CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA

Eighteenth meeting of the Conference of the Parties
Colombo (Sri Lanka), 23 May – 3 June 2019

CONSIDERATION OF PROPOSALS FOR AMENDMENT OF APPENDICES I AND II

A. Proposal

Transfer of *Mauremys annamensis* from Appendix II to Appendix I, in accordance with Criteria A i), A ii), A v), B i), B iii), B iv), and C i) of Annex I of Res.Conf.9.24 (Rev.CoP17).

B. Proponent

Viet Nam*:

C. Supporting statement

1. Taxonomy

1.1 Class: Reptilia

1.2 Order: Testudines

1.3 Family: Geoemydidae

1.4 Genus, species or subspecies, including author and year: *Mauremys annamensis* (Siebenrock, 1903), as defined in the CITES nomenclature standard reference for turtles (Fritz & Havas, 2007)

1.5 Scientific synonyms: *Cyclemys annamensis* Siebenrock, 1903
Annamemys merkleni Bourret, 1939
Annamemys annamensis (Siebenrock, 1903)

Ocadia glyphistoma McCord & Iverson, 1992 was considered a hybrid between *Mauremys annamensis* and *Mauremys (Ocadia) sinensis*, by Spinks *et al.* (2004), Stuart & Parham (2007), and Fritz & Havas (2007). For CITES purposes, however, specimens identified as *Ocadia glyphistoma* are excluded from this proposal, in agreement with Res. Conf. 12.11 (Rev. CoP17)

1.6 Common names: English: Vietnamese Pond Turtle, Annam Pond Turtle
French: Emyde d'Annam

* *The geographical designations employed in this document do not imply the expression of any opinion whatsoever on the part of the CITES Secretariat (or the United Nations Environment Programme) concerning the legal status of any country, territory, or area, or concerning the delimitation of its frontiers or boundaries. The responsibility for the contents of the document rests exclusively with its author.*

Spanish:

1.7 Code numbers: ITIS TSN 949161

2. Overview

Mauremys annamensis is a medium-sized freshwater turtle that can grow to 28.5 cm shell length and reach 2.1 kg. It is endemic to Viet Nam and is restricted in its natural occurrence to just three central provinces, where it inhabits floodplain wetlands. Animals take about 7 years to mature, and females may produce one or two clutches of 5-8 eggs per year. Egg and hatchling mortality rates are high in nature, and recruitment is slow. Available field survey and interview information documents that the species was reasonably common until the early to mid-1990s, when it became subject to commercial trade, which apparently led to the collapse of the entire species' population within a few years. Its life history attributes, i.e. late maturity, modest annual reproductive output, and high egg and juvenile mortality rates, make the species intrinsically vulnerable to over-exploitation, particularly of adults (AC28 Doc.15, Annex 2).

The primary threat to *Mauremys annamensis* is collection for trade. The species continues to be in demand in the international pet trade and the Asian consumption trade, and it is also used locally for medicinal purposes. Collected turtles are traded, mostly illegally, through a network of local middlemen before being exported or consumed locally. The species is popular for aquaculture in Viet Nam and P.R. China, where large numbers are reportedly kept and produced. Aquaculture facilities are widely perceived to continue to acquire breeding stock from the wild, which is believed to be fuelling illegal collection efforts and cross-border trade. Wetland habitat loss and degradation as a result of conversion to agriculture is a secondary threat to the species; the species may well be able to adapt to agricultural landscapes with wet ricefields, ponds and canals, but in this habitat animals will inevitably be encountered by humans and collected. *Mauremys annamensis* has been assessed in the IUCN Red List as Critically Endangered since 2000.

Mauremys annamensis is legally protected in Viet Nam from any form of exploitation by inclusion in Schedule IIB of Decree 32/2006/ND-CP, though enforcement at local jurisdictions may be insufficient. *Mauremys annamensis* was listed in CITES Appendix II by unanimous adoption at CoP12 (CoP 12 Prop. 21), which came into effect on 13 February 2003. A zero quota for wild-sourced specimens for commercial purposes was adopted at CoP16 (CoP16 Prop.32), effective 12 June 2013. A concurrent proposal by Viet Nam (CoP16 Prop.35) to transfer *Mauremys annamensis* to Appendix I was put to a vote on procedural matters and rejected from further consideration. At the request of Viet Nam, *Mauremys annamensis* was then included in the Periodic Review of Animal Species in the Appendices, conducted by the Animals Committee between CoP16 and CoP17 (Decision 16.124); the species was reviewed in document AC28 Doc. 20.3.9, and the Animals Committee agreed with the recommendation in the review to transfer *Mauremys annamensis* to Appendix I (AC28 Sum. 2 (Rev. 1); CoP17 Doc. 73 para.11).

To further address illegal international trade in *Mauremys annamensis*, its protection status under CITES must be increased to match its strict domestic protection. This species qualifies for inclusion in Appendix I of CITES, as it meets Criterion C i) of Annex I of Res.Conf.9.24 (Rev.CoP17), by having been documented that its population has declined severely across its very limited range as a result of unsustainable collection for trade (see sections 4.4 and 6.5). In addition, this species also meets criteria A i), A ii) and A v), and B iii) and B iv) (small wild population, declining, small sub-populations, high intrinsic vulnerability; and restricted area of distribution in the wild, decreased area and quality of habitat, and decreased number of individuals; see sections 3.1, 3.3, 4.1, 4.2, 5, and 6.5).

3. Species characteristics

3.1 Distribution

Mauremys annamensis is endemic to Viet Nam. It occurs only in the marshes and slow-flowing streams of the lowlands of Quang Nam, Da Nang, Quang Ngai, Binh Dinh, and Gia Lai Provinces of central Viet Nam, effectively the basin of the Boung river drainage. Within this geographic distribution area, the species is now restricted to scattered occurrence in isl=olated wetlands (Bourret, 1941; Iverson, 1992; Le *et al.,* 2004; Parham *et al.,* 2006; Fritz & Havas, 2007; Nguyen et al., 2009; McCormack et al., 2014).

3.2 Habitat

Throughout its range *Mauremys annamensis* seems to inhabit small lakes, ponds and wetland areas close to large rivers (such as the Thu Bon river in Quang Nam province). Many of these areas are seasonally inundated with flood waters during which time animals are likely to disperse. Local people reported that the species was common in the 1980's and 1990's, at which time animals were frequently seen in rice fields around villages within its range. During the dry season (April - September) *Mauremys annamensis* could be found at the base of bamboo stands around ponds and lakes. (Le *et al.,* 2004; ATCN, 2006b; McCormack, in litt to VN MA, 2 Oct 2012; McCormack et al., 2014).

