

Conservation and Trade of Terrestrial and Freshwater Turtles and Tortoises in the People's Republic of China

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There has been a long history of using chelonians as food and medicine in China. Softshell turtles were used by the king to reward his army more than 2700 years ago (Zhou and Zhou, 1992). Softshell turtles are regarded as a delicacy and are widely eaten throughout China. In the past, hard-shelled turtles were consumed mainly because of their perceived medicinal or tonic value. However, the eating of hard-shelled turtles has become popular in southern China and there are restaurants in Guangdong that only serve dishes with turtle ingredients. Turtles are often for sale in the food markets in southern China. In big cities such as Guangzhou, Shenzhen, Nanning, and Haikou, numerous hard-shelled and softshell turtles are available in the markets.

During the Ming Dynasty, the medicinal properties of turtles were recorded in detail in the "Compendium of Materia Medica." Dried softshell turtle heads, turtle shells (both hard-shelled and softshell species), and even turtle blood can be used as medicine (Zhou and Zhou, 1992). *Cuora trifasciata* is reported to have additional properties in curing cancer and other hard-to-heal diseases (Zhou and Zhou, 1992). In a recent pharmaceutical study, two out of six plastrons examined were shown to contain selenium, an anti-cancer substance (Zhang and Zhang, 1998). The most commonly used turtle part in Traditional Chinese Medicine (TCM) is the bony shell; bags full of hard-shelled plastrons and softshell carapaces are for sale in TCM markets. Various TCM pills and other medications with turtle ingredients and canned turtle jelly have also been produced.

The keeping of turtles has a long history in mainland China but the commercial trade of turtles solely as pets has just started. Only a small number of *Trachemys scripta elegans*, and occasionally *Indotestudo elongata* and *Manouria impressa*, have been seen in the few pet shops in big cities such as Guangzhou, Nanning, and Haikou.

National Utilization

Although several of the non-marine chelonians in China are protected by national law and individual provinces protect additional species, collecting and trade of native turtles are still widespread. With the exception of *Cuora yunnanensis*, which may already be extinct, all Chinese turtle and tortoise species are exploited whenever they are found. Due to the high market value that live turtles have

commanded in recent years, they are rarely utilized by villagers for subsistence consumption. Rather the turtles are either sold directly to urban restaurants or to food markets in big cities through middlemen (Fig. 1). The most valued species is *Cuora trifasciata* which currently costs up to US\$ 1000 per kg in Guangzhou markets. Young individuals of this species would be raised to adulthood before being sold in markets.

There are farms in mainland China producing captive-bred *Pelodiscus sinensis* for food but detailed information on these softshell turtle farms is lacking.

Turtles are not harvested for their shell alone. The dried carapaces and plastrons in the TCM trade are believed to be obtained from turtles also utilized in the food trade.

Legal International Trade

Before the economic reforms in China at the beginning of the 1980s, trade in turtles for food was dominated by Chinese species. Since the opening of borders with other Asian countries and when the Chinese currency became convertible, there has been an increasing influx of Asian turtles into China. The overall trade has probably increased because of the increasingly prosperous human population in southern China, the improved infrastructure and transport links with other Asian countries, and the northward spread of the habit of consuming wildlife. China is the major consumer of freshwater turtles and tortoises in the world and the majority of these are now imported from other Asian countries. However, due to the very large volume of trade and the multitude of trade routes (some direct while others are trans-shipped from other ports) involving different means of transport, control and monitoring of the international trade are far from adequate. In most cases, it is not certain where the turtles originated from nor what the national laws are that apply at the country of origin. Except CITES-listed species which are likely to have been imported illegally, it is difficult to differentiate legal international trade from illegal trade in other species. Statistics of the international trade are also lacking. However, up to 19 tons of turtles passed through three border ports between Guangxi province and Vietnam per day (Li and Li, 1997, 1998) and as much as several hundred tons of turtles were flown to Guangzhou from Indonesia in one day (O. Shiu and R. Kan, *pers. comm.*). A very small number of North American turtles (mainly

Trachemys scripta elegans and *Chelydra serpentina*) were also imported from time to time.

