	I
Rhizotrochus typus	Milne-Edwards and Haime, 1848		--	--	II
Rhyticeros undulatus	(Shaw, 1811)	wreathed hornbill	VU	--	II
Sarcogyps calvus	(Scopoli, 1786)	red-headed vulture	CR	--	II
Siebenrockiella leytensis ↔ †[DP]	(Taylor, 1920)	Palawan forest turtle	CR	CR	II
Simalia amethistina	(Schneider, 1801)	amethystine python	LC	--	II
Spilornis cheela †[CP]	(Latham, 1790)	crested serpent eagle	LC	--	II
Stenella attenuata	(Gray,)1846	pantropical spotted dolphin	LC	--	II
Stenella longirostris	(Gray, 1828)	spinner dolphin	LC**	--	II
Steno bredanensis	(G. Cuvier in Lesson, 1828)	rough-tooted dolphin	LC	--	II
Sternoclyta cyanopectus	(Gould, 1846)	violet-chested hummingbird	LC	--	II
Strix seloputo	Horsfield, 1821	spotted wood-owl	LC	--	II
Tanygnathus lucionensis ↓ †[DP]	(Linnaeus, 1766)	blue-naped parrot	NT	CR	II
Tanygnathus megalorynchos	(Boddaert, 1783)	great-billed parrot	LC	--	II

Tanygnathus sumatranus	(Raffles, 1822)	blue-backed parrot	LC	CR	II
Trichoglossus haematodus †[D]	(Linnaeus, 1771)	coconut lorikeet	LC	--	II
Trichoglossus johnstoniae ↓	Hartert, 1903	Mindanao lorikeet	NT	VU	II
Tupaia everetti ↔	Thomas, 1892	Mindanao treeshrew	LC	--	II
Tupaia palawanensis ↔	Thomas, 1894	Palawan treeshrew	LC	--	II
Tursiops aduncus	(Ehrenberg, 1833)	Indo-Pacific bottlenose dolphin	NT	--	II
Tursiops truncatus	(Montagu,1821)	common bottlenose dolphin	LC	--	II
Tyto capensis †[C]	(A. Smith 1834)	African grass owl	LC	--	II
Varanus bitatawa ? †[?]	Welton, Siler, Bennett, Diesmos, Duya, Dugay, Rico, Van Weerd, & Brown, 2010	Northern Sierra Madre forest monitor	--	VU	II
Varanus cumingi ↓ †[?D]	Martin, 1839	yellow-headed water monitor	LC	OTS	II
Varanus dalubhasa †[?]	Welton, Travers, Siler & Brown, 2014	monitor lizard	--	OTS	II
Varanus dumerilii †[?]	(Schlegel, 1839)	Dumeril's monitor	--	--	II
Varanus indicus †[C]	(Daudin, 1802)	mangrove monitor	LC	--	II
Varanus mabitang ↓ †[?]	Gaulke and Curio, 2001	Panay monitor	EN	CR	II
Varanus marmoratus ↔ †[C]	(Wiegmann, 1934)	marbled water monitor	LC	OTS	II
Varanus olivaceus ↓ †[?D]	Hallowell, 1856	Gray's monitor	VU	VU	II
Varanus rudicollis †[?]	(Gray, 1845)	black roughneck monitor lizard	--	--	II
Varanus salvadorii †[?]	(Peters and Doria, 1878)	crocodile monitor	LC	--	II
Varanus salvator †[C]	(Laurenti, 1768)	common water monitor	LC	--	I
Ziphius cavirostris	G. Cuvier, 1823	Cuvier's beaked whale	LC	--	II
INVERTEBRATES					
Acropora abrolhosensis †[?]	Veron, 1985	stony coral	VU	--	II
Acropora aculeus †[?]	(Dana, 1846)	stony coral	VU	--	II
Acropora awi †[?]	Wallace and Wolstenholme, 1998	stony coral	VU	--	II
Acropora batunai †[?]	Wallace, 1997	stony coral	VU	--	II
Acropora cerealis †[?]	(Dana, 1846)	stony coral	LC	--	II
Acropora cervicornis †[?]	(Lamarck, 1816)	staghorn coral	CR	--	II
Acropora clathrata †[?]	(Brook, 1891)	stony coral	LC	--	II
Acropora cuneata †[?]	(Dana, 1846)	stony coral	VU	--	II
Acropora cytherea †[?]	(Dana, 1846)	stony coral	LC	--	II
Acropora danai †[?]	(Milne-Edwards and Haime, 1860)	stony coral	LC	--	II
Acropora echinata †[?]	(Dana, 1846)	stony coral	VU	--	II
Acropora florida †[?]	(Dana, 1846)	stony coral	NT	--	II
Acropora granulosa †[?]	(Milne-Edwards and Haime, 1860)	stony coral	NT	--	II
Acropora humilis †[?]	(Dana, 1846)	stony coral	NT	--	II