3.3 Biological characteristics

Mauremys annamensis is a predominantly aquatic turtle that leaves the water only occasionally, preferring to bask on vegetation in shallow water instead. It is a generalist omnivore. Females reach substantially larger size than males; males develop little or no plastral concavity. Data collected at the Turtle Conservation Center at Cuc Phuong National Park, Viet Nam, indicates that maturity is reached around 7 years of age in captivity. At Cuc Phuong National Park, which is well north of the species' natural range, clutch sizes of up to 6 eggs have been reported, with only a single clutch produced per female per year. Clutches of five to eight eggs, and up to four clutches per female per year, have been reported in captivity in western collections; in optimal conditions, animals may reach maturity after 5 to 7 years, and can reach longevity of at least 41 years (Vander Schouw, 2011; McCormack, in litt to VN MA, 2 Oct 2012; McCormack et al., 2014). These life history attributes make the species intrinsically vulnerable to over-exploitation, particularly of adults (AC28 Doc.15, Annex 2).

3.4 Morphological characteristics

Mauremys annamensis is a moderately large freshwater turtle; females reach a carapace (dorsal shell) length of 28.5 cm and weight of 2.1 kg, males reach 23.2 cm and 1.7 kg (McCormack et al., 2014). The carapace is broad and bears three moderately distinct keels; the posterior margin is lightly indented. The plastron is rigidly attached to the carapace by the proportionally long bridge. The head, limbs and tail are proportionally moderate to graceful, the hands and feet are fully webbed. The carapace is rich brown to black. The plastron, bridge and underside of marginals are yellow with a large, angular and sharply-defined black blotch on each scute, and a second blotch on the bridge part of the pectoral and abdominal scutes; the black blotches cover most of the plastron, usually restricting the yellow colour to the central area, the outer margin and the scute seam areas. The head is olive-grey with several bold yellow lines continuing onto the neck, including a more or less distinct stripe encircling the upper surface of the head and passing over the eye. The chin is yellow with several longitudinal pale grey stripes. The limbs and tail bear black scales on pale grey skin, creating a dark grey appearance.

A study of mitochondrial and nuclear DNA documented the existence of two distinct genetic lineages among specimens kept at European zoos and other collections. The studied animals have no reliable geographic origin, and it remains unclear whether these lineages are geographically or otherwise distinct, but the results indicate the need for appropriate genetic management of animals in assurance colonies and re-introduced populations (Somerová et al., 2015).

3.5 Role of the species in its ecosystem

No information is available on the specific ecological role of this species; by analogy with other turtle species inhabiting similar wetland habitats, it is reasonable to assume that *Mauremys annamensis* plays a modest role as distributor of plant seeds, as a predator on aquatic and other invertebrates, and as an occasional scavenger on small dead vertebrates helps to keep ecosystems clean and healthy.

4. Status and trends

Mauremys annamensis has been assessed in the IUCN Red List as Critically Endangered since 2000 (Asian Turtle Trade Working Group, 2000). A reassessment (currently in progress) indicates that the species will be retained as Critically Endangered. *Mauremys annamensis* was not included in the 1982 version of the Amphibia-Reptilia Red Data Book; it was listed as 'K – Insufficiently Known (suspected to be threatened)' from 1988 to 1994, before being was re-assessed in 1996 as Least Concern, and to Critically Endangered in 2000. These great changes over time in assessments by IUCN reflect both the lack of information in the 1980s and 1990 as well as the steep increase in collection and trade since about 1990.

Mauremys annamensis has been listed as of particularly high extinction risk among tortoise and freshwater turtles globally, owing to: (i) its restricted distribution; (ii) the limited number of times it has been observed by scientists in the wild; and (iii) the intense levels of wildlife harvesting across its range in central and southern Viet Nam (Fong et al., 2007; Turtle Conservation Coalition, 2011 (14th place); Turtle Conservation Coalition, 2018 (17th place))

4.1 Habitat trends

Habitat for the species has been decimated in recent decades: lowland wetlands are considered prime agricultural land throughout Asia and are most often the first land to be claimed and cultivated. The rapid population growth in Viet Nam of recent decades has been accompanied by demand for such agricultural land to meet both domestic and export needs, and nearly all lowland wetland areas throughout the historic range have been converted to agriculture, largely for rice cultivation. At one site for the species in Binh Son district, Quang Nam province, some natural boggy wetlands remain which may represent some of the last historic habitat for the species. Wetland protected areas are underrepresented in the national protected areas network in Viet Nam (MacKinnon, 1997; McCormack, in litt to VN MA, 2 Oct 2012).

4.2 Population size

The actual or historic population size of *Mauremys annamensis* is unknown. From local interviews it has been reported that the species occurs sympatrically with *Mauremys sinensis* throughout much of it range, in these areas it has regularly been described as naturally more rare in the wild, with a 10:1 ratio of *Mauremys sinensis* to *Mauremys annamensis* described (McCormack, in litt to VN MA, 2 Oct 2012). The general understanding is that the species persists in the wild only as a highly fragmented occurrence, with little more than scattered single individuals remaining in just a few wetlands (Parham et al., 2006; McCormack, 2012; McCormack et al., 2014)

Noteworthy is the recent finding in the wild of seven animals identifiable as '*Ocadia glyphistoma*', a name now believed to be based on specimens of hybrid origin with *Mauremys annamensis* and *M. sinensis* as parents. The occurrence of these animals in the wild led to the hypothesis that population levels of both species have fallen so low that no separate breeding populations exist anymore, leading to hybridization (ATP, 2012a).

IUCN and TRAFFIC's Analysis of CoP16 Proposal 35 (IUCN and TRAFFIC, 2012) documented that during April and May 2006, comprehensive interview-based surveys were conducted in Quang Nam Province, focusing on *M. annamensis*. During the survey, 397 locals were interviewed, of whom 93 were able to provide information on *M. annamensis*. In particular, the two districts of Dien Ban and Duy Xuyen provided reliable information on the species; including information from a boy who was keeping a specimen of *M. annamensis* which he claimed to have caught in a small lake known locally as Ha Tre Lake. In November 2006, a team from the *Mauremys annamensis* Project (MAP; led by the Asian Turtle Program (ATP)) returned to investigate Ha Tre Lake. During this visit, non-lethal aquatic trapping was conducted, which resulted in the capture of a single sub-adult *M. annamensis*, the first ever confirmed wild capture of the species since 1939. As a result of the findings, the MAP established a project presence at the site starting in September 2007, with a full-time monitoring team located in Dien Phong Commune. By February

2008, a total of 339 additional interviews had been conducted in Duy Xuyen, Dien Ban, Que Son, Thang Binh and Dai Loc districts. Five *M. annamensis* were observed in the hands of a single trader in Vinh Dien town of Dien Ban district. Interviews with traders indicated that the species was becoming increasingly rare. This is further supported by the fact all five animals observed in trade were sub-adults or juveniles; the largest specimen was 280 g and still not mature and the smallest was only 85 g. In addition to interviews, a total of 110 days of trapping were carried out at three sites in Duy Xuyen and Dien Ban districts. Trapping resulted in no additional field records for *M. annamensis* (Nguyen et al., 2008).