Most of the Asian turtles have been seen for sale in the food markets in south China. Non-CITES species believed to have been imported into China include: *Platysternon megacephalum*, *Cuora amboinensis*, *Cuora galbinifrons*, *Cuora trifasciata*, *Cyclemys* spp., *Geoemyda spengleri*, *Hardella thurjii*, *Heosemys grandis*, *Heosemys spinosa*, *Heosemys yuwonoi*, *Hieremys annandalii*, *Malayemys subtrijuga*, *Mauremys annamensis*, *Mauremys mutica*, *Morenia petersi*, *Notochelys platynota*, *Ocadia sinensis*, *Orlitia borneensis*, *Pxyidea mouhotii*, *Sacalia quadriocellata*, *Siebenrockiella crassicollis*, *Amyda cartilaginea*, *Nilssonina formosa*, *Palea steindachneri*, and *Pelodiscus sinensis*.

A small number of food turtles (including both Chinese and other Asian species) are also exported from China to Hong Kong for human consumption. Large quantities of plastron and carapace are also exported to Taiwan.

Certain rare or newly described, native Chinese species have been targeted for the international pet trade. These are purchased from food markets or local villagers by Hong Kong pet dealers or their staff. They are transported to Hong Kong and then shipped to other countries such as the USA, Germany, and Japan. Rare or restricted Asian species that turned up in Chinese food markets are also sought for. Species particularly targeted include: *Cuora aurocapitata*, *Cuora galbinifrons*, *Cuora mccordi*, *Cuora pani*, *Cuora zhoui*, *Heosemys yuwonoi*, *Mauremys iversoni*, *Mauremys pritchardi*, *Ocadia glyphistoma*, *Ocadia philippeni*, and *Sacalia pseudocellata*.

Illegal Trade

CITES-listed species that have been observed in south China food markets include: *Batagur baska*, *Callagur borneoensis*, *Geoclemys hamiltonii*, *Kachuga tecta*, *Morenia ocellata*, *Indotestudo elongata* (Fig. 1), *Manouria emys*, *Manouria impressa*, *Aspideretes gangeticus*, *Aspideretes hurum*, and *Lissemys punctata*. It is most likely that they were imported into China illegally.

Potential Trade Impacts

With the exception of *Pelodiscus sinensis* in which the vast majority of individuals traded were bred and raised in farms, virtually all Asian chelonians in trade are believed to be wild-caught. Due to the very high price of *Cuora trifasciata*, there are small-scale farms in China breeding and rearing this species. However, the level of production is not enough to meet the demand as indicated by the continual increase in the value of this species. Small numbers of other Chinese turtles have also been produced from the opportunistic breeding of animals in stock, but they occupy an insignificant proportion of the food market. The continual harvest of large numbers of slow-growth, low-fecundity chelonians



Figure 1. Turtle seller at Ching Ping market, Shenzhen, China, with several crates of chelonians, including elongated tortoises, *Indotestudo elongata*, a CITES-listed species probably illegally imported. Photo by ML.

from the wild is clearly unsustainable and must have a deleterious effect. Already Chinese species have declined drastically in the wild and many of them are now endangered (Zhao, 1998). For example, *Chinemys reevesii* used to be very common and widespread and was the principal species in trade. Now, it hardly ever turns up in the food markets. Similar impacts have or are expected to occur to other Asian turtles populations. For example, the recently described *Heosemys yuwonoi*, which is endemic to Sulawesi in Indonesia, has already become commercially extinct in Chinese markets after being observed in those markets in great numbers for a short while.

The trade routes to supply turtles have shifted to more distant countries. The food trade may find new source countries to supply the turtles once the existing stock in Asia is depleted. Already small numbers of North American species are for sale in southern China markets, probably testing the response or just waiting for these trade networks to become connected.

Although the trade in rare turtles only involves a limited number of species in relatively low numbers, trade impact on

them is significant because the species concerned are rare and restricted. The very high price offered by the international pet market may provide enough incentive for some poor farmers to turn into full-time turtle collectors. Already species like *Cuora aurocapitata* and *Cuora mccordi* may have become commercially extinct in the wild.