Acropora hyacinthus †[?]	(Dana, 1846)	stony coral	NT	--	II
Acropora indonesia †[?]	Wallace, 1997	stony coral	VU	--	II
Acropora latistella †[C]	(Brook, 1892)	stony coral	LC	--	II
Acropora loripes †[?]	(Brook, 1892)	stony coral	NT	--	II
Acropora microphthalma †[?]	(Verrill, 1869)	stony coral	LC	--	II
Acropora millepora †[?]	(Ehrenberg, 1834)	stony coral	NT	--	II
Acropora nana †[?]	(Studer, 1878)	stony coral	NT	--	II
Acropora nasuta †[?]	(Dana, 1846)	stony coral	NT	--	II
Acropora nobilis †[?]	(Dana, 1846)	stony coral	LC	--	II
Acropora palifera †[?]	(Lamarck, 1816)	stony coral	--	--	II
Acropora palmerae †[?]	Wells, 1954	stony coral	VU	--	II
Acropora pulchra †[?]	(Brook, 1891)	staghorn coral	LC	--	II
Acropora retusa †[?]	(Dana, 1846)	stony coral	VU	--	II
Acropora robusta †[?]	(Dana, 1846)	stony coral	LC	--	II
Acropora rosaria †[?]	(Dana, 1846)	stony coral	DD	--	II
Acropora russelli †[?]	Wallace, 1994	stony coral	VU	--	II
Acropora sarmentosa †[?]	(Brook, 1892)	stony coral	LC	--	II
Acropora secale †[?]	(Studer, 1878)	stony coral	NT	--	II
Acropora simplex †[?]	Wallace and Wolstenholme, 1998	stony coral	VU	--	II
Acropora speciosa †[?]	(Quelch, 1886)	stony coral	VU	--	II
Acropora squarrosa †[?]	(Ehrenberg, 1834)	stony coral	LC	--	II
Acropora tenuis †[?]	(Dana, 1846)	stony coral	NT	--	II
Acropora valida †[?]	(Dana, 1846)	stony coral	LC	--	II
Acropora variabilis †[?]	(Klunzinger, 1979)	stony coral	DD	--	II
Acropora vaughani †[?]	Wells, 1954	stony coral	VU	--	II
Acropora willisae †[?]	Veron and Wallace, 1984	stony coral	VU	--	II
Acropora yongei †[?]	Veron and Wallace, 1984	stony coral	LC	--	II
Agaricia agaricites †[?]	(Linnaeus, 1758)	lettuce coral	LC	--	II
Antipathes ceylonensis †[?DP]	(Thomson and Simpson, 1905)	black coral	--	--	II
Barabattoia amicorum †[?]	(Milne-Edwards and Haime, 1849)	stony coral	LC	--	II
Caryophyllia spinicarens †[?]	(Moseley, 1881)	coral	--	--	II
Coeloseris mayeri †[?]	Vaughan, 1918	coral	LC	--	II
Coscinaraea columna †[?]	(Dana, 1846)	coral	LC	--	II
Coscinaraea exesa †[?]	(Dana, 1846)	coral	LC	--	II
Ctenactis echinata †[?]	(Pallas, 1766)	solitary disc coral	LC	--	II
Cupressopathes abies †[C]	(Linnaeus, 1758)	gorgonian	--	--	II

Cynarina lacrymalis †?	(Milne-Edwards and Haime, 1848)	stony coral	NT	--	II
Cyphastrea japonica †?	Yabe and Sugiyama, 1932	stony coral	LC	--	II
Echinopora gemmacea †?	(Lamarck, 1816)	stony coral	LC	--	II
Euphyllia cristata †?	(Chevalier, 1971)	grape coral	VU	--	II
Euphyllia glabrescens †?	(Chamisso and Eysenhardt, 1821)	stony coral	NT	--	II
Favia rotundata †?	(Veron, Pichon, and Wijsman-Best, 1977)	coral	NT	--	II
Favites stylifera †?	Yabe and Sugiyama, 1937	coral	NT	--	II
Fungia distorta †?	Michelin, 1842	disc coral	LC	--	II
Fungia fungites †?	(Linnaeus, 1758)	coral	NT	--	II
Fungia horrida †?	Dana, 1846	coral	LC	--	II
Fungia paumotensis †?	Stutchbury, 1833	coral	LC	--	II
Fungia repanda †?	Dana, 1846	coral	LC	--	II
Gardineroseris planulata †?	(Dana, 1846)	coral	LC	--	II
Goniastrea pectinata †?	(Ehrenberg, 1834)	stony coral	LC	--	II
Goniastrea retiformis †?	(Lamarck, 1816)	stony coral	LC	--	II
Goniopora stokesi †?	Milne-Edwards and Haime, 1851	stony coral	NT	--	II
Haliotis midae †C	Linnaeus, 1758	South African abalone	--	--	III
Halomitra pileus †?	(Linnaeus, 1758)	coral	LC	--	II
Heliofungia actiniformis †?	(Quoy and Gaimard, 1833)	mushroom coral	VU	--	II
Heliopora coerulea †C	(Pallas, 1766)	blue coral	VU	--	II
Herpolitha limax †?	(Esper, 1797)	mushroom coral	LC	--	II
Heteropsammia cochlea	(Spengler, 1781)	walking dendro	LC	--	II
Hippopus hippopus †C	(Linnaeus, 1758)	bear paw clam	CD	--	II
Hippopus porcellanus †CD	Rosewater, 1982	china clam	CD	--	II
Hydnophora exesa †?	(Pallas, 1766)	horn coral	NT	--	II
Hydnophora microconos †?	(Lamarck, 1816)	horn coral	NT	--	II
Leptoria phrygia †?	(Ellis and Solander, 1786)	coral	NT	--	II
Leptoseris yabei †?	(Pillai and Scheer, 1976)	coral	VU	--	II
Lobophyllia corymbosa †?	(Forskål, 1775)	brain root coral	LC	--	II
Lobophyllia robusta †?	Yabe, Sugiyama and Eguchi, 1936	coral	LC	--	II
Madracis asanoi †?	Yabe and Sugiyama, 1936	coral	DD	--	II
Merulina ampliata †?	(Ellis and Solander, 1786)	stony coral	LC	--	II
Millepora dichotoma †?	(Forskål, 1775)	net fire coral	LC	--	II
Millepora exaesa †?	(Forskål, 1775)	fire coral	LC	--	II
Millepora platyphylla †?	Hemprich and Ehrenberg, 1834	plate fire coral	LC	--	II
Millepora squarrosa †?	Lamarck, 1816	fire coral	LC	--	II
Montastraea colemani †?	Veron, 2000	coral	NT	--	II

