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Annex 2c - INDONESIA

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DIRECTORATE GENERAL NATURAL RESOURCES AND ECOSYSTEM CONSERVATION  
**DIRECTORATE OF BIODIVERSITY CONSERVATION OF SPECIES AND GENETIC**

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4 August 2023

Our Ref: S. 529 /KKHSG/PSG1/KSA.2/8/2023

To: **Ms. Ivonne Higuero**

CITES Secretariat  
International Environment House  
Chemin des Anemones  
CH-1219 Chatelaine Geneva  
Switzerland  
Email: info@cites.org

**Subject: Update on the Implementation Regarding Review of Significant Trade (RST) in Specimens of Appendix-II Species Concerning *Cuora amboinensis***

Dear Madam,

Referring to your letter No: DM/2022/ID/01 dated 20<sup>th</sup> April 2022 regarding Review of Significant Trade in Specimens of Appendix-II Species [Resolution Conf. 12.8 (Rev.CoP18)] and following up your email dated 31<sup>st</sup> July 2023 regarding the same matter, we would like to submit information on the implementation of *Cuora amboinensis* in Indonesia, as follows:

- a. Regarding the monitoring harvesting of *C. amboinensis*, there is no significant difference between 2018 – 2022.
- b. As a precautionary consideration, Indonesia will reduce the quota 40% and will applied the size limitation to ensure that harvest will not detrimental to the wild population.
- c. Considering the aforementioned, Indonesia kindly asks that this species should be removed from the Review Significant Trade.

Further, please kindly find the document respond on the final stage review of RST and Non-Detriment Findings (NDF) *Cuora amboinensis* as attached for your perusal.

Thank you for your kind attention and consideration.

Yours sincerely,

**Indra Exploitasia, DVM**

Interim Director of Biodiversity Conservation of Species and Genetic

Email: subditkonvensi.kkh@gmail.com, dit.kkh@gmail.com

cc.:

1. Director General of Natural Resources and Ecosystem Conservation, MoEF;
2. Permanent Mission of The Republic of Indonesia to the UN, WTO, and Other International Organization in Geneva, MoFA;
3. Director of Secretariat of Scientific Authority for Biodiversity.

**Update on The Implementation of the Recommendations regarding  
Indonesia/*Cuora amboinensis***

**c) Initiate appropriate harvest measures to ensure sustainability (for example: - size limits/selective harvest, - open/closed seasons, - harvest seasons, - harvest maximums, - restrictions to harvest frequency, sites or time of day, - control of number of harvesters, - types and methods of harvest)**

- Prohibition of harvesting pregnant females (April, May, and June are most females will lay eggs).
- Harvesting is only allowed for three months (October, November, and December) every year.
- Harvested specimens are only allowed with a minimal SCL (Straight Carapace Length) of  $\geq 18$  cm (mature individuals reach a size of 16 cm SCL).
- MA staff regularly conduct inspections to supplier house to ensure that the harvesting activity complies with all requirements (size restrictions and harvest season).
- During the harvest period (October, November, and December), the MA staff monitor size restrictions and number quotas with a harvest inspection report (Berita Acara Partisan/BAP tangkap).



**Figure 1.** “Bubu” is a funnel trap for catching the specimens.  
**d) Undertake science-based studies on status of the species (e.g. population size/density, trends, distribution) including an evaluation of the threats to the species for use as the basis for NDFs.**

For detail information, here we added some list of publications, and unpublished thesis about *Cuora amboinensis* in Indonesia during 2018-2021 and have been included in the NDF:

- Erina, E., Dewi, K., Sutriana, A., Fakhurrazi F., Ismail. I. & Hennivanda. 2019. Deteksi Salmonella sp. pada saluran pencernaan kura-kura ambon (*Cuora amboinensis*). *Jurnal Ilmiah Mahasiswa Veteriner* 3(2): 55-61
- Fauzi, M.A., Hamidy, A. & Kurniawan, N. 2020a. Harvesting trends of amboina box turtles (*Cuora amboinensis*) seventeen years after listing in Appendix II CITES. *Biodiversitas Journal of Biological Diversity* 21(3):1142-1148. DOI: 10.13057/biodiv/d210339
- Fauzi, M.A., Hamidy, A., Mumpuni & Kurniawan, N. 2020b. The threat of appendix CITES-listed turtles harvesting in Central Borneo and South Sumatra. *Journal of Tropical Life Science* 10(3):215-22. DOI: dx.doi.org/10.11594/jtlls.10.03.05
- Fauzi, M.A., 2020. Evaluasi pemanenan kura-kura Ambon (*Cuora amboinensis*) pada beberapa lokasi tangkap di Sumatra Utara,

Sumatra Selatan dan Kalimantan Tengah. Master Thesis. Brawijaya University.

Nurazizah. H. Tangkapan tidak sengaja (bycatch) kura-kura Ambon (*Cuora amboinensis*) oleh nelayan di Rawa Aopa, Sulawesi Tenggara. Undergraduate Thesis. Bogor Agricultural University. Purnomo, T. 2020. Kematian satwa liar tertabrak di Taman Nasional Rawa Aopa Watumohai, Sulawesi Tenggara. Undergraduate Thesis. Bogor Agricultural University

Qayyim D.I., Kusriani M.D. & Mardiasuti, A. 2019. Perdagangan dan pemanfaatan kura-kura di Palu, Sulawesi Tengah dan sekitarnya. Prosiding Seminar Nasional Konservasi dan Pemanfaatan Tumbuhan dan Satwa Liar "Sebagai Fondasi Konservasi dan Pemanfaatan Tumbuhan dan Satwa Liar. Indonesia. November 2018.

Riyanto A. & Mumpuni. 2019. Populasi dan karakteristik kura-kura (*Cuora amboinensis* dan *Siebenrockiella crassicollis*) yang dipanen di Jambi dan Sumatra Utara. Prosiding Seminar Nasional Konservasi dan Pemanfaatan Tumbuhan dan Satwa Liar "Sebagai Fondasi Konservasi dan Pemanfaatan Tumbuhan dan Satwa Liar. Indonesia. November 2018.

Tiara, M. 2020. Pengetahuan dan perilaku masyarakat mengenai konservasi kurakura di Sumatra bagian Selatan. Undergraduate Thesis. Bogor Agricultural University. Yusratul A., Kusriani, M.D. & Prasetyo, L.B. 2019. Pemodelan spasial kesesuaian habitat kura-kura Ambon (*Cuora amboinensis*) di Taman Nasional Rawa Aopa Watumohai. Prosiding Seminar Nasional Konservasi dan Pemanfaatan Tumbuhan dan Satwa Liar "Sebagai Fondasi Konservasi dan Pemanfaatan Tumbuhan dan Satwa Liar. Indonesia. November 2018.

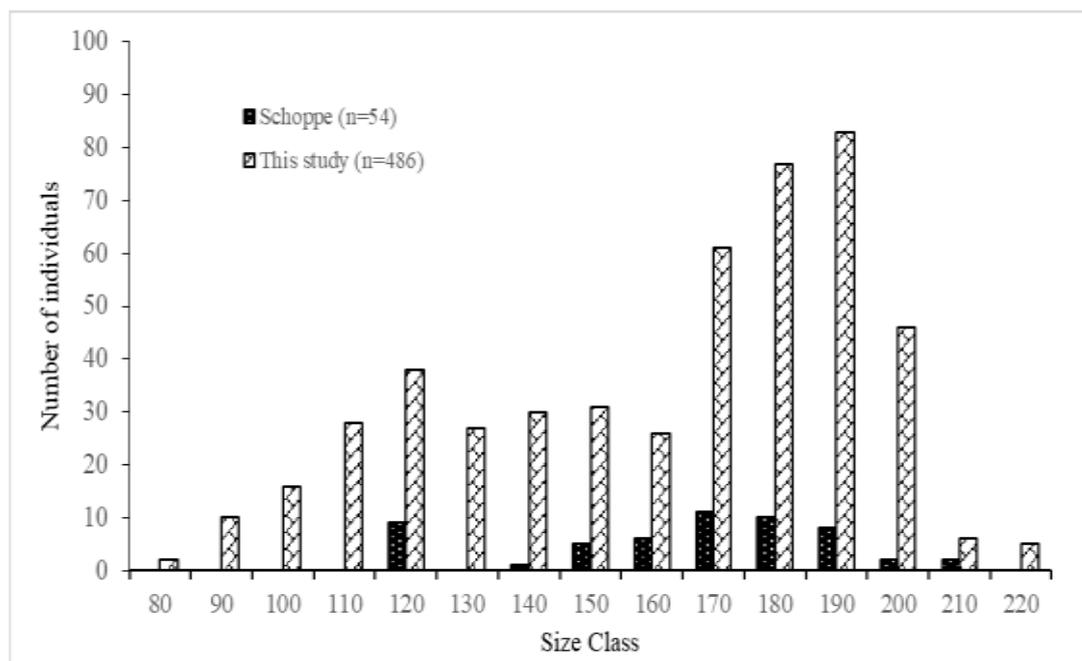
**e) Develop/Implement an ongoing science-based population monitoring program that is used in conjunction with an adaptive management program for the species (see harvest management measures and trade controls, below), for use in making NDFs**

The population size of *Cuora amboinensis* the species on protected area in the two hectares of a peat swamp forest in Taman National Rawa Aopa Watumohai in the south-east of the island of Sulawesi was estimated to be 120 individuals or 60 individual/ha. The population composition in terms of immature to mature ratio was almost 1:1 (54.9% immature and 45.1% mature). Harvest surveys of the species in an openly accessible area in East Kalimantan have shown that four middlemen alone easily assemble

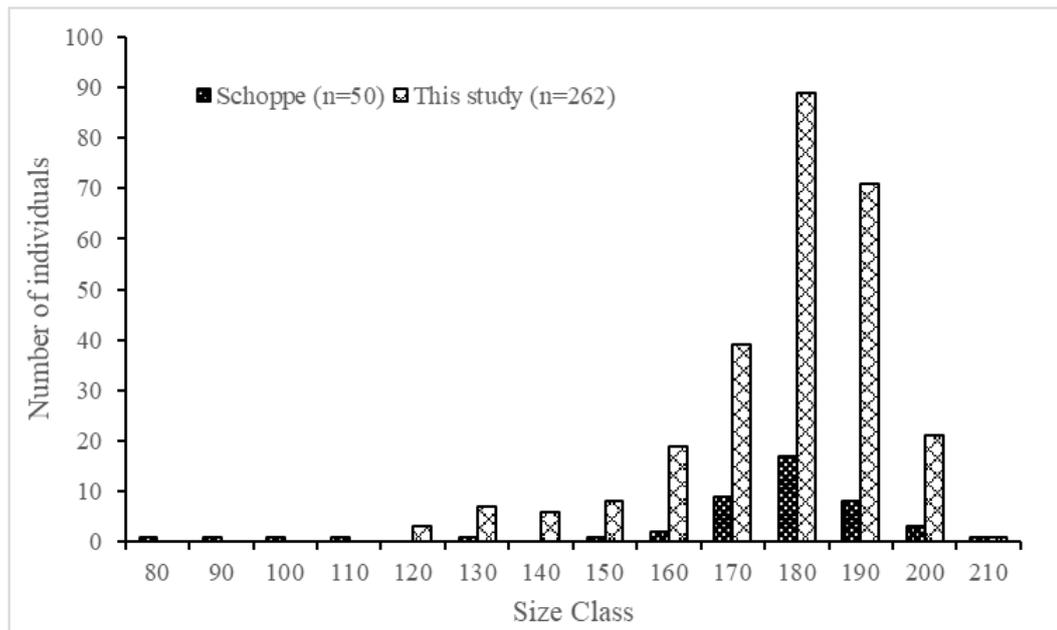
more than half of the nation's annual quota in one year. The composition of harvested individuals in the study site in Kota Bangun, East Kalimantan was significantly in favour of large adults (95.8%) and contained only 4.2% immature individuals (Schoppe, 2009). Riyanto & Mumpuni (2019) reported population size from harvested areas di Sumatra. Population size in Jambi was estimated 65,78 individual/ha, North Sumatra2 was 61,8 individual/Ha, and North Sumatra1 was 9,9 individual/ha. Meanwhile, the composition of harvested individuals in North Sumatra is also dominate by adult individuals (80%), but in Jambi dominated by immature individuals (59%). Roughly, there does not seem to be much difference between the populations in the harvested and protected areas.