4.3 Population structure

In the absence of field data, population structure information is effectively absent, beyond the observation that animals, believed to have been wild-caught, in recent trade have all been small, young individuals.

4.4 Population trends

In the late 1930's, Bourret (1941) considered the species abundant in its localised area of occurrence. When interviewed by the *Mauremys annamensis* Project staff in recent years, local interviewees often reported that when the species was common in the 1980's and early 1990's, animals would often wander into local houses, or even be considered pests as large animals would trample rice crops. With the economic incentive offered by traders arriving in central Viet Nam in the mid-1990s, populations were quickly decimated, with accounts of rice sacks being filled with turtles in a single night (McCormack, in litt to VN MA, 2 Oct 2012). By the late 1990s, the *M. annamensis* population was assumed to have declined steeply in the years immediately before then: "where once this species was observed more frequently in trade seizures, only a few specimens have been observed in 1998 and 1999. This reduction in observed occurrence within the trade, combined with loss in habitat and continued hunting pressures within its extremely limited known range, would suggest that *M. annamensis* is under serious threat of extirpation." (Hendrie, 2000).

In recent years, field surveys have found very small numbers of animals in the wild, indicating that the species is now extremely rare (Hendrie, 2000, in Proposal 12.21); the first animal trapped by scientists in natural habitat after Bourret (1941) was in 2006, over 65 years later (ATCN, 2006b). The species has occasionally appeared in illegal trade, but only in small numbers (Le *et al.*, 2004; McCormack & Nguyen Chi Nhan, 2009). At one site where the Asian Turtle Program has been focused in Binh Son district, Quang Ngai province, fewer than five new turtles have been observed each year since 2008 in the local villages, despite a local presence and local counterparts in three key villages (McCormack *et al.,* 2008). See also the information in section 4.3.

4.5 Geographic trends

Mauremys annamensis occurs in a restricted geographical range; it is not known or supposed to have experienced range contraction or expansion during the period that it is known to science (other than localized extinction across much of its range in recent decades). Likewise there are no geographic trends in biological characteristics, habitat use, habitat loss, or exploitation pressures.

5. Threats

Mauremys annamensis is under dual threats of direct collection and habitat degradation (Hendrie, 2000). Direct collection of adults as well as juveniles, historically for occasional subsistence consumption but mainly for international trade in recent years (Hendrie, 2000; McCormack et al., 2014), is highly likely to significantly impact populations of a species whose life history has evolved

to accept moderate losses of juveniles but whose reproductive adults are of great population value (see e.g., Doroff & Keith, 1990; Gibbons, 1990).

Conversion of natural lowland wetlands to agricultural land use, such as rice paddies and irrigation canals, is not incompatible with habitat use by *Mauremys annamensis*, but the close proximity of humans and turtles leads to extensive collection of animals that are encountered incidentally while tending crops and water management infrastructure. In addition, pollution from herbicides used during conflict, agrochemicals, industrial pollution, and sewage effluent, likely all represent additional impacts on the species and its habitat (Le *et al.,* 2004; McCormack et al., 2014).

Mauremys annamensis is rated Critically Endangered under criteria A1d+2d in the IUCN Red List, based on its last assessment in 2000 (Asian Turtle Trade Working Group, 2000), based on a known or inferred population reduction of at least 80% over the past three generations due to actual or potential levels of trade, and a similar projected future decline over the same time period (IUCN, 1994). It was reaffirmed as Critically Endangered under corresponding criteria at a Red List evaluation session for Asian turtles held in Singapore in February 2011 (Horne *et a*l., 2012).

6. Utilization and trade

6.1 National utilization

Historically *Mauremys annamensis* have been consumed locally for food as part of a subsistence diet, however in the last decade consumption has largely ceased with most animals now sold into the trade due to the high economic incentive. Since 2007 the Asian Turtle Program has observed numerous hatchling and juvenile animals which are also being collected from the wild and are entering the trade. Some are maintained at the village level where people are attempting to raise or farm animals, while others are held by mid-level traders with the intention of raising to a higher value before selling, or with the intention of farming. Often the realization that the species is becoming rare is cited as the reason behind collecting such small animals before someone else has the opportunity to remove it. (McCormack, in litt to VN MA, 2 Oct 2012; McCormack et al., 2014).

Mauremys annamensis does have specific local medicinal uses: throughout much of its range, its use in local traditional medicines remains, and is possibly being promoted. Blood from the turtles is mixed with strong rice wine and drunk with the belief that it is a cure for heart disease. Soups and other tonics are also made from the species. The alleged heart disease cure gives it a higher local price than other, closely related local species such as *M. sinensis.* (McCormack, in litt to VN MA, 2 Oct 2012).

6.2 Legal trade

During the period 2000-2017, the UNEP-WCMC CITES trade database recorded a total of 1581 exported live animals, as well as 22 specimens and 1.5 kg of specimens, of *Mauremys annamensis*. Available trade data from the UNEP-WCMC CITES Trade database are provided in the Annex to this proposal. Trade volumes were particularly high in the years 2012-2016, and comprised mainly live specimens reported as farmed or captive-bred in the United States, Austria and Germany, at a time when demand was reportedly high in East Asian collector trade. Also noteworthy in the Comparative Trade Tabulation is the export of a long-established captive breeding group (38 animals) in 2009 from Germany to Turkey, and the subsequent export of specimens to China/Hong Kong and Germany in 2013.

Mauremys annamensis has been extensively reported to be offered in the trade in Asia, Europe and North America: Cheung and Dudgeon (2006) recorded *M. annamensis* offered for sale in markets in Hong Kong, Shenzhen and Guangzhou during the period 2000-2003, and Gong et al. (2009) recorded between 11 and 50 animals in the Yuehe pet market in Guangzhou during 7 surveys from August 2006 to March 2008. *Mauremys annamensis* may be observed for sale on a small number of US-based websites: in 2008, captive-bred specimens were being offered by a

US dealer at a price of USD100 per turtle--see http://www.turtletimes.com/forums/topic/64899-turtlepimpcom-current-list-of-turtles-for-sale/. (IUCN and TRAFFIC, 2012).