Montastraea multipunctata †?	Hodgson, 1985	coral	VU	--	II
Montastreaa valenciennesi †?	(Milne-Edwards and Haime, 1848)	coral	NT	--	II
Montipora aequituberculata †?	Bernard, 1897	stony coral	LC	--	II
Montipora digitata †?	(Dana, 1846)	stony coral	LC	--	II
Montipora setosa †?	Nemenzo, 1976	stony coral	EN	--	II
Montipora tuberculosa †?	(Lamarck, 1816)	stony coral		--	II
Montipora venosa †?	(Ehrenberg, 1834)	stony coral	NT	--	II
Nautilus pompilius †C	Linnaeus, 1758	chambered nautilus	--	--	II
Ornithoptera priamus	(Linnaeus, 1758)	common green birdwing	LC	--	II
Oulastrea crispata †?	(Lamarck, 1816)	zebra coral	LC	--	II
Oulophyllia bennettae †?	(Veron, Pichon and Best, 1977)	stony coral	NT	--	II
Pachyseris rugosa †?	(Lamarck, 1801)	coral	VU	--	II
Pachyseris speciosa †?	(Dana, 1846)	coral	LC	--	II
Paramontastraea salebrosa †?	(Nemenzo, 1959)	coral	VU	--	II
Pavona cactus †?	(Forskål, 1775)	cactus coral	VU	--	II
Pavona clavus †?	(Dana, 1846)	coral	LC	--	II
Pavona explanulata †?	(Lamarck, 1816)	coral	LC	--	II
Pavona minuta †?	Wells, 1954	coral	NT	--	II
Pavona varians †?	Verrill, 1864	coral	LC	--	II
Pavona venosa †?	(Ehrenberg, 1834)	coral	VU	--	II
Pectinia lactuca †?	(Pallas, 1766)	coral	VU	--	II
Platygyra pini †?	Chevalier, 1975	stony coral	LC	--	II
Pocillopora damicornis †?	(Linnaeus, 1758)	cauliflower coral	LC	--	II
Pocillopora danae †?	Verill, 1864	cauliflower coral	VU	--	II
Pocillopora eydouxi †?	Milne-Edwards and Haime, 1860	stony coral	NT	--	II
Pocillopora verrucosa †C	(Ellis and Solander, 1786)	rasp coral	LC	--	II
Porites cylindrica †?	Dana, 1846	hump coral	NT	--	II
Porites lobata †?	Dana, 1846	lobe coral	NT	--	II
Porites rus †?	(Forskål, 1775)	coral	LC	--	II
Psammocora contigua †?	(Esper, 1797)	stony coral	NT	--	II
Psammocora profundacella †?	Gardiner, 1898	stony coral	LC	--	II
Psammocora stellata †?	Verrill, 1866	stony coral	VU	--	II
Sandalolitha robusta †?	(Quelch, 1886)	mushroom coral	LC	--	II
Seriatopora hystrix †?	Dana, 1846	thin birdsnest coral	LC	--	II
Sphenotrochus gilchristi †?	Gardiner, 1904	coral	--	--	II

Lobatus (Strombus) gigas †[C]	Linnaeus, 1758	queen conch	--	--	II
Stylaster marshae	Cairns, 1998	hydroid	--	--	II
Stylophora pistillata †[?]	(Esper, 1797)	hood coral	NT	--	II
Trachyphyllia geoffroyi †[?]	(Audouin, 1826)	open brain coral	NT	--	II
Trematotrochus corbicula †[?]	(De Pourtalès, 1878)	coral	--	--	II
Tridacna crocea †[C]	Lamarck, 1819	boring clam	LC	--	II
Tridacna derasa †[?]	(Röding, 1798)	southern giant clam	VU	--	II
Tridacna gigas †[CDP]	(Linnaeus, 1758)	giant clam	VU	--	II
Tridacna maxima †[C]	(Röding, 1798)	small giant clam	CD	--	II
Tridacna squamosa †[C]	Lamarck, 1819	fluted giant clam	CD	--	II
***Trogonoptera trojana* ?** †[C]	(Staudinger, 1889)	Palawan birdwing	NT	--	II
Troides amphrysus †[?]	(Cramer, 1779)	Malay birdwing	LC	--	II
Troides cuneifera †[C]	Oberthür, 1879	swallowtail	LC	--	II
Troides helena †[?]	(Linnaeus, 1758)	common birdwing	LC	--	II
Troides magellanus †[C]	(Felder, 1862)	Magellan birdwing	LC	--	II
***Troides rhadamantus* ?** †[C]	(H. Lucas, 1835)	golden birdwing	LC	--	II
Truncatoflabellum paripavoninum †[?]	(Alcock, 1894)	coral	--	--	II
Tubipora musica †[C]	Linnaeus, 1758	organ pipe coral	NT	--	II
Turbinaria frondens †[?]	(Dana, 1846)	disc coral	LC	--	II
Turbinaria mesenterina †[?]	(Lamarck, 1816)	disc coral	VU	--	II
Turbinaria peltata †[?]	(Esper, 1794)	disc coral	VU	--	II
Turbinaria reniformis †[?]	Bernard, 1896	yellow scroll coral	VU	--	II