**f) Undertake qualitative monitoring of the scale and trends of all harvest (increasing, stable or decreasing) for use in making NDFs**

Fauzi et al. (2021) with comparison of monitoring data of *C. amboinensis* on 2006 (published in Schoppe (2009) in North Sumatra and Central Kalimantan published recent monitoring of harvest size (Figure 2 and 3) that shown no evidence of decreasing of harvest size. The population is not or has not experienced large pressure due to harvesting activities if there is no change in harvest size over decade which does not become smaller compared to the harvest size of the previous period.



**Figure 2** Comparison of harvested individuals size of *C. amboinensis* between 2006 and 2019 in Nort Sumatra.



**Figure 3.** Comparison of harvested individuals size of *C. amboinensis* between 2006 and 2019 in Central Kalimantan.

**g) Develop and implement harvest guidelines (or “best practices”) describing accepted practices**

Harvesting guidelines have been socialized every year to determine catch quotas per province, which include harvest size, permitted harvest time, and also harvest method (only using funnel trap/bubu).

**h) Develop and implement local management with clearly defined harvest management measures (e.g., harvest seasons, harvest maximums, restrictions to harvest frequency, sites or time of day, control of number of harvesters, types and methods of harvest)**

The harvest period is only permitted in October, November, and December each year, with strict harvest size on SCL  $\geq$  18 cm. Harvesting is prohibited in April, May, and June. Harvest ban in April, May, and June. implementation of rotation of fishing locations such as at the village and sub-district levels.

**i) Undertake qualitative monitoring of the scale and trends of all export (increasing, stable or decreasing) for use in making NDFs**

Monitoring consists of monitoring catches, monitoring the realization of catch quotas per province, and monitoring the realization of export quotas. Each year in the preparation of export quotas, monitoring data on catch realization each province is presented for evaluation in the context of determining catch quotas per province. Aspects used for evaluation:

realization of the number of catches in the harvest period, size of individuals harvested, harvesting locations from the map of catch locations which are evaluated every two years.

**j) Implement/ improve a system to ensure individuals in captive production systems are distinguished from wild if both wild specimens and non-wild specimens are in trade**

Captive breeding facilities is regularly be inspected regularly to inspection and construction. The facilities must be providing captive reports, inspection report of hatching, inspection report of death, survival rate which all will be used to determine the maximum utilization limit for captive results. Specimen from captive breeding will be poured in an investigation report document and ill use F source code.

**k) Upon completion of other recommendations, the Management Authority of Indonesia should provide the scientific basis by which it has established that exports from their country are not detrimental to the survival of the species and are compliant with Article IV, paragraphs 2(a), 3 and 6(a) of the Convention. Particular focus should be given to how the actions Indonesia has taken or will take address the concerns/problems identified in the Review of Significant Trade process.**

Scoring of the NDF aspect shows that the biological, trade pressure and management aspects have a low vulnerability, but hunting pressure is moderate vulnerability to the existence of the *Cuora amboinensis* (Table 1). Management interventions are needed to ensure the sustainability, such as reducing quotas, stricter restrictions on the size that allow harvested for example by size, outreach to people who depend on these turtles for their lives about these limits as well as to rotate harvesting locations. In line with that breeding efforts are also more encouraged to produce and meet the export demand for pet.

**Table 1.** Summary of NDF scoring of *Cuora amboinensis* in Indonesia.

Aspect	Total Score	Total Criteria	Final Score
Biological	21	16	1.31
Hunting Pressure	10	6	1.67
Trade Pressure	4	3	1.33
Management	17	16	1.06

\*Score ranking; 1.0-1.5 = low vulnerability; 1.6-2.5 = moderate vulnerability; 2.6-3.0 = high vulnerability.

This assessment at least shows the utilization so far of *Cuora amboinensis* in Indonesia in general is low vulnerability to the existence this species, but precautionary is needed in managing its utilization considering that the hunting pressure aspect indicates moderate vulnerability. This assessment proposes several improvements in regulations concerning *Cuora amboinensis* utilization. The regulatory stages in *Cuora amboinensis* utilization are as follows:

1. To reduce 40% of the export quota become 7200 individuals starting from 2024.
2. More strict in that allowed individuals harvest with restrictions on the size (minimal harvest size  $\geq 18$  cm (SCL).
3. Harvest activity is only allowed in October, November, December.
4. Harvest is strictly prohibited in May, April, and June.
5. Outreach to people who depend on these turtles for their lives about these limits as well as to rotate harvesting locations,



# NON-DETRIMENT FINDINGS (NDF): SOUTHEAST ASIAN BOX TURTLE IN INDONESIA (*Geoemydidae: Cuora amboinensis*)



By:

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Secretariat of Scientific Authority for Biodiversity,  
The National Research and Innovation Agency  
and  
Directorate General of Nature Resources and Ecosystem  
Conservation, The Ministry of Environment and Forestry

**2023**

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## FORWORDS

The export of Southeast Asian Box Turtle, *Cuora amboinensis*, from Indonesia it has been going on for a long time even before entering the appendix II CITES in 2000. Mainly for consumption and material on Traditional Chinese Medicine. To control the use of *Cuora amboinensis* based on scientific data as well as fulfill the mandate of the CITES secretariat and the support for Government Regulation (PP) no. 8/1999 concerning Utilization of Wild Plant and Animal Species, the Scientific Authority (BRIN) is providing this NDF (Non-Detriment Findings) document as policy recommendations for the Management Authority (Ministry of Environment and Forestry- KLHK). The proposed recommendation is a strategy for determining the sustainable utilization of the *C. amboinensis* from Indonesia.

*Authors*  
Cibinong, 2023

# CHAPTER I INTRODUCTION

## 1.1. Background

The Southeast Asian Box Turtle, *Cuora amboinensis*, is a species widely distributed in South Asian, East Asian, and Southeast Asian. In Indonesia, it occurs from Sumatra, Borneo, Java, Bali, Sulawesi and the Moluccas. The turtle wide properly protected areas in Indonesia, whose turtle populations serve as assurance colonies, such as Berbak National Park (Jambi, Sumatra), Rawa Aopa Watumohai National Park (Sulawesi), Lore Lindu National Park (Sulawesi), and Sebangau National Park (Kalimantan). This species also serve in other conservation institution such as Zoo (Ragunan in Jakarta, Bandung in West Java, Prigen in East Java and Rimba Reptil). Especial for pet demands, Indonesia has encouraged breeding operations of this species in captivity, in order to reduce wild harvest gradually and to manage trades of this species to sustainable level. The harvest for trade from wild only allowed caught the specimens from outside protected as well as conservation areas. Especial for export of carapace in 2014, we note here that several arguments which not stand alone for explain from where the total number carapace exported. These carapaces were come as resultant of (1) residual from waste product of local consumption for long time, (2) the total number not exactly reflected *Cuora amboinensis* only, may mixed to other species, and (3) long collecting of specimen which dead before exported.

*Cuora amboinensis* was selected in review significant trade. Within the framework of CITES, the utilization of wild plants and animals must comply with principles of *legally, sustainably and non-determinant findings*, not cause damage to the population in nature. it all leads to a question; "Does the utilization of wildlife still maintain the sustainability of their populations in the wild?" To answer this question, the Scientific (BRIN) and Management Authority (DGNRE) conducted an assessment of the status of current species utilization and its potential impact on the species populations in the wild. The results of this assessment are presented in this document of NDF (Non-Detriment Findings) for the Southeast Asian Box Turtle.

## 1.2. NDF Objective

The NDF document is the result of an analysis of the utilization of Wild Plants and Animals (WPA) and its purpose is an attempt to ensure that a WPA circulation will not have a negative impact on the survival of the proposed species. The content of NDF in this document covers various biological aspects, including an analysis of taxonomy, distribution, ecology, growth, reproduction and population estimates; in addition, there was also an analysis of the socio-economic impacts of utilizing of the Southeast Asian Box Turtle.

This NDF document was compiled by the Scientific Authority (BRIN) to be used as a basis for policymaking by the Management Authority (KLHK). The proposed recommendations are strategies for implementing the sustainable use of WPA species.

### **1.3. NDF Scope**

This NDF document contains data and information on biology and management of the species, *Cuora amboinensis* where acquisition of data and information as well as the management of which involves many experts and stakeholders such as from scientific authority, management authority, universities, exporters and other. Further data and information collected were poured in this document.

## CHAPTER II BIOLOGICAL ASPECT

### 2.1. Classification

The scientific classification of The Southeast Asian Box Turtle currently is:

Kingdom : Animalia  
Phylum : Chordata  
Class : Reptilia  
Order : Testudines  
Family : Geoemydidae  
Genus : *Cuora*  
Species : *Cuora amboinensis* (Daudin, 1802)

The Box Turtle genus *Cuora* consisted 13 recognize species (Uetz et al., 2023). The Southeast Asian Box Turtle, *Cuora amboinensis*, is a small (straight carapace length to 25 cm), semi-aquatic turtle, largely restricted to standing water bodies of Southeast Asian, from eastern India to Indonesia and the Philippines. Four subspecies are currently recognized, e.i. the Wallacean Box Turtle *C. amboinensis amboinensis* (Daudin, 1802) often referred to as East Indian Box Turtle, the Malayan Box Turtle *C. a. kamaroma* (Rummler and Fritz, 1991), the Indonesian Box Turtle *C. a. couro* (Schweigger, 1812), and the Burmese Box Turtle *C. a. lineata* (McCord and Philippen, 1998; Schoppe & Das 2011). All, except the latest occur in Indonesia (Rummler and Fritz, 1991; McCord and Philippen, 1998; Uetz et al., 2023).