There is no question that under the right conditions, captive production of *Mauremys annamensis* is possible (see 8.1), but it is not always evident that animals traded domestically originated from legal captive breeding facilities, or that the breeding stock was legally acquired. Much of the breeding stock at private keepers and commercial farms is likely to have been acquired before the species was included in Appendix II, though information from interviews and ongoing trade seizures of evidently wild-collected animals (see 6.4) indicates that some captive production facilities are willing to acquire additional, illegally collected and traded, animals as breeding stock.

6.3 Parts and derivatives in trade

Mauremys annamensis has not been documented to be traded other than as live animals. Nevertheless, trade in parts and derivatives is likely to occur, or have occurred in the past. All turtle shells are bought in Viet Nam by traders to make into a generic bone glue, plastrons are normally preferred. In many areas shells that are considered beautiful are kept as household decorations.

6.4 Illegal trade

Before inclusion in CITES Appendix II, widespread trade occurred in this species for consumption in Asia and worldwide as a pet species; see section 3.3 of CoP12 Proposal 21 for extensive records and indications of illegal trade in *Mauremys annamensis* that were available before 2002. Recent seizures reported in Viet Nam include a case of six adult *M. annamensis* seized from the home of a Vietnamese trader in January 2009 (Humane Society International, Australia, 2009) and a case of 16 specimens reportedly seized from a house in the Dong Hoa district in August 2011 (Education for Nature Vietnam (ENV), 2012). A 2007 genetic study looked at eight individuals confiscated in northern Viet Nam and assumed the animals: (i) to be wild, owing to the lack of known turtle farms breeding *M. annamensis* at that time, and (ii) destined for China, presumably due in part to the location of the seizure (Fong et al., 2007).

While *Mauremys annamensis* was common in local trade in 1996 (Le *et al,.* 2004), the species is rarely seen in wildlife trade shipments in recent years, with only modest numbers (less than 10) specimens seen annually in local trade at sites in Quang Nam, Quang Ngai, Phu Yen, Binh Dinh and Gia Lai province since 2007, and the last wild-collected specimens recorded in 2013 (McCormack & Hendrie, 2007; McCormack et al., 2008, 2014; Turtle Conservation Coalition, 2018).

In January 2009 the Forest Protection Department of Quang Ngai province seized six individuals of *M. annamensis*, which were successfully transferred to the assurance breeding colony for the species at the Turtle Conservation Centre at Cuc Phuong National Park, Viet Nam (McCormack & Nguyen Chi Nhan, 2009). In 2013, five seizures of *M. annamensis* were recorded in Viet Nam, together concerning 83 live animals, while a single seizure in 2014 involved 4 live animals (Provincial Forest Protection Department data). An evaluation of reported seizures of tortoises and freshwater turtles for the period 2000-2015 (CoP17 Doc.73 Annex) recorded a total of 91 live specimens of *M. annamensis* seized in 7 separate seizure cases.

6.5 Actual or potential trade impacts

Direct exploitation of the species, historically for subsistence consumption and local medicinal use, but in the past two decades primarily for export trade, has been the prime driver of the species' decline from historically abundant to a few individuals encountered per year at present (Hendrie, 2000; ATCN, 2006b; McCormack & Nguyen Chi Nhan, 2009). According to IUCN and TRAFFIC (2012), collection from the wild for Asian (and particularly Chinese) markets is suggested to pose a greater threat to *M. annamensis* than export for the Western pet trade, and the Asian trade network for this species is largely illegal (Raffel and Meier in litt., 2012). According to Nguyen et al. (2008), intensive collection of *M. annamensis* to meet the rising demand for turtles in China since the late 1980s has significantly reduced remaining populations, with fewer animals observed in the trade in each passing year.

Wholesale price in central Viet Nam has varied around USD50 during 2009-2011, but curiously, in August 2011 the local wholesale price for *Mauremys annamensis* spiked, to USD 1200-1440 per kg, before collapsing below its previous level within weeks, and hovered around USD 25 per kg in 2012. The reasons for this odd price development were never clarified, but may have involved an attempt to create a high-value market for farm-produced animals. Regardless, such price fluctuations may offer added incentive for local collection efforts. (McCormack, in litt to VN MA, 2 Oct 2012).

Long-lived, late-maturing species with moderate annual reproductive output and high juvenile mortality, as shown by turtles including *Mauremys annamensis*, have proven to be highly susceptible to overexploitation, particularly of adult animals (Doroff & Keith, 1990; Gibbons, 1990; Congdon et al., 1993; O'Brien et al., 2003). The population trend data in section 4.4 strongly suggests that *Mauremys annamensis* has been subject to unsustainable collection for the past several decades and this has resulted in the collapse of its population. Of particular significance is that commercial turtle farms in East Asia create a specific demand for animals collected from the wild, being considered the primary purchasers of wild-collected turtles and driving the collection of the last remaining wild animals through increased trade prices (Shi *et al.*, 2007).

7. Legal instruments

7.1 National

Mauremys annamensis is included in Schedule IIB of Decree 32/2006/ND-CP, dated 30 March 2006, on Management of Endangered, Precious, and Rare Species of Wild Plants and Animals. Category II includes species whose utilisation is restricted to scientific research, establishing breeding populations, and international exchange; any such activities require a collection permit from the Ministry of Agriculture and Rural Development. Wildlife does need permits to be transported nationally; such transport permits can be issued by provincial Forest Protection Department offices. A veterinary health certificate may also be required. Viet Nam's Decree No. 159/2007/ND-CP sets out penalties for forest and wildlife crimes.

Mauremys annamensis is protected from commercial exploitation as a Priority Protected Rare, Precious and Endangered Species under Decree 160/2013/ND-CP of the Government.

7.2 International

Mauremys annamensis was included in CITES Appendix II at CoP 12 (Proposal 21, Santiago, Chile, 2002), which came into effect by 13 February 2003. A zero quota for specimens sourced from the wild and traded for commercial purposes was adopted at CoP16 (CoP16 Prop.32), effective 12 June 2013.

Mauremys annamensis is included in Annex B of EU Commission Regulation no. 709/2010 (amending EC Regulation 338/97), which requires that the country of import must issue an import permit before a shipment of the species can enter the European Union.

Health inspection certification is required by a number of countries before live animals, including turtles, may be imported.

The recommended conditions for transport of live turtles by air are detailed in the IATA Live Animals Regulations; compulsory adherence to these Live Animal Regulations has been adopted by legislation in a number of countries, and is required by a number of international airlines.