to using the CITES database is that it includes information on the source of the specimens being traded. Aside from providing information on confiscations, it also shows which traded organisms were collected from the wild and so might need protection from overexploitation in their natural habitats. However, there have been several cases of actually wild-caught specimens being intentionally or unintentionally identified as captive-bred (Nijman 2010), which leads to an underestimation of the impact of harvesting organisms from the wild for international trade. There have also been reports of falsification of permits to indicate local origins, as with the parrot trade in Cameroon (UNODC 2016), which would take it out of the jurisdiction of CITES as it does not deal with domestic trade.

The source code I in the CITES Trade Database indicates confiscations, and there are 1,329 such reports among traded animals from 1975 to 2018. Even from a casual glance, this seems a very low number considering what is known of the extent of illegal trade internationally. Case in point: the DENR-BMB records on the large number of confiscations of turtles and turtle eggs in 2013 and 2015 are not reflected in the CITES database; there is no record of any trade in Cheloniidae, legal or otherwise, in those years. Also, the sizable confiscations of non-insect arthropods is not in CITES. Only some 30,000 species are currently listed in CITES; millions more are not protected by its trade regulations. To be able to increase the effectiveness of conservation strategies, there should be a consolidation of information from various records despite the inherent difficulties (such as with inconsistencies in units used to measure quantities), since they may fill each other's data gaps.

The inclusion of species in the CITES Appendix can be heavily influenced by political maneuvering among member states (Sky 2010). Unfortunately, those that are in greatest need of trade regulation—or banning altogether—are least likely to be included in the Appendices because of the high demand for them in the market. During the 15th Conference of Parties (COP-15) in 2010, the COP voted as a body not to list the polar bear, blue-fin tuna, corals, and sharks in any Appendix, despite overwhelming evidence of significant declines in their population (a major criterion for inclusion) and, in the case of the tuna and sharks, support from the FAO. Commonly contesting the inclusion of marine species in CITES Appendices are China and Japan, the latter of which has never supported the inclusion of any marine species. Lobbying for inclusion of commonly traded Philippine animals is therefore a difficult proposition but one that must be done if trade is to be regulated and monitored. In the 12th meeting of the Conference of the Parties in 2002, the Philippines along with India and Madagascar successfully lobbied the inclusion of the whale shark *Rhincodon typus* Smith, 1828 in Appendix II (CITES 2002). In 2019, its proposal for the inclusion of the Tokay gecko *Gekko gecko* (Linnaeus, 1758) in Appendix II was also successful (CITES 2019). Non-state actors (commonly NGOs) have historically had an important role in influencing agenda-setting and even final decisions in COPs, though some NGOs have also had

questionable practices of abusing CITES to be able to claim "campaign" victories (Challender and McMillan 2019).

There have been instances when the Philippine government lifted bans on trade of species that are listed in the Appendices of CITES. In a Notification to the Parties in 2016, CITES admonished the country for lifting the ban on exports of the giant clam *Tridacna crocea* Lamarck, 1819, which is listed in Appendix II, in 1991. A similar ban suspension was done with trade in corals in 1992 to allow for the export of stockpiled specimens. CITES expressed concern over both instances being used to export illegally acquired specimens. The Philippine Red List, first released by the DENR in 2004 (as the National List of Threatened Fauna Species), may inform decisions on what species to lobby for inclusion in the CITES Appendices, though it includes only terrestrial fauna (Gonzalez et al. 2018, BCSP 2020).

It should be emphasized that the data from historical accounts, CITES records, and national government records (DENR-BMB, PCSD) cannot be directly compared, primarily in the sense that there is no standard for counting the volumes of traded animals across these sources of data. Historical accounts are very crude and allow the counting only of incidences of trade involving an animal, often times not even of a specific identity, and most usually without indication of the number of animals or derivatives involved in the trade. Both CITES and local government records report on volumes, but the former does so much more consistently. Therefore, no attempt was made to compare or show temporal trends in the volumes of traded animal taxa across the covered time period. However, the mentions of animals or their derivatives (e.g musk, civet, ivory, pearls, boar, etc.) being traded during and prior to the Spanish colonial period in The Philippine Islands: 1493-1898 by Emma Blair and James Alexander Robertson and accounts on the "Galleon Trade" like the paper by Iaccarino (2011) confirm that certain animals have been exploited from the wild for over 500 years.