### 2.2. Biological Characteristics

This species characterized by shell shape ranges from flat-topped to highly domed, depending on subspecies. The posterior edge of the carapace is unserrated. The carapace itself is with or without sloping sides, and tricarinate in young, with keels disappearing during growth. A distinct hinge is present between the hyo- and hypoplastron (Bramble, 1974). The caudal and rostral plastron sections are linked by a dermatoid connection. Because of the flexibility of the plastron *Cuora amboinensis* is able to completely close its shell (Rogner, 1996). The carapace is dark olive, brown to black, whereas the plastron is yellow, cream, or pale brown, with or without dark blotches on the marginals and on the outer edges of the plastral scutes. The head is dark brown or green above, yellow below, with three yellow or orangish-yellow bands running across the sides of the head. Limbs are olive or yellowish gray. Digits are entirely webbed (Schoppe & Das, 2011).

Lifespan is 25–30 years, maximum age of 38.2 years was recorded from captivity (Bowler, 1977; Jenkins, 1995; Whitaker & Andrews, 1997). This maximum age is supported by the report of Reckel (1999) that life expectancy of this species in captivity is to be up to 38 years. Sexual maturity reaches after 4–5 years and 2–3 eggs are produced several times each year, the nesting seasons are in January-February and April (Jenkins, 1995; Whitaker & Andrews, 1997). Sexual maturity is slower in males, Praedicow (1985) observed sexual maturity of females at 5-6 years and of males at 8-9 years. According to Rogner (1996) the clutch size

can achieve even five eggs. Once maturity is reached, the species is known to lay 1–2 clutches of 1–4 eggs (Congdon, 2000; Ernst *et al.*, 2000). Lim and Das (1999) confirmed this but stated that a total of four to six eggs per clutch are an exception. Mortality of eggs and juveniles is estimated to be roughly around 50% (see Wilbur, 1975; Mitchell, 1988), hence one female can probably only produce three juveniles in one year.

In the wild the incubation period lasts for between 67 and 77 days, while 76 to 77 days have been reported in captivity (Whitaker & Andrews, 1997). *Cuora amboinensis* is eat includes both plant and animal matter. The turtle lays 1–4 large (24–34 x 44–57 mm) eggs with masses of 14–31.5 g. Meanwhile Mumpuni (unpubl. data) the size of eggs in captivity is large also (40.8–53 x 28.1–31.1 mm).

The considerable variation in egg size, incubation period, and reproductive season, as evident from data derived from captive breeding, is thought to be reflective of geographic variation in this widespread turtle species (Schoppe & Das, 2011). A mean growth rate of 0.06 mm/day for subadult animals until 24 months of age and a mean growth rate of 0.038 mm/day for adults was calculated, implying that an adult size of 160 mm CL is reached in four years and five months in captivity (Schoppe and Dolorosa, in prep.).



**Figure 1** The Southeast asian Box Turtle, *Cuora amboinensis*, from Jambi. A. lateral view. B. Ventral view shown dermatoid connection on caudal and rostral plastron. (Photograph by A. Riyanto)

### 2.3. Distribution

*Cuora amboinensis* is widespread in Southeast asia, both on the asian mainland and on the oceanic and continental islands, that distribution extends from northeast India through Bangladesh, Myanmar, Thailand, Laos, Vietnam, Cambodia, the Malay Peninsula, the Greater Sundas to eastern Indonesia and the Phillipines (Rummler & Frits, 1991; Fritz & Havas, 2007; Uetz et al., 2023).

Distributed throughout the Indonesian archipelago (Figure 2), such as Sumatra, Enggano island, Weh Island, Natuna Island, Kalimantan (Borneo), Java, Sulawesi, Peleng island, Halmahera, Mollucas island, Sulu archipelago, Tanimbar Island, Bali, Sumbawa and Timor island (Rummler & Fritz, 1991; Fritz & Havas, 2007; Ivarado *in* Kuchling et al., 2007; Diesmos et al., 2008; Riyanto & Rahmadi 2021).



**Figure 2** Distribution of *Cuora amboinensis* in Indonesia. Source of data: yellow dot = iNaturalist + field survey. The map was generated using ArcGIS 10.5.

#### **2.4. Habitat and Ecology**

*Cuora amboinensis* is a habitat generalist, adaptable to anthropogenically altered habitats, including towns and villages (Moll, 1997; Schoppe, 2008). The species is widely distributed in lowland freshwater habitats from sea level to about 500 m asl. It is also semi-aquatic, that inhabiting various natural and made-man wetlands with soft bottoms and slow or no current. Individuals may wander substantial distance over the course of a lifetime, but do not migrate seasonally or to any geographically significant extent (Ernst et al., 2000). Natural habitats include marshes, creeks, mangrove swamps, ponds, peat swamp forests, permanent or temporary wetlands, shallow lakes and sometimes rivers. The man-made habitats include flooded rice fields, oil palm and rubber plantations that are either partly flooded or that have an extensive drainage system as well as in irrigation ditches, canals, orchards, vegetated drainage systems, ponds and pools near houses (Das, 1991; Schoppe 2008, 2009; Sharma & Tisen, 2000; Samedi & Iskandar, 2000; Riyanto & Mumpuni, 2019). Variety of habitat types presented in Figure 3.



**Figure 3** Several habitat types of the Southeast Asian Box Turtle, *Cuora amboinensis*, in Indonesia. **A.** Small canal on the village at North Sumatra. **B.** Small creek. **C.** Paddy field. **D.** Swamp, in Southeast Sulawesi. (A—photograph by A. Riyanto; B to D— photograph by Y Aini)

## 2.5. Preys and Its Predators

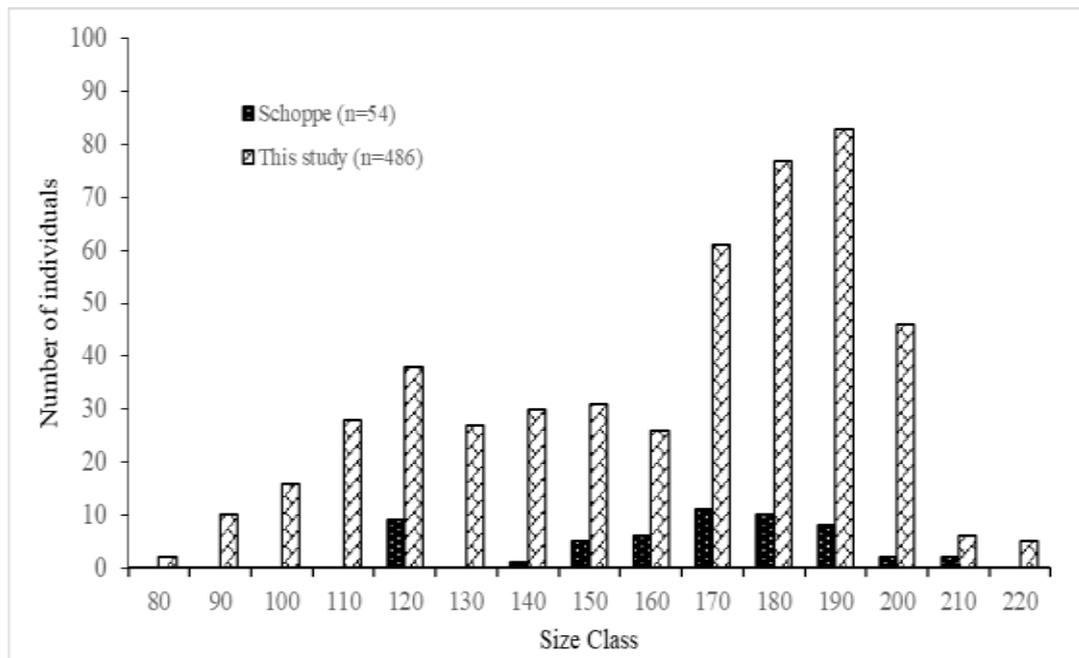
Little known about the predator of the Southeast Asian Box Turtle. Moll & Moll (2004) suspected eggs and a significant proportion of hatchlings are an important source of food for monitor lizards, crocodiles, herons, and other wetland/riverine birds, and small mammalian predators, such as civets. But this statement may not be so relevant because of the nature of turtles that hide, have hard shells and nests that are hard to find. Stanner (2010) observed predation by the water monitor lizards, *Varanus salvator*, in Bangkok, Thailand. Karraker et al. (2020) obtained diet samples from 200 individual turtles and found that the species is omnivorous, exhibiting an ontogenetic shift from more carnivorous to more omnivorous. In the wild, the Southeast Asian Box Turtle has an omnivorous but primarily vegetarian diet (Rogner, 1996), but shows preference for a carnivorous diet in captivity (Schoppe, unpubl. data). The species forages on aquatic plants, aquatic insects, molluscas, and crustaceans in the water and on plants, fungi, and worms on land (Lim & Das, 1999).

The greater activity during overcast periods, and activity during major moon phases (Jensen & Das, 2008); turtles hide under debris along the banks during the day and are active at night (Alcala, 1986). Apriani et al. (2015) reported based on their observation in the wild in Seram, show that *Cuora amboinensis* hiding or covering the body with litter, showing itself when basking which is only 10–15 minutes and find food. Aini (2021) also reported from Rawa Aopa National Park that *Cuora amboinensis* will take refuge in ground-level burrows, bamboo or rattan clumps, under piles of litter or savanna grass, or in stagnant waterholes during the day. Therefore, the variables that are important for *Cuora amboinensis* are the presence of water, canopy cover, ground cover, and vegetation.

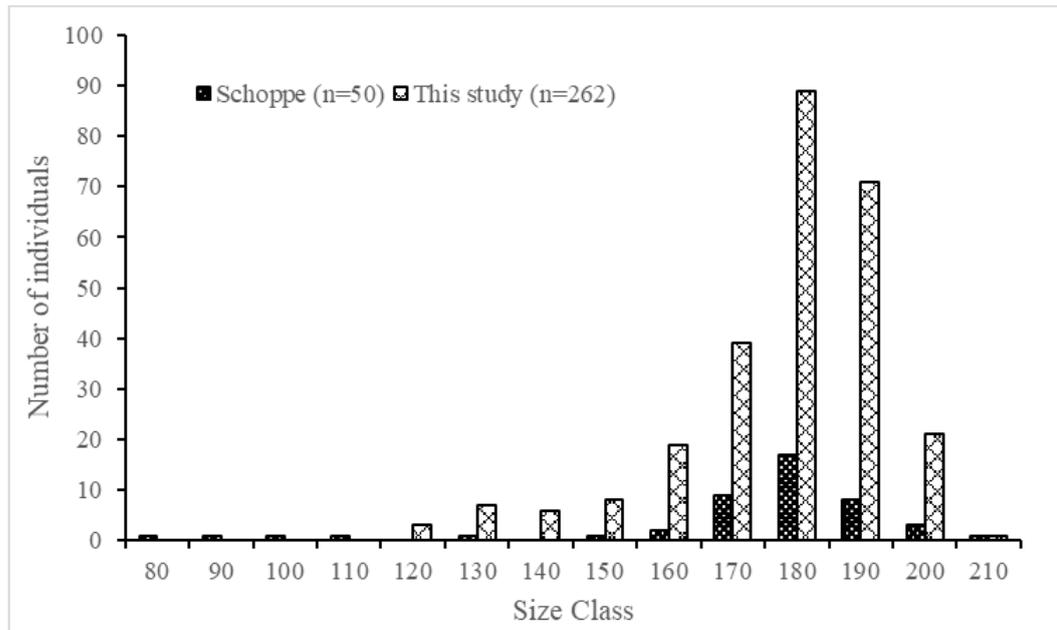
## 2.6. Population

The population size of *Cuora amboinensis* the species on protected area in the two hectares of a peat swamp forest in Taman Nasional Rawa Aopa Watomohai in the south-east of the island of Sulawesi was estimated to be 120 individuals or 60 individual/ha. The population composition in terms of immature to mature ratio was almost 1:1 (54.9% immature and 45.1% mature). Harvest surveys of the species in an openly accessible area in East Kalimantan have shown that four middlemen alone easily assemble more than half of the nation's annual quota in one year. The composition of harvested individuals in the study site in Kota Bangun, East Kalimantan was significantly in favour of large adults (95.8%) and contained only 4.2% immature individuals (Schoppe, 2009). Riyanto & Mumpuni (2019) reported population size from harvested areas di Sumatra. Population size in Jambi was estimated 65,78 individual/ha, North Sumatra2 was 61,8 individual/Ha, and North Sumatra1 was 9,9 individual/ha. Meanwhile, the composition of harvested individuals in North Sumatra is also dominate by adult individuals (80%), but in Jambi dominated by immature individuals (59%). Roughly, there does not seem to be much difference between the populations in the harvested and protected areas.