8. Species management

8.1 Management measures

No population management measures have taken place or are in preparation in the species' range beyond the establishment of a legal framework for sustainable development and conservation of freshwater turtles and tortoises (Le Xuan Canh *et al*., 2002).

An international program has taken shape since 2006 to reintroduce and strengthen a viable population of *Mauremys annamensis* into its native range, led by the Asian Turtle Program (a collaborative effort of Education for Nature Viet Nam (ENV), the Cleveland Metroparks Zoo, and partners), and supported by local and national authorities, national universities, and the global turtle conservation community. Captive-bred individuals born in Hong Kong, Europe and North America were repatriated to Viet Nam, where they are currently held for genetic and veterinary screening and in anticipation of suitable habitat being adequately secured. By 2012, the Cuc Phuong Turtle Conservation Center held about 200 individuals for the project, many of them bred in captivity from 18 founder animals (ATP, 2012b). In 2013, 71 captive-bred specimens were imported into Viet Nam from Germany and the Netherlands for reintroduction to the wild as part of the project. The project includes a large outreach component to generate support for conservation of the species through awareness and community engagement, a training component for local authorities, and a population monitoring program. (ATCN, 2006a, 2006b; ATP, 2012a, 2012b; McCormack & Hendrie, 2007; McCormack et al., 2008; McCormack & Nguyen Chi Nhan, 2009).

8.2 Population monitoring

Comprehensive local and regional trade surveys as well as local surveys of suitable habitat have been in place for the past decade, but the population is too scarce to consider it to amount to population monitoring.

8.3 Control measures

8.3.1 International

Since its inclusion in CITES Appendix II in 2002, international shipments of *Mauremys annamensis* are required to be accompanied by appropriate CITES export permits. Once exported from Viet Nam, animals of *M. annamensis* are subject to national regulations pertaining to customs regulation and quarantine measures when entering the importing country.

8.3.2 Domestic

No control measures are in place beyond those described in section 7.1, national legislation and regulations. Wildlife authorities, customs and enforcement authorities of the range and trading countries have made great efforts to ensure that turtles traded within their jurisdiction are legal and regulated, as evidenced by extensive record of seizures of illegally traded turtles in Viet Nam and the countries of the region (AC25 Doc.19, Annex C).

8.4 Captive breeding and artificial propagation

Some small turtle breeding farms have been established in Bac Ninh, Binh Dinh and Phu Yen provinces of Viet Nam, with the largest observed in 2009 holding approximately 40 animals of *Mauremys annamensis*; the current number held is unknown. Near Hanoi one turtle farm focusing on *M. mutica* also keeps a few dozen *M. annamensis.* Successful captive reproduction of *M. annamensis* has occurred at some farms, but no information is available on the numbers of hatchlings produced annually.

Mauremys annamensis was one of about 30 species of freshwater turtles that is commercially bred at a turtle farm at Tun Chan, Hainan Island (Shi & Parham, 2001, Shi *et al.*, 2002). During a visit in October 2001, at least 25 adults and another 50 juveniles were observed at this farm (van Dijk, in litt. to German SA, Nov. 2001, in Prop. 12.21). The animals were bred under the same practices as *Mauremys mutica* and were sold for similar prices. Trade observations in markets in China in subsequent years have documented significant quantities of *M. annamensis*, many apparently originating from captive production facilities, based on their uniform size, undamaged appearance, and generally healthy condition (van Dijk, pers. comm. to Vietnamese SA, 16 June 2015). Aquaculture facilities reportedly continue to acquire breeding stock from the wild, which is believed to be fuelling illegal collection efforts and cross-border trade (Shi *et al.*, 2007).

Modest numbers of *M. annamensis* are bred by zoos, conservation facilities and private hobbyists in Viet Nam, Europe, the United States and Hong Kong. The Asian Turtle Program, at its facilities at Cuc Phuong NP, has a long-established successful breeding program for the species (ATP, 2016). Breeding of *M. annamensis* in Europe and North America is primarily a non-commercial, conservation-focused effort, and a commercial interest for only a very limited number of breeders. One member of the Schildkrötenfreunde Österreich bred 6 animals in 2000 and 3 animals in 2001 (Schildkrötenfreunde Österreich, 2001, 2002). The Columbus Zoo, Ohio, bred 2 hatchlings in 1991 and 1993, respectively (Slavens & Slavens, 2002). Unpublicized breeding successes have occurred at Kadoorie Farm and Botanic Garden in Hong Kong and at an undisclosed breeder in the USA (van Dijk, in litt. to German Scientific Authority, Nov. 2001, in Proposal 12.21). In recent years, hobbyist efforts to breed the species in captivity have developed from isolated attempts towards co-ordinated breeding programs, involving information exchange and management of genetics. A European studbook for the species was established some years ago within the OOS Foundation framework and *M. annamensis* is one of the priority species for the project Schildkrötenrettung im Allwetterzoo Münster (Meier, 2000). A Taxon Management Group (TMG) was established for the species by the Turtle Survival Alliance in January 2001. By January 2001, 77 animals were held within the Asian Turtle Consortium in the USA and another 54 animals were registered with European studbooks managed by the OOS Foundation. A small captive breeding group was established in Spain in 2012 based mainly on confiscated specimens (López Sánchez et al., 2013). Successful captive breeding at European institutions occurred from 2006, and quickly became so successful, and placement options so limited, that some institutions have resorted to only incubating some of the eggs produced (Meier & Raffel, 2011; Zwartepoorte et al., 2015), while repatriation efforts of captive-bred animals from Europe back to conservation initiatives in Viet Nam occurred since 2013 (Zwartepoorte et al., 2015).

8.5 Habitat conservation

Viet Nam has an extensive system of protected areas and is making dedicated efforts to safeguard these areas from illegal and unregulated exploitation, collection of natural resources, and degradation of the ecosystem (MacKinnon, 1997; Rambaldi *et al.,* 2001). However, the protected areas system is focused on forest areas, and surveys in central Viet Nam have not confirmed the species' presence in any existing protected areas; it is likely that due to its habitat niche such areas do not exist. At present the Asian Turtle Program is working with the Forest Protection Department of Quang Ngai province and local People's Committee to establish a small Species Habitat Conservation Area (SHCA) for *Mauremys annamensis*. (ATCN, 2006b; McCormack & Nguyen Chi Nhan, 2009). Approximately 100 hectares of suitable habitat have been identified by the Asian Turtle Program (ATP) and partners for a reintroduction programme and establishment of a community-based wildlife protected area (Horne et al., 2012).

8.6 Safeguards

No safeguards are applicable beyond legal, regulatory and enforcement processes in place, including the need for non-detriment findings for shipments in international trade and validation of captive-bred and legal acquisition status.