One possible explanation for the discrepancies between the confiscation records of CITES and DENR-BMB/PCSD is that virtually all of the 1,329 records (with only two exceptions) of confiscation in the CITES Trade Database were reported by the importing country, not the Philippines as exporter. D'Cruze and Macdonald (2016) recognize this as a significant shortcoming of the CITES system, aside from not being able to monitor what happens to confiscated live specimens.

Enforcement of wildlife laws is only sporadically successful (TRAFFIC 2008, Rosen and Smith 2010), as indicated by the large volumes reported by CITES, local government agencies, and TRAFFIC, as well as by the fluctuating number of seizures across the years covered by this study. Also, the number of confiscations is not necessarily a measure of the success of legal frameworks meant to punish transgressors. According to available data from DENR-BMB from 2008 to 2015, only 99 cases were filed in court in that same time period when over 200 confiscations were made. Moreover, only eight of these cases have been resolved in this time period. One possible reason for this is that in some confiscations made, the wildlife is abandoned and the investigation is not able to determine the source. Most confiscations were made in the year 2011 with 46 in total, though only 15 cases were filed and one resolved in that same year. This one case involved a trader who was caught with one sun parakeet in Cartimar, Pasay City on 20 September 2011. On 28 February 2013, he was found guilty and penalized PhP5,000.00, a measly sum compared to what he has earned from transactions in wildlife trade. An online trader convicted in 2019 was apprehended again in 2020 for trading online in Brahminy kites *Haliastur indus* (Boddaert, 1783), white-bellied sea eagle *Haliaeetus leucogaster* (Gmelin, 1788), and changeable hawk-eagle *Nisaetus cirrhatus* (Gmelin, 1788); for his conviction in 2019, he paid a fine of PhP40,000.00 despite being caught with 13 unlicensed wildlife including falcons, parrots, tortoises, and iguanas (TRAFFIC 2020). These low figures for cases filed and convictions carried out are not exclusive to the country. Even in a developed nation like the UK, and with concerted efforts from its agencies, this is also a problem (Wellsmith 2011).

Wellsmith (2011) identifies certain issues in enforcement: under-resourcing operations; corruption in many layers of the enforcement network; a general lack of seriousness on the treatment of IWT as an illegal activity, compared to drug trafficking or human trafficking; the lack of deterrents; and the "dark figure" or the unknown true extent/volume of IWT. Corruption is particularly problematic in developing countries, which are the primary recognized source of illegally traded wildlife (van Uhm and Moreto 2018). This "dark figure" may be particularly important in the bird trade, given that DENR-BMB and PCSD records show birds to be among the most confiscated animals in the IWT but this is not reflected in CITES confiscation records.

The role of China in IWT is not to be underestimated. It is among the top three sources of illegally traded wildlife (van Uhm 2018). China has been trading in wildlife for at least two thousand years with Pakistan, India, Italy, and other Mediterranean countries, with ivory, rhinoceros horns, pearls, and corals being common imports into the country (Yi-Ming et al. 2000). It is the largest destination and market for pangolins and their derivatives (Cheng et al. 2016), particularly their scales for traditional Chinese medicine (TCM). The exploitation of sea cucumbers in China, its largest market, dates all the way back to the Ming Dynasty (1368-1644 BC) (Chen 2003).The use of wildlife derivatives as TCM has a long history and is rooted in the country's culture (Yi-Ming et al. 2000, van Uhm and Moreto 2018). There have been renewed calls for stricter regulations in wildlife trade in China, particularly consumption in the context of the COVID-19 pandemic highlighting the great potential of these activities in helping spread zoonotic diseases (Xiao et al. 2021).

CONCLUSION

CITES transactions, which are managed by DENR-BMB and PCSD in the Philippines, represent the legal trade in animals, although its records only show incidences of wild capture and illegal trade in the form of confiscations or seizures. Understandably, given its illicit nature, IWT is not as thoroughly reported in official records. DENR-BMB and PCSD are the primary repositories of such information, but their existence depends on confiscation operations by these and allied agencies. The temporal scope is also limited; the earliest available consolidated records from both government offices is from 2008. Despite these limitations, important conclusions can be drawn from the data available. Based on all of the sources, hard corals, birds, reptiles, mammals, and bivalves are the most harvested from the wild and most illegally traded. Birds, particularly parrots, are the most legally traded but do not prominently appear in CITES records of confiscations. This would suggest that birds might be particularly problematic in the context of the "dark figure" of IWT that complicates anti-IWT law enforcement. Several bird, mammal, and reptile species that are endemic to the Philippines and have either decreasing or unknown population trends in the wild appear in two or all three sources of data, and therefore might benefit from reassessment