Fauzi et al. (2021) with comparison of monitoring data of *C. amboinensis* on 2006 (published in Schoppe (2009) in North Sumatra and Central Kalimantan published recent monitoring of harvest size (Figure 4 and 5) that shown no evidence of decreasing of harvest size. The population is not or has not experienced large pressure due to harvesting activities if there is no change in harvest size over decade which does not become smaller compared to the harvest size of the previous period.



**Figure 4** Comparison of harvested individuals size of *C. amboinensis* between 2006 and 2019 in North Sumatra.



**Figure 5** Comparison of harvested individuals size of *C. amboinensis* between 2006 and 2019 in Central Kalimantan.

## 2.7. Coexistence with Human

Little is known about the long-term or large-scale consequences of the loss of reptiles from freshwater ecosystems (Cheung & Dudgeon, 2006). Turtles play a role in their ecosystem's food chain both as predators of various invertebrates, and as prey species. Eggs as well as a significant proportion of hatchlings are an important source of food for monitor lizards, crocodiles, herons and other wetland/ riverine birds, and small mammalian predators such as civets (Moll & Moll, 2004). Although information on the scale of predation on eggs and hatchlings is not available for any Asian freshwater turtle, egg and hatchling survival of North American aquatic turtles is reported to be low with mortality mainly caused by predation. The common and widely distributed North American Painted Turtle *Chrysemys picta* and the Southeast Asian Box Turtle have some similarities in life history such as size, sex ratio and age at maturity. For the Painted Turtle 92% mortality was recorded between egg laying and arrival of hatchlings at pond (Wilbur, 1975). A later study on the same species estimated 54% mortality, mainly due to predation (Mitchell, 1988) Because of its consumption of worms and molluscs, some of which might act as intermediate hosts for various human diseases, this species may help to stem invertebrate-borne diseases (van Dijk 2000). In determining the importance of Southeast Asian Box Turtle as a seed disperser, it was noted that fruits of five important trees e.g., fig trees *Ficus* sp., Indian Mulberry *Morinda citrifolia* are consumed (Peter Widmann, Scientific Consultant, Katala Foundation Inc., Palawan, Philippines, in litt. to the researcher, 18 Aug. 2006; Karraker et al., 2020). Significant ecological impacts of the loss of turtles might include changes in energy flow, nutrient cycling and food-web structure, and heavily exploited species could be reduced to a level at which they become functionally extinct well before extirpation has taken place (Cheung & Dudgeon, 2006). Unfortunately, ecological studies of most Asian herpetofauna are extremely

limited and, in this regard, Asian turtles have been described as '*truly forgotten and ignored creatures*' (Thirakhupt and van Dijk, 1994; see also Moll & Moll, 2004).

## CHAPTER III UTILIZATION ASPECT

### 3.1. Threats

The main threat of the species is over exploitation and may decline the habitat for the species by land cover change to housing and industry. In anticipated detriment population from over exploitation, since 2001 until 2017 the quota was setup constant in 18000. This condition started from 2019 after this species drown into RST in 2018. After that the quotas decrease from 18000 to 12000. From 2019 to 2021 the quotas stay constant and increase from 2021 untill 2022. Roadkill and by catch also be the threats of this species in Indonesia. The significant ecological impact of the loss of this species includes changes in energy flow, nutrient cycling, and food web structure (Schoppe, 2008). As fishing has been one of the major economic activities for the local people, the balance between the utilization of natural resources (i.e., fishing) and conservation (i.e., maintaining *Cuora amboinensis*) needs to be achieved and maintained. Fishing activities by fishermen in the study area will be used as the source of information for the existence of *Cuora amboinensis*, as well as the possible threat for this species due to bycatch.



**Figure 6** The kinds of funnel trap for trapping *Cuora amboinensis* dan *Siebenrockiella crassicollis* in Indonesia, the material from the frame is made of wood and nylon netting in Jambi (left), and the material is made of woven metal in North Sumatra. (Photograph by A Riyanto)

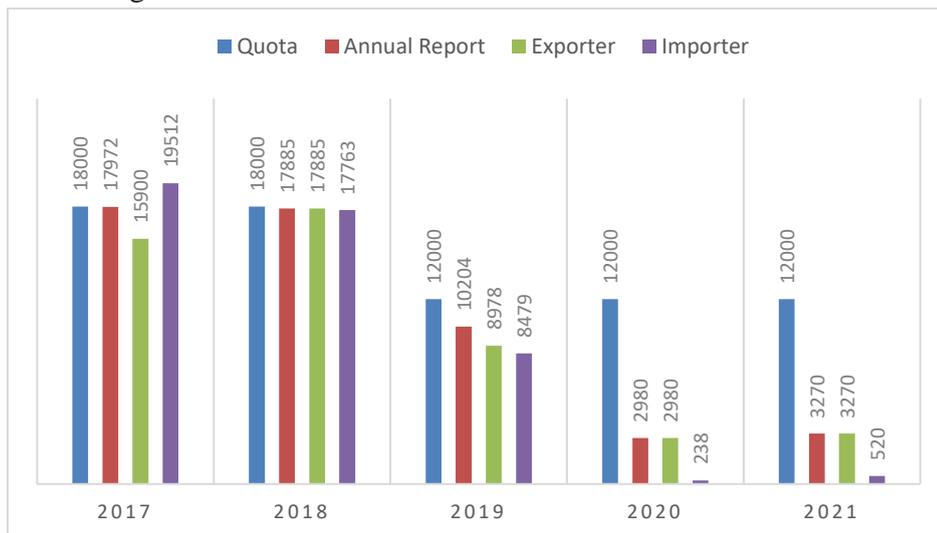
Turtles are exploited for purposes local consumption, export mainly to Europe and North America for the pet trade or export to China for food and Traditional Chinese Medicine (TCM) (Holloway, 2003). Indonesia is main supplier of *Cuora amboinensis* for international meat, TCM, and pet markets. A conservative estimate is that illegal trade amounts to 10 times the volume of legal volume (Schoppe, 2009), that is covers live specimens and the shell trade (Schoppe

& Das, 2011).

Vary in capture technique, such as in northeastern India and Bangladesh, occasionally the turtle caught in gill nets set for fish. In Malaysia and Indonesia, the turtle is either hand captured or collected with baited traps during darkness (Schoppe 2008, 2009). This is like what happened in Sumatra, Kalimantan, and Sulawesi. The people use bait such as palm fruit. The oil palm fruit is tied and placed in funnel traps. The trap can be adjusted to target a certain size, namely by adjusting the entrance and the diameter of the woven body of the trap. In Jambi and North Sumatera, the turtle hunters have a kind of wisdom, namely by rotating harvest locations, besides that turtle hunting activities are influenced by the rice harvest season (Riyanto & Mumpuni, unpubl. data).

### 3.2. Trade

During the period before the species included in CITES Appendix II in 2000, the species was managed in Indonesia as a fishery resource under DKP, which used to merge all *Geoemydidae* spp. (Asian freshwater turtles) together under the category “*kura kura*” or hard-shelled turtle. In this period the export volume is not exactly known but seems unlimited exploitation. The Asian Turtle Trade Official records of legally exported specimens alone indicate an annual export of about 300000 individuals in the 1990s (Jenkins 1995; Lau et al. 1995; Samedi & Iskandar 2000) and 20000 annually after the CITES Appendix II listing (UNEP-WCMC CITES Trade Database, 2007). Since 2001, Indonesia follows the recommendations of the Animals Committee, Plants Committee or the Standing Committee was setup annual export quota to be 18000, and then in 2017 was reduced to be 12000 individuals. The annual export quota and its realization between 2017 to 2021 represented Figure 7.



**Figure 7** Comparison annual quota, realization, report from exporter and importer of *Cuora amboinensis* between 2017 to 2021. Data from exporter and importer report gathered from CITES trade database.

Based on the graphic is known that real realization since 2019 started to

decline and dropped in 2020 and 2021. This is a phenomenon caused by the effect of global pandemic Covid-19, and not reflected to the decline of the wild population. The realization based on data of exporter report during five years seem that annual volume is 68 % of annual export quota.

## **CHAPTER IV MANAGEMENT ASPECT**

### **4.1. National Regulation on the Wildlife Trade**

The harvest and trade of all CITES Appendix II species, must be strictly controlled-in terms of harvest, domestic transport, and export – by the DG KSDAE as the CITES Management Authority. This follows Decree of the Minister of Forestry Number 447/Kpts-II/2003 concerning the Administration Directive of Harvest and Capture and Distribution of the Specimens of Wild Plant and Animals Species. The annual national quota is set under this Decree by the Director General of KSDAE, and the Provincial Offices of the KSDAE (i.e. the BKSDA) issue harvest permits, whose totals cannot exceed the amounts which have been allocated as the provincial quota. Permits for domestic transport are also issued by the provincial office in accordance with the annual quota and with reference to harvest permits.

Collectors and exporters must be licensed and registered at the Directorate General of KSDAE to apply for CITES export permits. All shipments should be verified and checked by the provincial office of KSDAE (BKSDA) whose officers are posted in the designated international ports. Any violation to this regulation is sanctioned based on the provisions of the Government Regulation No. 8 of 1999 concerning Wild Animals and Plants Species Utilization, which is the implementation of the Act No. 5 of 1990 concerning Conservation of Living Resources and Their Ecosystems. The Government Regulation No. 8 of 1999 provides penalties for smuggling/ misdeclaration or trade that is not in accordance with the provision of the regulation and may be liable to imprisonment (in accordance with the Customs and Excise Law) and or fines of maximum IDR 250 million (about USD 27,000).

### **4.2. Harvest and Trade Monitoring**

The provincial offices of the Management Authority (BKSDA) control and enforce harvest/ collection permits, and implement quota management and monitoring, for CITES-listed species in all administrative jurisdictions. In accordance with the Decree of the Minister of Forestry No. 447 of 2003 the BKSDA office will issue permits to collect species included in the quota list in the field based on the quota allocated for each respective province. All specimens harvested from the habitat are officially registered by the Sub-provincial Section Offices of BKSDA (Districts office of BKSDA) who then report back to the provincial BKSDA.