9. Information on similar species

Mauremys annamensis can easily be recognised by its clear pattern of creamy yellow stripes on its otherwise deep olive-green face, head and neck. The only other Asian turtle with a similar head pattern is *Cuora amboinensis*, which is instantly separated from *M. annamensis* by its possession of a transverse hinge across the plastron, which allows *Cuora amboinensis* to close its shell completely. In contrast, *Mauremys annamensis* cannot move its shell. *Mauremys sinensis* has much finer and more numerous yellow head stripes and also has yellow stripes on the limbs.

10. Consultations

Mauremys annamensis is endemic to Viet Nam and thus has no other range states that could be consulted.

11. Additional remarks

An earlier proposal to transfer *Mauremys annamensis* to Appendix I was prepared and submitted by Viet Nam for CoP16 (CoP16 Prop.35) but this was defeated in a procedural vote following the adoption of Proposal 32 which placed a zero quota on trade in wild specimens of *Mauremys annamensis* for commercial purposes. At the request of Viet Nam at CoP16, *Mauremys annamensis* was included in the Periodic Review of Animal Species in the Appendices, conducted by the Animals Committee (Decision 16.124). The review of the species was prepared by Viet Nam and presented in document AC28 Doc. 20.3.9. The Animals Committee agreed with the recommendation in the Periodic Review document to transfer *Mauremys annamensis* to Appendix I (AC28 Sum. 2 (Rev. 1); CoP17 Doc. 73 para.11).

A major workshop of Asian turtle specialists, held in Singapore in February 2011, evaluated possible CITES listing needs for Asian turtles. These specialists recommend that *Mauremys annamensis* warrants to be transferred to Appendix I in CITES and retained at Critically Endangered in the IUCN/SSC Red List of Threatened Species. These measures would help conserve the survival and viability of remaining populations, through increased enforcement efforts and higher penalties for those convicted of illegally trading in the species (Horne *et al.* 2012).

12. References

ATCN (Asian Turtle Conservation Network). 2006a. Vietnamese Pond Turtles come home. Press Release, Hanoi, 11 May 2006. http://www.asianturtlenetwork.org/library/ATCN_news/2006_articles/Press_release_Endemic_Vietnamese_Pond_turtles_come_home_05_06.html

ATCN (Asian Turtle Conservation Network). 2006b. *Mauremys annamensis* 65 Years Later. Press Release, Hanoi, 7 December 2006. http://www.asianturtlenetwork.org/library/ATCN_news/2006_articles/Mauremys_annamensis_recorded_in_natural_habitat_after_65_years.html

ATP (Asian Turtle Program). 2012a. Press Release: Hybrid between Vietnamese Pond Turtle and Chinese Stripe-necked Turtle found in central Vietnam. 26 September 2012. http\\:www asianturtleprogram.org.

ATP (Asian Turtle Program). 2012b. The *Mauremys annamensis* Project (MAP). http://www.asianturtleprogram.org/working-on/map_project.html . Consulted 22 June 2015.

ATP (Asian Turtle Program). 2016. Press Release: Cuc Phuong National Park breeding success for the Vietnamese Pond Turtle in 2015. 1 February 2016. http\\:www asianturtleprogram.org.

Asian Turtle Trade Working Group 2000. *Mauremys annamensis* (errata version published in 2016). *The IUCN Red List of Threatened Species* 2000: e.T12876A97370458. http://dx.doi.org/10.2305/IUCN.UK.2000.RLTS.T12876A3393755.en.

Bourret, R. 1939. Notes Herpétologiques sur l'Indochine Française. XVIII. Reptiles et Batrachiens reçus au Laboratoire des Sciences Naturelles de l'Université au cours de l'année 1939. Description de quatre espèces et d'une variété nouvelles. *Annexe au Bulletin Général de l'Instruction Publique*, no. 4, December 1939: 1-40.

Cheung, S.M., and Dudgeon, D. 2006. Quantifying the Asian turtle crisis: market surveys in southern China, 2000-2003. *Aquatic Conservation: Marine and Freshwater Ecosystems*, Vol. 16: 751-770.

Doroff, A. M., and Keith, L.B. 1990. Demography and Ecology of an Ornate Box Turtle (*Terrapene ornata*) Population in South-Central Wisconsin. *Copeia*, 1990 (2): 387-399.

Education for Nature Vietnam (ENV). 2012. *Phu Yen: Inappropriate settlement of confiscated wildlife.* http://envietnam.org/E_News/E_432/Phu_Yen_Inappropriate_settlement_of_confiscated_wildlife.html . Consulted 22 June 2015.

Fong, J.J., Parham, J.F., Shi H., Stuart, B.L., and Carter, R.L. 2007. A genetic survey of heavily exploited, endangered turtles: caveats on the conservation value of trade animals. Animal Conservation, Vol. 10 (4): 452-450. DOI: 10.1111/j.1469-1795.2007.00131.x

Fritz, U., and Havas, P. 2007. Checklist of Chelonians of the World. *Vertebrate Zoology*, Vol. 57 (2): 149-368.

Gibbons, J. Whitfield (editor). 1990. *Life History and Ecology of the Slider Turtle*. Smithsonian Institution Press, Washington D.C. & London. 368 pp.

Gong S., Chow, A.T., Fong, J.J., and Shi H.. 2009. Chelonian trade in the largest pet market in China: scale, scope and impact on turtle conservation. *Oryx*, Vol. 43(2): 213-216.

Hendrie, Douglas B. 2000. Status and Conservation of Tortoises and Freshwater Turtles in Viet Nam. Pp. 63-73 in *Asian Turtle Trade: Proceedings of a Workshop on Conservation and Trade of Freshwater Turtles and Tortoises in Asia* (van Dijk, Stuart & Rhodin, eds.). Chelonian Research Monographs, Number 2.

Horne, B.D., Poole, C.M., and Walde, A.D. (eds). 2012. Conservation of Asian Tortoises and Freshwater Turtles: Setting Priorities for the Next Ten Years. Recommendations and Conclusions from the Workshop in Singapore, February 21-24, 2011. ISBN: 978-981-07-1737-7. http://www.cites.org/common/com/AC/26/SG-Tortoise-&-Freshwater-Turtle-Workshop-Report.pdf

IUCN and TRAFFIC. 2012. IUCN/TRAFFIC Analyses of the Proposals to amend the CITES Appendices. Prepared by IUCN Global Species Programme and TRAFFIC for the Sixteenth Meeting of the Conference of the Parties to CITES. IUCN – International Union for the Conservation of nature, Gland, Switzerland. 103 pp.