of their IUCN Red List classifications. The guaiabero, Philippine falconet, Luzon hawk-owl, Luzon lowland scops owl, Mindanao highland scops owl, Palawan birdwing, golden birdwing, Mindanao treeshrew, and Palawan treeshrew are endemic, illegally traded species that are not in the Philippine Red List. Meanwhile, only one species of sea cucumber and none of the sources of mother of pearl or the *Aerodramus* species that are sources of birds' nest are in CITES Appendices and are therefore not protected by the international agreement on trade. These various sources of temporal data present certain problems regarding the understanding of IWT trends in the Philippines, the most important of which are the following: 1) lack of valid species level identification of traded taxa particularly in government records; and 2) inadequacy of relevant information on the records of events (taxa, number, volume, value, source, etc.) for non-CITES records, which are the primary sources for IWT trends. Identification of species should be a key part of the confiscation process; wildlife enforcement officers (WEO) would certainly benefit from ongoing training in this aspect of enforcement. Additionally, it is important that historical records from as back as the Spanish colonial period be explored, as this will give a more comprehensive view of the history of trade and its pressures on wild populations. Without this historical perspective, existing estimates of trade volumes based on modern records of legal trade and seizures may be severe underestimations of the actual impact of the industry (Miller et al. 2019).

The DENR-BMB and PCSD, with their respective groups like the Philippine Operations Group on Ivory and Illegal Wildlife Trade (POGI), should remain as the front liners in the fight against IWT, but given the proliferation of IWT occurring through airports and seaports, including the use of legal courier services, the Philippines Ports Authority (PPA), Philippine Coast Guard (PCG), Bureau of Customs (BoC), and the Civil Aviation Authority of the Philippines (CAAP) should consolidate their efforts alongside these two agencies. Similar to the UK, a unified body may be beneficial, especially one that is guided by innovations in IT, perhaps highlighting the potential role that the Department of Information and Communications Technology (DICT) could play in this endeavor.

It is recommended further that the following endemic, wild-captured species be included in the Philippine Red List:

- Philippine falconet (*Microhierax erythrogenys*)
- Luzon hawk-owl (*Ninox philippensis*)
- Luzon lowland scops owl (*Otus megalotis*)
- Mindanao highland scops owl (*Otus mirus*)
- black-nest swiftlet (*Aerodramus maximus*)
- Palawan birdwing (*Trogonoptera trojana*)
- golden birdwing (*Troides rhadamantus*)
- Mindanao treeshrew (*Tupaia everetti*)
- Palawan treeshrew (*Tupaia palawanensis*)

The Philippine Red List status of the following should be reassessed given the intensity and long history of trade:

- Asian palm civet (*Paradoxurus hermaphroditus*) – currently not listed
- Palawan pangolin (*Manis culionensis*) – currently listed as EN
- Philippine tarsier (*Carlito syrichta syrichta*) – currently listed as OTS
- Philippine cobra (*Naja philippensis*) – currently listed as OTS
- yellow-headed water monitor (*Varanus cumingi*) – currently listed as OTS

The Philippine Red List can be useful in determining which species should be proposed for inclusion in CITES Appendices.

ACKNOWLEDGMENTS

This study was funded by the School of Science and Engineering (SOSE) of the Ateneo de Manila University through its Industry 4.0 Research grant.

CONFLICT OF INTEREST

The authors declare that the authors have no Conflict of Interest in the study.

CONTRIBUTIONS OF INDIVIDUAL AUTHORS

Cruz: This paper forms part of his dissertation for his Ph.D. Biology degree. He formulated the research topic, did all research, performed all methodologies, and wrote all the text.
Lagunzad: She was the dissertation adviser. She helped develop the topic, guided the methodologies, and proofread the text.

REFERENCES

Ades G, Banks CB, Buhlmann KA, Chan B, Chang HC, Chen TH, Crow P, Haupt H, Kan R, Lai JY, Lau M, Lin HC, Haitao S. Turtle trade in northeast Asia: Regional summary (China, Hong Kong, and Taiwan). Chelon Res Monogr 2000; 2:52-54.

Arcilla JS. A multicultural connection. In: Arcilla JS, ed. Kasaysayan: The story of the Filipino people (Volume 3: The Spanish conquest). Hong Kong: Asia Publishing Company Limited, 1998: 113-138.

Arroyo-Quiroz I, Salcido RPG, Leader-Williams N. Mexico in the international reptile skin trade: A case study. Biodiv Conserv 2007; 16:931-952. doi: 10.1007/978-1-4020-6320-6_7.

Asian Turtle Trade Working Group. *Cuora amboinensis* (errata version published in 2016). The IUCN Red List of Threatened Species, 2000: e.T5958A97349919. https://dx.doi.org/10.2305/IUCN.UK.2000.RLTS.T5958A11953035.en. (Downloaded: 27 February 2020).

[BCSP] Biodiversity Conservation Society of the Philippines. Philippine Red List of threatened wild fauna, Part I - Vertebrates. Philippines: DENR-BMB, 2020.

bin Othman AS, Goh GH, Todd PA. The distribution and status of giant clams (family Tridacnidae) - A short review. Raffles Bull Zool 2010; 58:103-111.

Blair EH, Robertson JA, eds. The Philippine Islands, 1493–1898. Cleveland: Clark, 1903.

Blundell AG, Mascia MB. Discrepancies in reported levels of international wildlife trade. Conserv Biol 2005, 19:2020-2025.

Bruckner AW. Tracking the trade in ornamental coral reef organisms: The importance of CITES and its limitations. Aquarium Sci Conserv 2001, 3:79-94.