For domestic transport, the specimens must be covered by permits issued by BKSDA or its Section Offices. To facilitate better control, the domestic transport permit is, started from January 2005, now standardized throughout Indonesia. All permits (collection and domestic transport permits) are required to be reported to central level, which will improve monitoring of internal (domestic) trade. For international trade, there are already a limited numbers of import/export points nominated for Indonesia's CITES trade (see CITES Notification 1999/79).

Monitoring the chain of custody between source regions and collection points

within Indonesia is theoretically possible of accuracy. Each province is divided into a number of BKSDA jurisdictions which will be able to track the legality of the specimens.

Standardized domestic transport permits are issued by BKSDA, in which five separate copies must accompany internal shipments within Indonesia. In addition, there should be a monthly report by BKSDA offices to report levels of internal transport to the central Directorate General of Ecosystem and Nature Conservation (DG KSDAE) office (as the CITES MA). The five copies are: the first copy must follow the specimen; the second copy stays as the file of BKSDA; the third copy is sent to the central office (DG KSDAE) as the file for DG KSDAE and used for crosschecking with the original which is enclosed with application for export; the fourth copy is file for BKSDA destination and used for cross checking with the original when the shipment has arrived; and fifth copy is for the Section of BKSDA.

#### **4.3. Species Management—wild specimens**

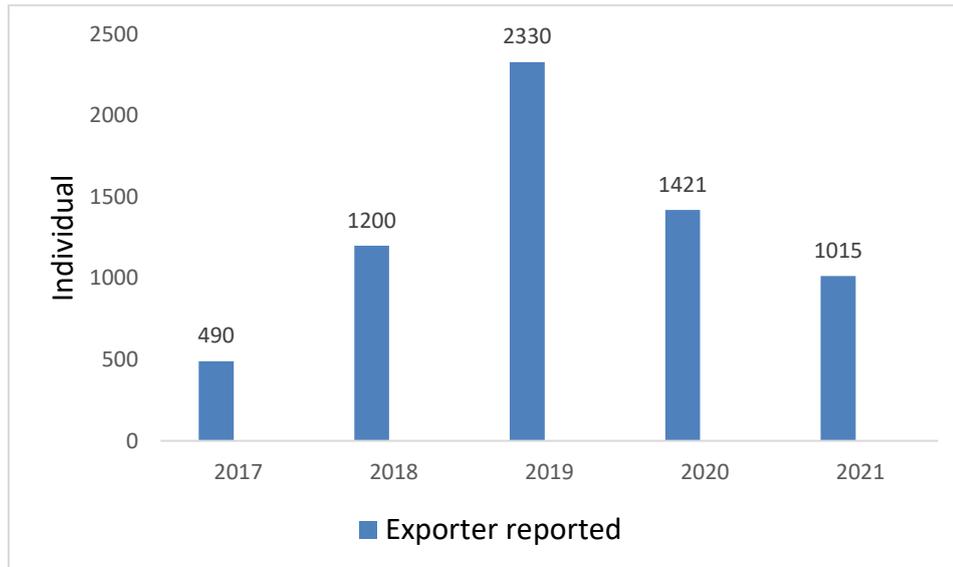
Southeast Asian Box Turtle is listed in Appendix II since 2000. Despite this turtle is widespread species, Indonesia concerns the continuity of export of this species thus put effort on the management of trade through quota system to satisfy Article IV of the CITES Convention, which meant demonstrating no detriment to the wild population.

Today, quotas for all reptiles subject to export in Indonesia are more sophisticated. Management Authority officers in each Province where harvesting takes place, establish proposed harvest levels in the field, which are then reviewed and assessed further by CITES Scientific Authority (National Research And Innovation Agency, BRIN, previously named Indonesian Institute of Science, LIPI). Various parameters, including environmental conditions, are used to set up quotas. In setting the quotas, the Scientific Authority involves individuals from a wide range of expertise, including scientists from other Research Organizations, Universities and NGOs. Once quotas are finalized BRIN submits them back to DG KSDAE as CITES Management Authority, which then issues an annual decree on the national allowable harvest. The decree identifies the allowable harvest of each species down to the province level.

Individual species harvest quotas are based on a range of available data, including information on the biology, population, and distribution of the species, general land-use and potential threats in specific areas. The export quota is typically established as 90% of the total national harvest: domestic trade is around 10% (Siswomartono 1998).

#### **4.4. Species Management—captive breed specimens**

The effort to make captive breed program has been initiated and supported by the Indonesian Government. The captive bred company is registered in the Indonesia CITES MA namely PT. Agrisatwa Alam Nusa in Bekasi, West Java. The registration mechanism of the captive bred operation of CITES listed is according to Government regulation No. 19/Menhut-II/2005 concerning Captive Bred operation on wild fauna and flora. Export volume of this specimen produced from captive bred facility (source code F) during the year of 2017 - October 2021 is shown in Figure 8 with export destination countries include China, taiwan, Singapore, USA, and Maroko.



**Figure 8** Export volume of specimen produced from captive breed facility (year 2017 - October 2021). Data from exporter report gathered from CITES trade database.

This farm has complete facilities such as parent pools which equipped laying area, big incubation room, quarantine room and pool temporary shelter for babies before selling. The farm keep the parent of *Cuora amboinensis* with ratio 1 male : 2 females, and usually, the babies sold when the age 2-3 months.



**Figure 9** Captive breeding facilities of PT. Agrisatwa Alam Nusa. The parent pool equipped nesting area (left), and incubation room showed incubation boxes (right).



**Figure 10** *Cuora amboinensis* adult in the facility of PT. Agrisatwa Alam Nusa.



**Figure 11** Egg and hatchling of *Cuora amboinensis* on PT. Agrisatwa Alam Nusa. Arrangement of the eggs to be incubated in container box (left), and the hatchling (right).



**Figure 12** Hatchling and babies of *Cuora amboinensis* were produced by PT. Agrisatwa Alam Nusa. New hatchlings (left), and babies (right).

For monitoring, the CITES Management Authority (MA) designed a tool to control and monitor the production of a company such as establishment Maximum Utilization Limit (MUL). MUL is an estimate of breeding success for a particular species, by a particular breeder over a forthcoming one-year period.

#### **4.5. Protection of the species: Protected Areas and other Measures**

Harvest of any species within gazetted Protected Areas, is prohibited under Act No. 5 of 1990. Anybody entering or trespassing in Protected Areas without permits may be prosecuted. Despite some reports on encroachment into protected areas by local people, protected areas would be the perfect place to safeguard from illegal harvesting of any species.

Some habitat distribution of *Cuora amboinensis* are in protected area. Indonesia has gazetted total 518 units of protected areas covering about 27 million hectares. Of this number, there are 490 units of terrestrial protected areas covering about 23 million hectares (Ministry of Forestry, 2011). The Protected Areas in Sumatra, Kalimantan, Sulawesi, Java, Bali, Moluccas are of important areas for total protection of Southeast Asian Box Turtle protection. This turtle has been recorded in RAWNP (Aini, 2018; Aini, 2019, Nurazizah, 2020) with population more than 50 individual/ha (Karraker 2018). On this conservation area, local fisher does not trade this species like the other fish. When the turtles come to their traps (local trap “bubu”), they will release it at the place. But some of them found the turtles died because the turtle drowns into the water inside the bubu. Another possible threats in RAWNP are land fire (Ridha 2018) and roadkill (Purnomo 2020). Riyanto & Mumpuni (2013) encountered *C. amboinensis* di Bali Barat National Park.

#### **4.6. Low Enforcement: smuggling combat**

In order to monitoring the wildlife circulation, the CITES Management Authority build coordination and cooperation with related parties such as State

Police, Customs & Quarantine and NGO (i.e WCS Indonesia Program). Along with that, the Management Authority established a special unit to handle smuggling cases on wildlife. In line with this task, Indonesia also increased the capacity of officers in identification and survey on wildlife species also socialization the role in the management of the wildlife in annual basis. In some cases, Indonesia CITES MA and law enforcement agencies consults BRIN (Indonesia CITES SA) in identifying confiscated specimens.

In January 2015, Indonesia succeeds to foil the smuggling of carapace including *C. amboinensis* carapace in Port of Tanjung Priok and then in September 2017 carapace mixed antlers in Tangerang, West Java.



**Figure 13** Conferention pers of the successful in foiling the smuggling. Left-January 2015 (Photos: news.detik.com). Right-Arrested smuggling of carapace and antler in September 2017 (Photo: Poskotanew.com).

In March 2021, succeeded in thwarting the delivery of 285 individuals of the Southeast Asian Boxe Turtle to Surabaya which were not accompanied by the required documents.



**Figure 14** Southeast Asian Box Turtle confiscated din March 2021 (Photo: <https://jatim.tribunnews.com>).

## CHAPTER V NDF SCORING

### 5.1. NDF Scoring

The scoring of Southeast asian Box Turtle, *Cuora amboinensis*, is divided into four aspects, namely: biology, hunting pressure, trading pressure and management. The items assessed for these four aspects mostly follow Setyastuti & Wirawati (2019) and Kurniati et al. (2023). The assessment of each item is guided by the description in CHAPTERS II and III, with the following details:

**Table 1.** Category and criteria for NDF score of *Cuora amboinensis* in Indonesia.

No	Criteria	Category	Indicator	Score
<b>Biological Aspect</b>				
1	Taxonomy: Identify species level using morphological characters	Low – 1	Easily identify up to species level with morphological characters	1
		Medium – 2	It is a little difficult to identify the level of species with morphological characters	
		High – 3	Cannot identify to species level with morphological characters	
2	Reproduction season: Reproduction time is the mating season for a species.	Low – 1	Breed all year round	
		Medium – 2	Breed in certain seasons (e.g., during the dry season or throughout the rainy season)	2
		High – 3	Breed only once a year/uncertain or unknown	
3	Growth rate: Sexual maturity of <i>Cuora amboinensis</i> 4.5-5 year in captivity.	Low – 1	Fast both in growth rate and sexual maturity	
		Medium – 2	Moderate growth rate and moderate sexual maturity	2
		High – 3	Slow growth rate and slow sexual maturity	
4	Egg cell susceptibility: Egg size is an important parameter for reproductive strategies. The larger the egg size (based on diameter) the greater the ability to adapt to maturity. The smaller the egg size, the more vulnerable it is.	Low – 1	Large egg size (>150 µm)	1
		Medium – 2	Medium egg size (100-150 µm)	
		High - 3	Small egg size (<100 µm)	
5	Life span: Maximum age. The shorter the age, the higher the level of vulnerability.	Low – 1	>10 years	1
		Medium -2	5-10 years	
		High – 3	<5 years	
6		Low – 1	Solitaire	1
		Medium – 2	Solitaire but sometimes in group	