Iverson, John B. 1992. *A Revised Checklist with Distribution Maps of the Turtles of the World.* Privately Printed, Richmond, Indiana, 363pp. ISBN 0-9617431-1-5.

Le, Minh, Thang Hoang, and Duc Le. 2004. Trade Data and some Comments on the Distribution of *Mauremys annamensis* (Siebenrock, 1903). *Asiatic* Herpetological *Research*, Vol. 10: 110-113.

Le Xuan Canh, Tran Thi Hoa and Truong Quang Bich. 2002. *Status of Freshwater Turtles and Tortoises and Measures for their Conservation in Viet Nam*. Country Report and Presentation presented at the Technical workshop on conservation of and trade in freshwater turtles and tortoises in Asia, Kunming, Yunnan Province (People's Republic of China), 25-28 March 2002.

López Sánchez, J.M., Gómez de Berrazueta, J.M., and González Pardo de Santayana, A. 2013. The beginning of a new breeding group of Annam Turtle, *Annamemys annamensis*. Sociedad Herpetologica Valenciana, no pagination [5 pp.].

MacKinnon, J. (ed.). 1997. *Protected Areas Systems Review of the Indo-Malayan Realm.* Asian Bureau of Conservation and World Conservation Monitoring Centre for the World Bank. 198 pp., 24 maps.

McCormack, T., and Hendrie, D., 2007. Turtle conservation developments in Vietnam. *TSA Magazine*, 2007: 32-33..

McCormack, T., Hendrie, D., Nguyen Duc Luong, and Nguyen Xuan Thuan. 2008. Vietnamese Pond Turtle Project develops in central Vietnam. *TSA Magazine*, 2008: 44-45.

McCormack, T., and Nguyen Chi Nhan. 2009. Reintroduction preparations for captive bred Vietnamese Pond Turtles. *TSA Magazine*, 2009: 86-88.

McCormack, T. 2012. Notes on status and biology of *Mauremys annamensis*. Submission to Viet Nam CITES MA, 2 Oct 2012.

McCormack, T.E.M., Dawson, J.E., Hendrie, D.B., Ewert, M.A., Iverson, J.B., Hatcher, R.E., and Goode, J.M. 2014. *Mauremys annamensis* (Siebenrock 1903) – Vietnamese Pond Turtle, Annam Pond Turtle, Rùa Trung Bộ. In: Rhodin, A.G.J., Pritchard, P.C.H., van Dijk, P.P., Saumure, R.A., Buhlmann, K.A., Iverson, J.B., and Mittermeier, R.A. (Eds.). Conservation Biology of Freshwater Turtles and Tortoises: A Compilation Project of the IUCN/SSC Tortoise and Freshwater Turtle Specialist Group. Chelonian

Research Monographs 5(7):081.1–14, doi:10.3854/crm.5.081. annamensis.v1.2014, http://www.iucn-tftsg.org/cbftt/.

Meier, E. 2000. Sind die Schildkröten Asiens noch zu retten? Pp. 171-176 in *Schildkröten – Grosses Schildkrötensymposium 5. Jahrestagung der SfÖ* (Artner & Meier, eds.). Natur und Tier-Verlag, Münster.

Meier, E., and Raffel, M. 2011. Update from the International Center for the Conservation of Turtles (IZS) at Münster Zoo. *Turtle Survival* [TSA], 2011: 54.

Nguyen, D.L., Nguyen, X.T., McCormack, T. and Hendrie, D. 2008. Conservation of the Vietnamese Pond Turtle (*Mauremys annamensis*) in central Vietnam. *Asian Turtle News*. http://www.asianturtlenetwork.org/library/ATCN_news/2008_articles/Conservation_of_the_Vietnamese_Pond_Turtle.html.

Nguyen Van Sang, Ho Thu Cuc, and Nguyen Quang Truong. 2009. *Herpetofauna of Vietnam*. Frankfurt am Main (Germany): edition Chimaira. ISBN 978-3-89973-462-1.

Parham, J.F., Stuart, B.L., and Orlov, N.L. 2006. *Mauremys annamensis*: Distribution record for Vietnam. *Herpetological Review*, Vol. 37 (2): 239.

Rambaldi, G., Bugna, S, and Geiger, M. 2001. Review of the Protected Area System of Vietnam. *ASEAN Biodiversity*, Oct-December 2001: 43-51.

Schildkrötenfreunde Österreich. 2001. Nachtzuchtstatistik 2000. *Emys*, vol. 8 (1): xi-xiii.

Schildkrötenfreunde Österreich. 2002. Nachtzuchtstatistik 2001. *Emys*, vol. 9 (2): iv-vii.

Shi, Haitao, and James Ford Parham. 2001. Preliminary Observations of a large turtle farm in Hainan Province, People's Republic of China. *Turtle and Tortoise Newsletter*, Issue 3: 4-6.

Shi, H.T., Lau, M.W.N., Chen, T.H., and Parham, J.F. 2002. *The Status of Trade, Captive Breeding, Research and Conservation of the Chelonians in China, including Hong Kong and Taiwan.* Country Report and Presentation presented at the Technical workshop on conservation of and trade in freshwater turtles and tortoises in Asia, Kunming, Yunnan Province (People's Republic of China), 25-28 March 2002.

Shi H., Parham, J.F., Lau, M.W.N., & Chen T.-H. 2007. Farming Endangered Turtles to Extinction in China. *Conservation Biology*, Vol. 21 (1): 5-6.

Shi, H.T., Hou M., Pritchard, P., Peng J.J. , Fan Z., and Yin F. (eds). 2008. Identification Manual for Traded Turtles in China. China Encyclopedia Press, Beijing, China. 168 pp. ISBN 978-7-5000-7937-8.

Siebenrock, F. 1903. Schildkröten des östlichen Hinterindien. *Sitzungsberichte der kaiserlichen Akademie der Wissenschaften in Wien. Mathematisch-Naturwissenschaftliche Klasse*, Vol. 112 (1): 334-352.

Slavens, F., and K. Slavens. 2002. Reptiles and Amphibians in Captivity - Breeding - Turtles, Crocodiles and Tuatara. http://fslavens.home.mindspring.com/bturtle.html (Viewed 25 April 2002).

Somerova, B., Rehák, I., Velensky, P., Palupciková, K., Protiva, T., and Frynta, D. 2015. Haplotype variation in founders of the *Mauremys annamensis* population kept in European Zoos. *Acta Herpetologica*, Vol. 10(1): 7-15, DoI 10.13128/Acta_Herpetol-15149.

Spinks, P.Q., Shaffer, H.B., Iverson, J.B., and McCord, W.P. 2004. Phylogenetic hypotheses for the turtle family Geoemydidae. *Molecular Phylogenetics and Evolution*, Vol. 32: 164-182.