Challender DWS, MacMillan DC. 2019. Investigating the influence of non-state actors on amendments to the CITES Appendices. J Int Wildl Law Pol 2019; 22:90-114. https://doi.org/10.1080/13880292.2019.1638549.

Chen J. Overview of sea cucumber farming and sea ranching practices in China. SPC beche-de-mer Information Bulletin 2003; 18:18-23.

Cheng W, Xing S, Bonebrake TC. Recent pangolin seizures in China reveal priority areas for intervention. Conserv Lett 2016; 10:757-764.

[CITES] Convention on International Trade in Endangered Species of Wild Fauna and Flora. Notification to the parties concerning Philippines: Prohibition on trade in CITES specimens. Geneva: CITES, 20 June 1996. https://cites.org/sites/default/files/eng/notif/1996/915.shtml (Accessed: 29 March 2021).

CITES. Conference of the Parties 12 Proposal 35: Inclusion of the whale shark (*Rhincodon typus*) on Appendix II of CITES. CITES, 2002. 24 pp.

CITES. Conference of the Parties 18 Proposal xxx: Inclusion of *Gekko gecko* in Appendix II, in accordance with Article II, Paragraph 2 (a) of the Convention and satisfying Criterion B of Annex 2 a of Resolution Conf. 9.24 (Rev. CoP17). CITES, 2019. 15 pp.

D'Cruze N, Macdonald DW. A review of global trends in CITES live wildlife confiscations. Nat Conserv 2016; 15:47-63.

[DA-BFAR] Department of Agriculture – Bureau of Fisheries and Aquatic Resources. In turbulent seas: The status of Philippine marine fisheries. Philippines: DENR, 2004.

DA-BFAR. Philippine fisheries profile, 2005. Philippines: BFAR, 2006.

[DENR-BMB] Department of Environment and Natural Resources – Biodiversity Management Bureau. The fifth national report to the convention on biological diversity. Philippines: DENR-BMB, 2014.

Diokno MSI. The rise of the Chinese trader. In: Dalisay JY, ed. Kasaysayan: The story of the Filipino people (Volume 4: Life in the colony). Hong Kong: Asia Publishing Company Limited, 1998: 47-70.

Dizon EZ. The emergence of the elite. In: Dalisay JY, ed. Kasaysayan: The story of the Filipino people (Volume 2: The earliest Filipinos). Hong Kong: Asia Publishing Company Limited, 1998: 157-174.

Floren AS. The Philippine shell industry with special focus on Mactan, Cebu. Coastal Resource Management Project. Philippines: DENR, 2003.

Gong SP, Chow AT, Fong JJ, Shi HT. The chelonian trade in the largest pet market in China: Scale, scope and impact on turtle conservation. Oryx 2009; 43:213-216.

Green EP, Hendry H. Is CITES an effective tool for monitoring trade in corals? Coral Reefs 1999; 18:403-407.

Gomez L, Sy EY. Illegal pangolin trade in the Philippines. TRAFFIC Bulletin 2018; 30:37–39.

Gonzalez JCT, Layusa CAA, Aguang LE, Duya MRM, Heaney LR, Balete DS, Tabaranza DGE, Espanola CP, van de Ven WAC, Diesmos AC, Causaren RM, Diesmos MLL, Lagat RT, Realubit NDC, Sy EY, Lit IL, Naredo JCB, Lastica-Ternura EA, Pasicolan SA, Tagtag AM, De Leon JL, Lim TMS, Ong PS. Review and update of the 2004 National List of Threatened Terrestrial Fauna of the Philippines. Sylvatrop 2018; 28:73-144.

Iaccarino U. The "Galleon System" and Chinese trade in Manila at the turn of the 16th century. Ming Qing Yanjiu 2011; 16:95-128.

Karesh WB, Cook RA, Bennett EL, Newcomb J. Wildlife trade and global disease emergence. Emerg Infect Dis 2005; 11:1000-1002.

Keong CY. Sustainable resource management and ecological conservation of mega-biodiversity: The Southeast Asian Big-3 reality. Int J Environ Sci Dev 2015; 6:876-882.

Lam TTY, Shum MHH, Zhu HC, Tong YG, Ni XB, Liao YS, Wei W, Cheung WYM, Li WJ, Li LF, Leung GM, Holmes EC, Hu YL, Guan Y. Identifying SARS-CoV-2 related coronaviruses in Malayan pangolins. Nature 2020; 583:282-285. https://doi.org/10.1038/s41586-020-2169-0.

Martin-Smith KM, Samoilys MA, Meeuwig JJ, Vincent ACJ. Collaborative development of management options for an artisanal fishery of seahorses in the central Philippines. Ocean Coast Manage 2004; 47:165-193.

Miller EA, McClenachan L, Uni Y, Phocas G, Hagemann ME, Van Houtan KS. The historical development of complex global trafficking networks for marine wildlife. Sci Adv 2019; 5:1-9.

Mitchell MA. History of exotic pets. In: Manual of exotic pet practice. Philadelphia: Saunders, 2009: 1-3.

Nijman V. An overview of international wildlife trade from Southeast Asia. Biodivers Conserv 2010; 19:1101-1114.

Pires SF. The illegal parrot trade: A literature review. Global Crime 2012; 13:176-190. https://doi.org/10.1080/17440572.2012.700180.