	Aggregated life habits: Life habits are categorized into (a) solitaire and (b) groups. In the <i>Cuora amboinensis</i> which has fast movement, the more varied its life habits, the lower its vulnerability due to natural factors (predators or fishing pressure)	High – 3	In group	
7	Cryptic behaviour/habits, more hiding places it has, the lower its vulnerability to natural predation or hunting pressure.	Low - 1	If a type always has cryptic characters / hides in hidden cavities in ground beside river, or shrubs	1
		Medium - 2	If a species is sometimes cryptic (for example, only during the day) but is exposed in open areas (at night) to find food	
		High - 3	If a species always has a character that is always easy to find and exposed in open areas	
8	Geographical distribution: The more limited the distribution of a species, the higher the level of its vulnerability	Low – 1	Distributed throughout the Indonesian archipelago	1
		Medium – 2	Distributed in the majority of the Indonesian archipelago	
		High - 3	Distributed only in certain locations (locally endemic)	
9	Vertical distribution. This is an indicator of the species' capability to adapt to different air temperatures.	Low – 1	0-1200 m asl	
		Medium – 2	0-700 m asl	2
		High – 3	700-1200 m asl	
10	Habitat: The more specific the habitat of a species, the higher the level of its vulnerability. In general, species with specific habitats have low adaptability, so if their habitat is damaged, it will have a direct impact on the species.	Low – 1	Not specific	1
		Medium – 2	Moderate	
		High - 3	Specific	
11	Habitat type: The more specific the habitat of a species, the higher the level of its vulnerability. In general, species with specific habitats have low adaptability, so if their habitat is damaged, it will have a direct impact on the species.	Low – 1	Occurs in all habitat types	1
		Medium – 2	Occurs in two types of habitats	
		High – 3	Occurs in only one habitat type	
12	Substrates: 3 types - (a) muddy, (b) semi muddy, (c) not muddy	Low - 1	Occurs in all substrate types	1
		Medium - 2	Occurs in two substrate types	
		High – 3	Occurs only in one substrate type	

13	Threats of natural predators: The number of natural predator species	Low - 1	< 5 species	1
		Medium - 2	5 – 10 species	
		High - 3	> 10 species	
14	Population trends, determined from (1) data on trends in population abundance in nature; (2) coverage of catch distribution area; (3) results from interviews or data on catches of first-level hunters/collectors; (4) results from data collection on the types of hunters' livelihoods.	Low - 1	(1) The trend of abundance in nature is stable. (2) The trend of abundance in nature is increasing. The trend of abundance in nature decreases to a maximum of 20% of the previous population abundance data.	1
		Medium - 2	(1) The trend of abundance in nature has decreased by up to 70% from the previous population abundance data. The distribution of hunting areas is further away from the beginning of hunting efforts.	
		High - 3	(1) The trend of abundance in nature has decreased to >70% from the previous population abundance data; The distribution area is increasingly limited and fragmented, the turtle capture "hot spot" area is no longer found.	
15	Trend of responsiveness to utilization pressure. seen from the evaluation of biometric trends in catches from time to time. the population is not or has not experienced pressure due to utilization if there is no change in size which does not become smaller compared to the catch of the previous period	Low – 1	stable	1
		Medium – 2	fluktuative	
		High – 3	decrease	
16	Native or introduced species:	Low – 1	Invasive species	
		Medium – 2	Alien species	
		High – 3	Native species	3
<b>Hunting Pressure Aspect</b>				
17	Availability of national production data.	Low – 1	Available – complete	1
		Medium – 2	Partly available – not complete	
		High – 3	Unavailable	
18	Availability of national production data based each harvested area	Low – 1	Available at a national scale	1
		Medium – 2	Only available for some capture areas	
		High - 3	No data available	

19	Variation of capture tools: The types of capture tools determine the probability of <i>Cuora amboinensis</i> , although the type of capture tools that are often used depends on the type of habitat where the turtle occur.	Low – 1	1 (one type of capture tool)	
		Medium – 2	2 (two types of capture tools)	2
		High – 3	> 2 (more than two capture tool types)	
20	Harvest areas: Indonesia is an archipelagic country with more than 17,000 islands. If the hunting area of the <i>Cuora amboinensis</i> gets wider, its vulnerability will be low, because the hunting level is relatively low and spread out. If the hunting area is located in most parts of Indonesia, the hunting area is narrower, but the hunting pressure is medium. The limited/specific hunting areas will increase the vulnerability of the turtle to hunting pressure.	Low – 1	Wide range – in all parts of Indonesia	
		Medium – 2	In the majority areas of Indonesia	2
		High – 3	Limited areas – only at certain locations	
21	Hunting season (in a year): This affects the intensity of hunting pressure on a population. Hunting season is related to the weather conditions at the hunting locations.	Low – 1	jarang	
		Medium – 2	sedang	2
		High - 3	sering	
22	Local wisdom in rotating harvest areas. This rotation is beneficial for turtles to be able to grow and develop	Low – 1	rotating harvest locations as a local wisdom is found in national scale	
		Medium – 2	rotating harvest locations as a local wisdom is found, but but not at national scale	2
		High - 3	there is no wisdom regarding rotation of harvest locations	
<b>Trade Pressure Aspect</b>				
23	Recording of trade data: Complete information on volumes and species being traded is recorded.	Low – 1	Trade data are completely recorded (species, volume per species, species origins)	1
24	National/domestic trade volume	Low – 1	Low volume of domestic trading	1
		Medium – 2	Medium volume of domestic trading	
		High – 3	High volume of domestic trading	
25	Annual volume for international trade: Data from annual exports from the Management Authority.	Low – 1	Low export volume (realization <50% export quota)	
		Medium – 2	Medium export volume (realization ≥ 50 to 75% of export quota)	2

		High – 3	High export volume (realization >75% of export quota)	
<b>Management Aspect</b>				
26	Management plan: Is there any for <i>Cuora amboinensis</i> conservation?	Low - 1	Fully implemented	1
		Medium - 2	Partially implemented	
		High – 3	Not yet implemented	
27	Documentation of data and information. All data and information are well documented and comprehensively represents all harvest localities.	Low – 1	Data has been recorded and covers all capture locations in Indonesia, or the available data covers at least 90% of capture locations in Indonesia	
		Medium - 2	Data has been recorded but does not cover all the capture locations (25-90%)	2
		High – 3	Available data is less than 25%	
28	Sustainable use regulations.	Low - 1	Available on nationally scale	1
		Medium - 2	Available on locally scale	
		High – 3	No available	
29	Implementation of sustainable use regulations	Low – 1	Has been implemented on nationally scale	1
		Medium - 2	Has been implemented, but still on locally scale	
		High – 3	Not yet implemented	
30	Socialization of regulations. In this criterion, it is assessed whether there is socialization of existing regulations. Furthermore, whether the socialization has been carried out to all utilization related parties (KLHK/BKSDA, exporters, collectors and hunters).	Low - 1	All regulations have been socialized nationally to related parties	1
		Medium - 2	Some regulations have been socialized nationally	
		High – 3	There has been no socialization of regulations nationally	
31	Capture license. In this criterion, it is assessed whether there are any licensing rules associated with capturing the <i>Cuora amboinensis</i> in collector level.	Low - 1	All collectors have permits	1
		Medium - 2	Some collectors already have permits	
		High – 3	The collectors don't have permits	
32	Implementation of capture licensing. In this criterion, it is assessed whether the CITES licensing rules related to <i>Cuora amboinensis</i> have been implemented.	Low - 1	All implemented	1
		Medium - 2	Partially implemented	
		High – 3	Not yet implemented	
33	Restrictive harvested locations. It is assessed whether there are rules for restricting the capture locations of <i>Cuora</i>	Low – 1	Available at national level	1
		Medium - 2	Available but not at national level	
		High – 3	Not available	

	<i>amboinensis</i> , which determine allowable and not allowable locations for harvesting the species			
34	Implementation of restrictive harvested locations.	Low - 1	Implemented at national scale	1
		Medium - 2	Implemented but not at national scale	
		High - 3	Not yet implemented	
35	Assess whether there are rules to capture restrictions of the <i>Cuora amboinensis</i> that can be caught	Low - 1	Available at national level	1
		Medium - 2	Available but not at national level	
		High - 3	Not available	
36	Implementation of capture restrictions.	Low - 1	Implemented at national scale	1
		Medium - 2	Implemented but not at national scale	
		High - 3	Not yet implemented	
37	Traceability of traded commodities.	Low - 1	The national system/mechanism already exists and is complete (covering data on capture areas, transportation, product processing, domestic distribution, and overseas distribution)	1
		Medium - 2	The system/mechanism already exists but is incomplete and not yet on a national scale	
		High - 3	There is no traceability system/mechanism	
38	Implementation of traceability system of traded commodities	Low - 1	Implemented at national scale	1
		Medium - 2	Implemented but not at national scale	
		High - 3	Not yet implemented	
39	Utilization regulation. This criterion assesses whether there is a licensing system that regulates <i>Cuora amboinensis</i> (trading, breeding, specimen exchange, and research).	Low - 1	Utilization regulation is completely available	1
		Medium - 2	Utilization regulation is available but not complete	
		High - 3	No utilization regulation is available	
40	Law enforcement. Assessed whether there is law enforcement against violations of the use of <i>Cuora amboinensis</i> .	Low - 1	Law enforcement has been carried out in all cases of violations	1
		Medium - 2	Law enforcement has only been applied to some cases of violations	
		High - 3	There is no law enforcement	
41	Control of capture locations	Low - 1	Capture on non-conservation areas	1
		Medium - 2	Capture on conservation areas	
		High - 3	all above	

**Table 2.** Summary of NDF scoring of *Cuora amboinensis* in Indonesia.

Aspect	Total Score	Total Criteria	Final Score
Biological	21	16	1.31
Hunting Pressure	10	6	1.67
Trade Pressure	4	3	1.33
Management	17	16	1.06

\*Score ranking; 1.0-1.5 = low vulnerability; 1.6-2.5 = moderate vulnerability; 2.6-3.0 = high vulnerability.

Scoring of the NDF aspect shows that the biological, trade pressure and management aspects have a low vulnerability, but hunting pressure is moderate vulnerability to the existence of the *Cuora amboinensis*. Management interventions are needed to ensure the sustainability, such as reducing quotas, stricter restrictions on the size that allow harvested for example by size, outreach to people who depend on these turtles for their lives about these limits as well as to rotate harvesting locations. In line with that breeding efforts are also more encouraged to produce and meet the export demand for pets.

## 5.2. General Conclusions and Recommendations

This assessment at least shows the utilization so far of *Cuora amboinensis* in Indonesia in general is low vulnerability to the existence this species, but precautionary is needed in managing its utilization considering that the hunting pressure aspect indicates moderate vulnerability.

This assessment proposes several recommendations for improving regulations concerning *Cuora amboinensis* utilization. The regulatory stages in *Cuora amboinensis* utilization are as follows:

1. We recommend reducing 40% of the export quota become 7200 individuals starting from 2024.
2. More strict in that allowed individuals harvest with restrictions on the size.
3. Outreach to people who depend on these turtles for their lives about these limits as well as to rotate harvesting locations,
4. More encouraged breeding efforts to produce and meet the export demand for pet.