Stuart, B.L., van Dijk, P.P. and Douglas B. Hendrie, D.B. 2002 "2001". *Photographic Guide to the Turtles of Thailand, Laos, Vietnam and Cambodia*. Four bilingual versions, Khmer/English (ISBN 0-9632064-6-X), Laotian/English (ISBN 0-9632064-7-8), Thai/English (ISBN 0-9632064-8-6), and Vietnamese/English (ISBN 0-9632064-9-4); each 84 pp. Wildlife Conservation Society Asia Program, July 2002.

Stuart, B.L., and Parham, J.F. 2007. Recent hybrid origin of three rare Chinese turtles. *Conservation Genetics*, Vol. 8: 169-175.

TRAFFIC. 2012. *Seizures and prosecutions: March 1997-October 2012*. TRAFFIC Bulletin, Cambridge, UK

Turtle Conservation Coalition (2011). Turtles in Trouble: The World's 25+ Most Endangered Tortoises and Freshwater Turtles—2010. Lunenburg, MA: IUCN/SSC Tortoise and Freshwater Turtle Specialist Group, Turtle Conservation Fund, Turtle Survival Alliance, Turtle Conservancy, Chelonian Research Foundation, Conservation International, Wildlife Conservation Society, and San Diego Global Zoo.

Turtle Conservation Coalition (2018). Turtles in Trouble: The World's 25+ Most Endangered Tortoises and Freshwater Turtles — 2018. [Stanford, C.B., Rhodin, A.G.J., van Dijk, P.P., Horne, B.D., Blanck, T., Goode, E.V., Hudson, R., Mittermeier, R.A., Currylow, A., Eisemberg, C., Frankel, M., Georges, A., Gibbons, P.M., Juvik, J.O., Kuchling, G., Luiselli, L., Shi, H., Singh, S., and Walde, A. (Eds.)]. Ojai, CA: IUCN SSC Tortoise and Freshwater Turtle Specialist Group, Turtle Conservancy, Turtle Survival Alliance, Turtle Conservation Fund, Chelonian Research Foundation, Conservation International, Wildlife Conservation Society, and Global Wildlife Conservation, 80 pp.

Uetz, P. (editor). 2015. The Reptile Database. http://www.reptile-database.org, accessed 18 June 2015.

UNEP-WCMC CITES Trade Database. *Mauremys annamensis*. (Consulted 17 June 2015, 29 March 2016 and 19 November 2018).

Vander Schouw, Paul. 2011. Significant breedings: Annam Pond Turtle. *Turtle Survival* [TSA], 2011: 22.

Zwartepoorte, H., Becker, H., Meier, E., Raffel, M., and McCormack, T. Captive Breeding critical to saving the highly endangered Vietnamese Pond Turtle (*Mauremys annamensis*). *Turtle Survival Magazine*, Vol. 15: 54-55

Table 1. Gross export trade tabulation for *Mauremys annamensis*, displaying available records of legal international trade for the period 2003-2017; the species was included in CITES Appendix II with effect of 13 February 2003 and no earlier records are available; records for 2017 may not be complete. Trade records downloaded from UNEP-WCMC CITES Trade Database on 19 November 2018.

Term	Coun-try	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	total
live	CH					5	5					28	45	29	25	2	2		141
live	CN		6			34													40
live	DE						6		38			34	58		2	21	16		175
live	HK			7		34													41
live	JP														6				6
live	NL												13		18				31
live	TR												38						38
live	US				10				4		12		35	50	593	395	10		1109
specimens	VN			20				2											22
specimens	VN			1.5 kg															1.5 kg
Total (live only)		0	6	7	10	73	11	2	42	0	12	62	189	79	644	418	28	0	1581

Table 2. Comparative trade tabulation for *Mauremys annamensis*, displaying available records of international trade for the period 2003-2017; the species was included in CITES Appendix II with effect of 13 February 2003 and no earlier records are available; records for 2017 may not be complete. Trade records downloaded from UNEP-WCMC CITES Trade Database on 19 November 2018.

Year	Importer	Exporter	Origin	Importer reported quantity	Exporter reported quantity	Term	Purpose	Source
2003	US	CN		6		live	T	W
2004	CA	HK	XX		3	live	T	O
2004	TH	HK	XX	1		live	P	O
2004	TH	HK	XX		1	live	T	O
2004	US	HK	XX	3		live	T	O
2004	US	VN			1.5 Kg	specimens	S	W
2004	US	VN			20	specimens	S	W
2005	JP	US		10	10	live	T	F
2006	JP	CH		5		live	T	F
2006	VN	CN		34		live	T	U
2006	VN	HK	XX		34	live	E	O
2007	JP	CH		5	5	live	T	C
2007	JP	DE	AT	6	6	live	T	C
2008	US	VN		2		specimens	T	W
2009	TR	DE	XX	38	38	live	T	O

Table 2 (continued)

Year	Importer	Exporter	Origin	Importer reported quantity	Exporter reported quantity	Term	Purpose	Source
2009	TW	US			4	live	T	I
2011	HK	US		12	12	live	T	F
2012	CN	DE	AT		17	live	T	C
2012	HK	DE	AT	17		live	T	C
2012	HK	CH	HK	12	6	live	T	O
2012	HK	CH		12	22	live	T	F
2013	CN	TR			18	live	T	C
2013	HK	TR		18		live	T	C
2013	DE	TR	XX		2	live	T	W
2013	DE	TR		2		live	T	C
2013	HK	CH	HK	7	9	live	T	O
2013	HK	CH		32	36	live	T	F
2013	HK	US		34	35	live	T	F
2013	VN	DE			14	live	B	F
2013	VN	DE			44	live	N	C
2013	VN	NL			13	live	N	F
2014	HK	CH	HK	1		live	T	O
2014	HK	CH		28	28	live	T	F
2014	HK	US		40	40	live	T	F
2014	SG	US		10	10	live	Z	F
2015	CH	DE			2	live	P	F
2015	HK	CH		23	25	live	T	C
2015	HK	JP		6		live	T	F
2015	HK	US		557	557	live	T	C
2015	HK	US		36	36	live	T	F
2015	SG	NL		18	17	live	Z	F
2016	DE	CH	DE		2	live	P	F
2016	HK	US		320	320	live	T	C
2016	HK	US		50	50	live	T	F
2016	JP	US		10	10	live	T	F
2016	TW	DE			21	live	B	C
2016	TW	US			15	live	T	F
2017	DE	CH	DE	2		live	P	F
2017	DE	US		10		live	T	C
2017	TW	DE			16	live	B	C