Posa MRC, Diesmos AC, Sodhi NS, Brooks TM. Hope for threatened tropical biodiversity: Lessons from the Philippines. Bioscience 2008; 58:231-240.

Rhyne AL, Tlusty MF, Schofield PJ, Kaufman L, Morris JA, Bruckner AW. Revealing the appetite of the marine aquarium fish trade: The volume and biodiversity of fish imported into the United States. PLoS ONE 2012; 7:e35808. https://doi.org/10.1371/journal.pone.0035808.

Rhyne AL, Tlusty MF, Szczebak JT, Holmberg RJ. Expanding our understanding of the trade in marine aquarium animals. PeerJ 2017; 5:e2949. doi: 10.7717/peerj.2949.

Rosen GE, Smith KF. Summarizing the evidence on the international trade in illegal wildlife. EcoHealth 2010; 7:24-32.

Shepherd CR, Sy EY. First record of international trafficking of Critically Endangered long-beaked echidnas (*Zaglossus* sp.). J Indones Nat Hist 2018; 5:22–26.

Sky MB. Getting on the list: Politics and procedural maneuvering in Cites Appendix I and II decisions for commercially exploited marine and timber species.

Sustainable Development Law and Policy 2010; 10:35-40,54-55.

Sodhi NS, Posa MRC, Lee TM, Bickford D, Koh LP, Brook BW. The state and conservation of Southeast Asian biodiversity. Biodivers Conserv 2010; 19:317-328.

Sy EY. Checklist of exotic species in the Philippine pet trade, I. Amphibians. J Nat Stud 2013; 13:48–57.

Sy EY. Checklist of exotic species in the Philippine pet trade, II. Reptiles. J Nat Stud 2015; 14:66-93.

Sy EY. Trading faces: Utilisation of Facebook to trade live reptiles in the Philippines. Malaysia: TRAFFIC Southeast Asia, 2018. 34 pp.

Sy EY, Schoppe S, Diesmos MLL, Lim TMS, Diesmos AC. Endangered by trade: Seizure analysis of the critically endangered Philippine forest turtle *Siebenrockiella leytensis* from 2004–2018. Philipp J Syst Biol 2020; 14:1-8. DOI 10.26757/pjsb2020b14003.

The Philippine Commission. Fifth annual report of the Philippine Commission. WA: Government Printing Office, 1905.

The Philippine Commission. Sixth annual report of the Philippine Commission. WA: Government Printing Office, 1906.

TRAFFIC. What's driving the wildlife trade? A review of expert opinion on economic and social drivers of the wildlife trade and trade control efforts in Cambodia, Indonesia, Lao PDR, and Vietnam. Washington: East Asia and Pacific Region Sustainable Development Department – World Bank, 2008. 103 pp.

TRAFFIC. Philippines nabs wildlife trafficker a second time. TRAFFIC, 17 June 2020. https://www.traffic.org/news/philippines-nabs-wildlife-trafficker-a-second-time/ (Accessed: 29 March 2021).

TRAFFIC Southeast Asia, van Asch E. The illegal wildlife trade in East Asia and the Pacific. In: UNODC, ed. Transnational organized crime in East Asia and the Pacific. United Nations, 2013.

[UNODC] United Nations Office of Drugs and Crime. World wildlife crime report: Trafficking in protected species. United Nations, 2016.

van Uhm DP. Wildlife crime and security. In: Reichel P, Randa R, eds. Transnational Crime and Global Security [2 Volumes]. Santa Barbara: ABC-CLIO, LLC, 2018.

van Uhm DP, Moreto WD. Corruption within the illegal wildlife trade: A symbiotic and antithetical enterprise. Brit J Criminol 2018; 58:864–885.

Vincent ACJ, Giles BG, Czembor CA, Foster SJ, eds. Trade in seahorses and other syngnathids in countries outside Asia (1998-2001). Fisheries Centre Research Reports 19(1). Vancouver: Fisheries Centre, University of British Columbia, 2011.

Wabnitz C, Taylor M, Green E, Razak T. From ocean to aquarium. Cambridge: UNEP-WCMC, 2003.

Wellsmith M. Wildlife crime: The problems of enforcement. Eur J Crim Policy Re 2011; 17:125-148.

Weston MK, Memon MA. The illegal parrot trade in Latin America and its consequences to parrot nutrition, health and conservation. Bird Populations 2009; 9:76-83.

Xiao L, Lu Z, Li, X, Zhao X, Li BV. Why do we need a wildlife consumption ban in China? Curr Biol 2021; 31:R168-R172. https://doi.org/10.1016/j.cub.2020.12.036.

Xu J, Zhao S, Teng T, Abdalla AE, Zhu W, Xie L, Wang Y, Guo X. Systematic comparison of two animal-to-human transmitted human coronaviruses: SARS-CoV-2 and SARS-CoV. Viruses 2020; 12:244. doi:10.3390/v12020244.

Yasue M. Nellas A, Panes H, Vincent ACJ. Monitoring landed seahorse catch in a changing policy environment. Endang Species Res 2015; 27:95-111.

Yi-Ming L, Zenxiang G, Xinhai L, Sung W, Niemelä J. Illegal wildlife trade in the Himalayan region of China. Biodiv Conserv 2000; 9:901-918.