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**MINISTRY OF ENVIRONMENT AND FORESTRY REPUBLIC OF INDONESIA**  
DIRECTORATE GENERAL NATURAL RESOURCES AND ECOSYSTEM CONSERVATION  
**DIRECTORATE OF BIODIVERSITY CONSERVATION OF SPECIES AND GENETIC**

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4 August 2023

Our Ref: S. 525 /KKHSG/PSG1/KSA.2/8/2023

To: **Ms. Ivonne Higuero**

CITES Secretariat  
International Environment House  
Chemin des Anemones  
CH-1219 Chatelaine Geneva  
Switzerland  
Email: info@cites.org

**Subject: Update on the Implementation Regarding Review of Significant Trade (RST) in Specimens of Appendix-II Species Concerning *Malayemis subtrijuga* and *Notochelys platynota***

Dear Madam,

Referring to your email dated 31<sup>st</sup> July 2023 regarding Review of Significant Trade in Specimens of Appendix-II Species [Resolution Conf. 12.8 (Rev.CoP18)], we would like to submit information on the implementation of *Malayemis subtrijuga* and *Notochelys platynota* Indonesia. Please kindly find the document Non-Detriment Findings (NDF) a Primary Evaluation of those species as attached for your perusal. For species of *M. Subtrijuga* based on molecular data and pattern distribution, this species is non-native species in Indonesia. The result from primary evaluation of this species is lower than five (5) which means that the wild population is non-detrimental. Therefore we request the CITES Secretariat to remove this species from Review of Significant Trade in specimens of Appendiks-II.

Thank you for your kind attention and consideration.

Yours sincerely,

**Indra Exploitasia, DVM**

Interim Director of Biodiversity Conservation of Species and Genetic  
Email: subditkonvensi.kkh@gmail.com, dit.kkh@gmail.com

cc.:

1. Director General of Natural Resources and Ecosystem Conservation, MoEF;
2. Permanent Mission of The Republic of Indonesia to the UN, WTO, and Other International Organization in Geneva, MoFA;
3. Director of Secretariat of Scientific Authority for Biodiversity.

# CITES Non-detriment finding

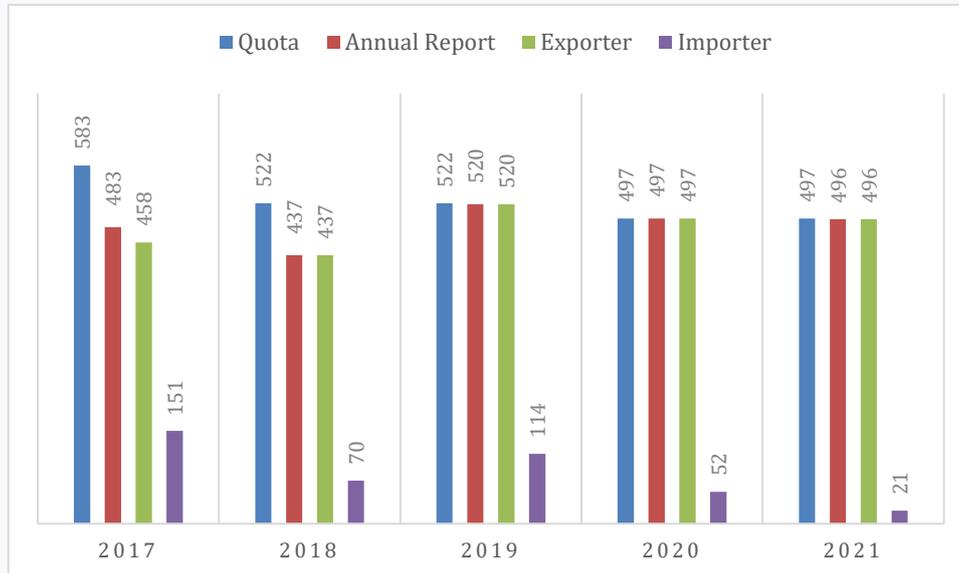
## A Primary Evaluation of *Notochelys platynota* from Indonesia

*Text in italics is explanatory and should be deleted in completed documents. Please refer to the NDF Guidelines document for further explanation on how to complete this evaluation.*

<b>Species name</b>	Malayan flat-shelled turtle ( <i>Notochelys platynota</i> )			
<b>Range state name</b>	ID			
<b>Report compiled by</b>	SA & MA			
<b>Date compiled</b>	07/22/2023			
<b>Section One: Summary</b>				
<p><i>Please provide a short overview (1-2 paragraphs) of the trade in this species in the country of interest.</i></p> <p>Malayan flat-shelled turtle (MFST), <i>Notochelys platynota</i>, was put on Appendix II.</p> <p>Based on the AC32 Doc. 14.2 mentioned that the exports of MFST from Indonesia was selected as RST candidates because they met the selection criteria of high volume. Indonesia has follows the CITES secretariat recommendation to reduce the quota up to 35% or to be 522 individuals that starting from 2018, and as well as applying a maximum size for harvest in 15 cm SCL. Based on exported reported in CITES trade database that from 2017 to 2021 was 2,408 individuals in total exported or equally to 482 individuals each year. This NDF will examine the 482 individuals yearly wild caught of MFST.</p>				
<b>Section Two: Primary Evaluation score</b>				
<i>Please score each attribute listed within the table below and sum these to provide a total.</i>				
	<b>Number of points</b>			<b>Score</b>
<b>Criteria</b>	<b>1</b>	<b>2</b>	<b>3</b>	
<b>Annual Harvest level</b>	Low (<2,000)	Medium (2,000 - 20,000)	High (>20,000)	<b>1</b>
<b>Area of occupancy</b>	Large (>20,000km <sup>2</sup> )	Medium (2,500 – 20,000km <sup>2</sup> )	Small (<2,500km <sup>2</sup> )	<b>1</b>
<b>Life-history</b>	Fast	Medium	Slow	<b>3</b>
<b>Illegal trade and IUCN Threat status</b>	If levels of illegal trade are known, they should be included under “Annual harvest level”. If unknown, and suspected to be detrimental, give a <b>maximum score of 1 point</b> . Similarly, if the status of the species is listed as VU, EN or CR in the IUCN Red List of Threatened Species, give a <b>maximum score of 1 point</b>			<b>1</b>
<b>Section Three: Justification – Harvest level</b>				

Please provide an explanation with appropriate references to justify the score given.

Our export quota was 583 in 2017 and was reduce to be 522 in 2018 and 2019, then to be 497 for 2020 and 2021 (in order to following CITES secretariat) as well as applied maximal size for harvest in 15 cm SCL, but the export based on exporter report from 2017 to 2021 was 2408 individuals in total or equally to 482 individuals each year (see fig 1). This would give us an annual harvest rate value of 1.



**Figure 1.** Comparison of annual export quota, annual report, exporter and importer report of *Notochelys platynota* from Indonesia between 2017 to 2021.

**Section Four: Justification – Area of occupancy**

Please provide an explanation with appropriate references to justify the score given.

MFST has variable habitats, including marshes, swamps, ponds, and streams in lowland rain forests with abundant aquatic plants, and widely distributed in Indonesia, including three big islands Sumatra, Java and Kalimantan as well as the adjusted islands surrounding them. Feed primarily on aquatic plants. In captivity, MFST are found omnivorous.

The total area of wetland of Sumatra (72,043 km<sup>2</sup>), Java (12,206.14 km<sup>2</sup>), and Kalimantan (57,692.46 km<sup>2</sup>) is 141,941.6 km<sup>2</sup>.

Therefore, we assign an area of occupancy of 1.

**Section Five: Justification – Life history**

Please provide an explanation with appropriate references to justify the score given.

The reproductive of MFST is little known. Lifespan in captivity reach 18.8 years, with clutch size 4 to 6 eggs, but unknown on age of first maturity.

We therefore assign this species clearly to the ‘Slow’ category: 3 points.

**Section Six: Illegal trade**

Please provide an explanation with appropriate references to justify the score given.

No data on illegal trade, the species is listed as VU.

We therefore assign this species clearly to score 1 point

**Section Seven: Conclusion, course of action and determination on exports**

Please provide an overall conclusion on the perceived threat of trade to the species and details on whether further course of action will be taken to complete an NDF for the species.

Our evaluation yields a final score of **6**, therefore a **thorough NDF is required**.

### Evaluating Non-Detriment

Primary Evaluation score lower than five (5) = trade is non-detrimental (**record the score and justification in the *Primary Evaluation* worksheet provided (in [Annex B](#)). This can be used for Step 4 of the Non-Detriment Finding**).

If the *Primary Evaluation* score is equal to or greater than five (5) then the non-detriment requirement cannot be satisfied, warranting additional information based on other indices to evaluate detriment. **A *Secondary Evaluation* should be undertaken**.

Based on this primary evaluation therefore with consideration of the precautionary, the annual export quota will be reduced by 50% (to be 250 individuals) and as well as applied size limitation for allowed harvest specimens in straight carapace length (SCL)  $\leq$  15 cm.

This management intervention will provide guarantees a sustainable on utilization of Malayan flat-shelled turtle from Indonesia at level annually harvest from Sumatra and Kalimantan up to 250 individuals, and this will be enforced from 2024.

#### Section Eight: Literature Cited

Please provide references to all the reports and literature cited in this evaluation.

AC32 Com. 3. Compliance REVIEW OF SIGNIFICANT TRADE IN SPECIMENS OF APPENDIX-II SPECIES

An Age entry for *Notochelys platynota*

[https://genomics.senescence.info/species/entry.php?species=Notochelys\\_platynota](https://genomics.senescence.info/species/entry.php?species=Notochelys_platynota)

Borneo Happy Farm

<https://www.borneohappyfarm.com/malayan-flat-shell-turtle>

Kusrini, M.D., Hamidy, A., Guntoro, J., Cota, M. & Schoppe, S. 2021. *Notochelys platynota*. *The IUCN Red List of Threatened Species* 2021: e.T14856A546301. <https://dx.doi.org/10.2305/IUCN.UK.2021-1.RLTS.T14856A546301.en>. Accessed on 22 July 2023.

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# CITES Non-detriment finding

## A Primary Evaluation of *Malayemys subtrijuga* from Indonesia

*Text in italics is explanatory and should be deleted in completed documents. Please refer to the NDF Guidelines document for further explanation on how to complete this evaluation.*

<b>Species name</b>	Mekong snail-eating turtle ( <i>Malayemys subtrijuga</i> )
<b>Range state name</b>	ID
<b>Report compiled by</b>	SA & MA
<b>Date compiled</b>	07/22/2023

**Section One: Summary**

*Please provide a short overview (1-2 paragraphs) of the trade in this species in the country of interest.*  
 Mekong Snail-Eating Turtle (MSET), *Malayemys subtrijuga*, listed in Appendix II. The harvest of MSET in Indonesia extremely low volume, in total was 569 individuals from 2017 to 2021 or average 114 individuals per year. Based on molecular data and pattern distribution, MSET is **nonnative species** in Indonesia. This NDF will examine the 114 wilds caught MSET each year.



Figure 1. A male *Malayemys subtrijuga* from Demak, Northern coast of Central Java (Photograph by A. Hamidy)

**Section Two: Primary Evaluation score**

Please score each attribute listed within the table below and sum these to provide a total.

Criteria	Number of points			Score
	1	2	3	
<b>Annual Harvest level</b>	Low (<2,000)	Medium (2,000 - 20,000)	High (>20,000)	<b>1</b>
<b>Area of occupancy for non native/allien/invasive species</b>	Large (>20,000km <sup>2</sup> )	Medium (2,500 – 20,000km <sup>2</sup> )	Small (<2,500km <sup>2</sup> )	<b>1</b>
<b>Life-history</b>	Fast	Medium	Slow	<b>2</b>
<b>Illegal trade and IUCN Threat status</b>	If levels of illegal trade are known, they should be included under “Annual harvest level”. If unknown, and suspected to be detrimental, give a <b>maximum score of 1 point. Similarly, if the status of the species is</b> listed as VU, EN or CR in the IUCN Red List of Threatened Species, give a <b>maximum score of 1 point</b>			<b>0</b>

**Section Three: Justification – Harvest level**

Please provide an explanation with appropriate references to justify the score given.

The harvest of MSET in Indonesia actually extremely low volume, based on exporter report the total number export between 2017 to 2021 was 569 individuals or about 114 individuals each year. Based on molecular and distribution data, MSET is nonnative species in Indonesia.

Based on those would give us an annual harvest rate value of 1.

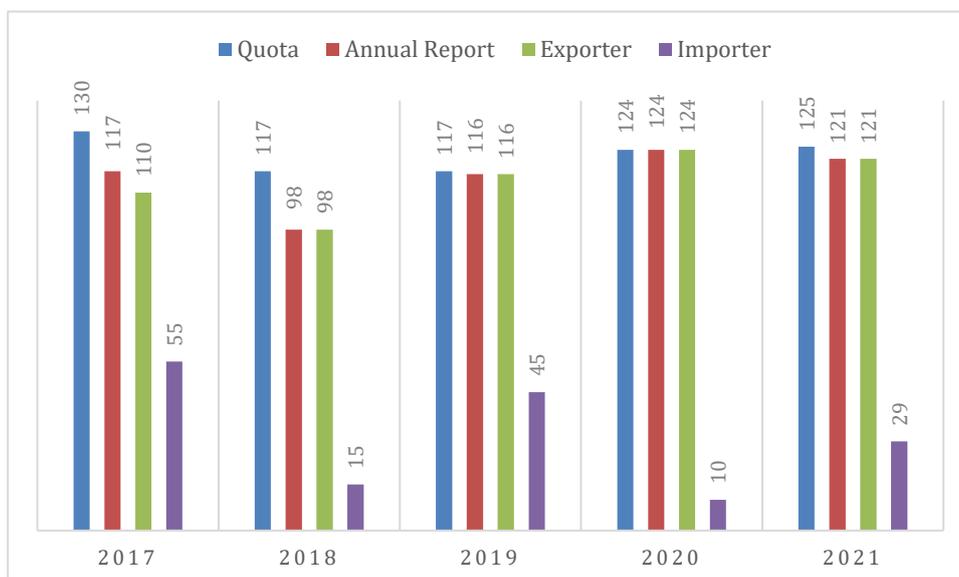


Figure 2. Comparison of export quota, annual report, exporter, and importer report of Malayemys subtrijuga from Indonesia.

**Section Four: Justification – Area of occupancy**

Please provide an explanation with appropriate references to justify the score given.

Based on a record of the Museum Zoologicum Bogoriense (MZB), MSET is distributed in western Java (Jakarta, Serang/Banten, and Tasikmalaya) and Sumatra (Riau), Figure 2. On Java, the species inhabiting wetland on northern coast. The distribution in Indonesia is thought a result of human intervention primarily from the Mekong River on mainland Southeast Asia.

MSET inhabits lowland freshwater habitats including ponds, canals, streams, swamps, marshes, and wet rice fields. The total area of wetland on the northern coast of Java is 12,206.14 km<sup>2</sup>.

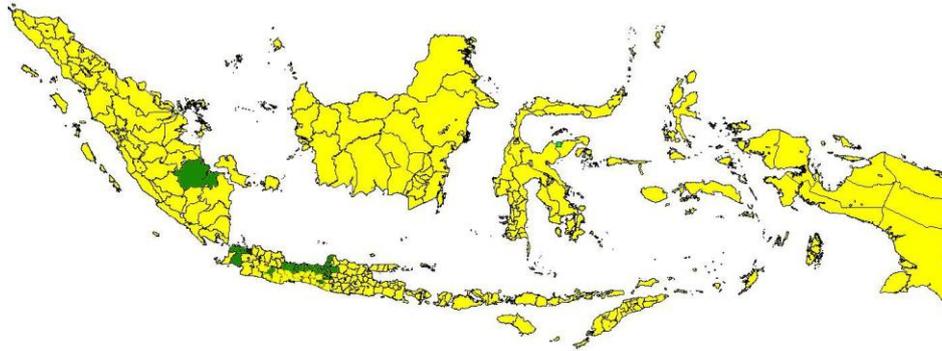


Figure 3. Distribution of *Malayemys subtrijuga*, a non native turtle in Indonesia (Map prepared by Munir).

Hamidy et al. (2019) sequenced two mitochondrial genes of 11 *M. subtrijuga* specimens, consisting of field-collected turtles from Java and captive individuals from a breeder on Sumatra. These sequences were compared with data for Indochinese populations submitted to GenBank by Ihlow et al. (2016). A low genetic variation was found, leading Hamidy et al. (2019) to regard *M. subtrijuga* as having been introduced to Indonesia. Genetic divergence between Indonesian and Indochina population is 0.0-0.5% in NADH4 and 0.0-1.0% in CytB.

But Dawson et al (2020) believed solely on mitochondrial genes may be unsuitable for resolving the history of recent divergences and declare those are inadequate to fully settle the status of *M. subtrijuga* on Java. Based on the limited and jumping distribution (Indochina and Java) especially at the locations of anchored Indonesia-Indochinese interaction of trade history in the past (northern cost of Java) and as well as conclusion from Hamidy et al. (2019), we conclude that MSET is nonnative turtle in Indonesia.

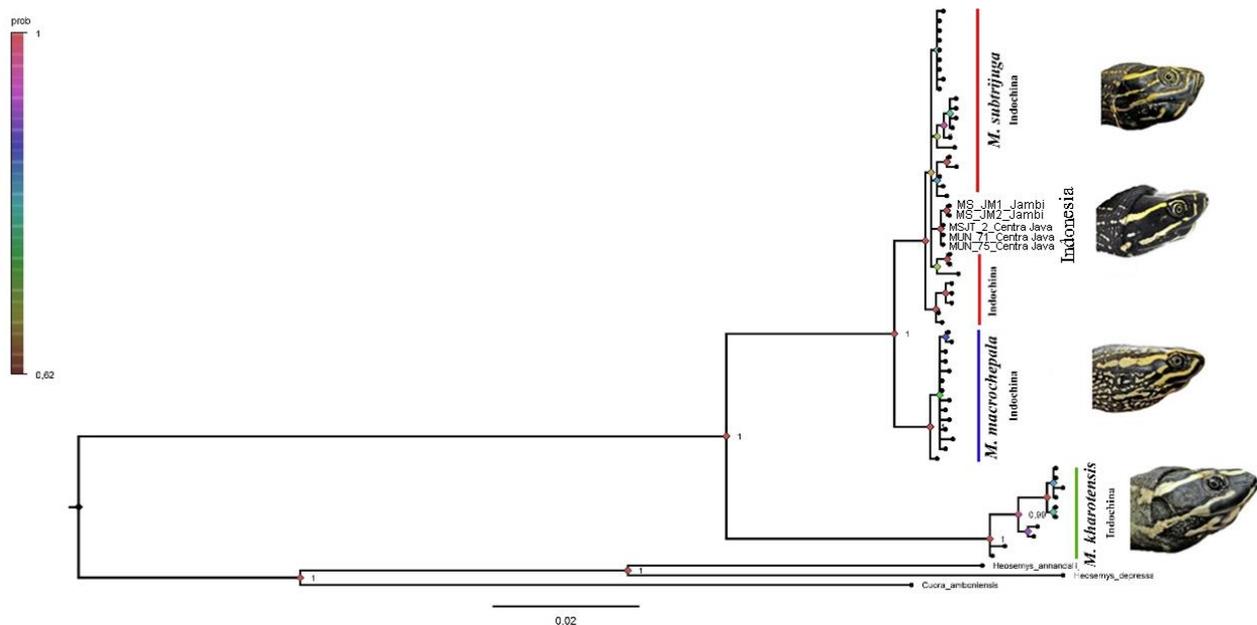


Figure 3. Phylogenetic of *Malayemys* based on 1884 bp of mitochondrial gene (*NADH dehydrogenase subunit 4, Cytochrome b, tRNA-His, tRNA-Ser, tRNA-Leu dan tRNA-Thr*)

Taking into account non-native species, the order of our scoring of the Section Four: Justification – Area of occupancy is reversed, on the grounds that the wider the distribution area of non-native species, the greater the potential for harm to local biodiversity.

Therefore, we assign an area of occupancy of 1.



**Figure 4.** The Habitat of *Malayemys subtrijuga* in northern coast of Java encompass wet land area about 12,206.14 km<sup>2</sup>

#### Section Five: Justification – Life history

*Please provide an explanation with appropriate references to justify the score given.*

In captivity the maximum longevity of MSET reaches 14.2 years, males reach maturity at age around 3 years and 5 years in females, and clutch is size 3–10 eggs with 4–6 clutches per year.



**Figure 5.** Captive breeding of *Malayemys subtrijuga*

We therefore assign this species clearly to the ‘Medium’ category: 2 points.

#### Section Six: Illegal trade

*Please provide an explanation with appropriate references to justify the score given.*

Illegal trade is unknown, and in the Red List IUCN listed as NT.

We therefore assign this species clearly to score 0 points.

## Section Seven: Conclusion, course of action and determination on exports

*Please provide an overall conclusion on the perceived threat of trade to the species and details on whether further course of action will be taken to complete an NDF for the species.*

Our evaluation yields a final score of **4**, therefore **the wild population is non-detrimental**.

### Evaluating Non-Detriment

Primary Evaluation score lower than five (5) = trade is non-detrimental (**record the score and justification in the *Primary Evaluation* worksheet provided (in [Annex B](#)). This can be used for Step 4 of the Non-Detriment Finding**).

If the *Primary Evaluation* score is equal to or greater than five (5) then the non-detriment requirement cannot be satisfied, warranting additional information based on other indices to evaluate detriment. **A *Secondary Evaluation* should be undertaken**.

Since MEST included in the review proces in AC-26 CITES, Indonesia has followed the Secretariat recommendation to reduce the export quota up to 35 % become 125 individuals every year with limitation of maximal harvest size 10 cm (SCL). Considering the low level of harvest and inclusion of this species as non-native to Indonesia, we believe that current harvest quota is not detriment to wild population.

## Section Eight: Literature Cited

Please provide references to all the reports and literature cited in this evaluation.

AnAge entry for *Malayemys subtrijuga*

[https://genomics.senescence.info/species/entry.php?species=Malayemys\\_subtrijuga](https://genomics.senescence.info/species/entry.php?species=Malayemys_subtrijuga)

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