Conservation and Management

Legal Status. — Several freshwater turtles and tortoises are listed in the People's Republic of China Wild Animals Protection Law: *Testudo horsfieldii* and *Pelochelys cantorii* (listed as *P. bibroni*) are state major protected wildlife grade I, while *Cuora trifasciata*, *Cuora yunnanensis*, *Geoemyda spengleri*, *Manouria impressa*, and *Palea steindachneri* are grade II protected. The Wild Animals Protection Law also covers important economic and scientific species, though the actual species are not listed. For terrestrial species, the State Forestry Administration is responsible for the administering and enforcing of this law, while the Fisheries Ministry is responsible for the aquatic species. The collecting of state major protected species is only allowed for scientific research, captive-breeding, exhibition, and other special reasons. Permission from the Forestry or Fisheries Bureau in the central government is needed for the collecting of grade I protected species. For grade II protected species, permission from the Forestry or Fisheries Department in the provincial government is required. The transport of state major protected species across county boundaries needs the permission from the provincial Forestry or Fisheries Department. The import and export of these state major protected species and CITES-listed species need the permission from the Forestry or Fisheries Bureau in the central government and a certificate issued by the Endangered Species of Wild Fauna and Flora Import and Export Administrative Office. The People's Republic of China became a Party to CITES in 1981. Non-native CITES Appendix I species are treated as state major protected wildlife grade I. Similarly, non-native CITES Appendix II species are treated as grade II protected.

In addition to the state-protected species, individual provinces may have a list of provincially protected turtles. The management of these species is formulated by the provincial legislature.

Species Management. — As far as is known, there is no management plan for freshwater turtles and tortoises anywhere in China. In addition to the protected measures offered by the Wild Animals Protection Law outlined above, hunting and collecting of turtles inside the more than 700 reserves are prohibited. However, enforcement is not adequate. Protected species are commonly seen for sale in the markets and illegal collecting of turtles inside reserves occurs regularly.

Habitat Conservation. — There are more than 700 reserves in the People's Republic of China, protecting more than 6% of the total national area (Mackinnon et al., 1996).

One of them is specifically for the protection of *Testudo horsfieldii* in Xinjiang province. The turtle habitats within these reserves are afforded protection according to law. However, illegal logging, liming of streams to collect aquatic animals, and/or conversion to cultivated land occurs in some of the reserves. Some major lowland turtle habitats such as large river and freshwater marshes are under-represented in the existing protected area system and are threatened by pollution and development. Also the habitats of some of the very restricted species like *Cuora aurocapitata* and *Cuora pani* lie outside the reserves and remain unprotected.

Control Measures. — The Forestry Department and Fisheries Department are responsible for enforcing the various conservation laws and regulations protecting tortoises and turtles. Inspections are carried out in markets, restaurants, and ports.

SPECIES ACCOUNTS

Platysternon megacephalum (Fig. 2)

Distribution: Widespread in central and southern China, including Yunnan, Guizhou, Anhui, Jiangsu, Zhejiang, Jiangxi, Hunan, Fujian, Guangdong, Hainan, and Guangxi provinces.

Habitat availability: This species normally lives in unpolluted hill streams and the surrounding riparian habitats. There are still many suitable streams left.

Population status: This species is considered to be "endangered" in China (Zhao, 1998). It is now rarely seen in the wild.

Population trends: Previously common in the food markets but now only low numbers of individuals turn up in the market, indicating that wild populations have declined drastically.

Threats: Main threat is over-collecting for the food trade. Deforestation, the construction of small hydro-electric plants, and the liming of streams within the range of this species cause habitat destruction and degradation.

Chinemys megalcephala

Distribution: Reported from Jiangsu, Anhui, Hubei, and possibly Guangxi provinces in central and southern China (Zhao, 1998). The validity of this species has been in debate (Iverson et al., 1989) but a recent karyotype study indicated that it is a valid species (Guo et al., 1997).

Habitat availability: This species lives in creeks and ponds in low hills. There are still suitable habitats left in China.

Population status: This species is rare and considered to be "endangered" in China (Zhao, 1998).

Population trends: Used to be regularly offered in the food markets but now is rarely found, indicating a decline in wild populations.

Threats: Main threat is over-collecting for the food trade. Urbanization, water pollution, and the increased use of fertilizer and pesticide cause habitat destruction and degradation.



Figure 2. The big-headed turtle, *Platysternon megacephalum*, a species that was previously common in the food markets of southern China, but now only low numbers of individuals turn up in the market, indicating that wild populations have declined drastically. Photo by Peter Paul van Dijk.

Chinemys nigricans

Distribution: Restricted to Guangdong and Guangxi provinces in southern China. There is also a record from Hainan based on market animals (Zhao, 1998).

Habitat availability: This species lives in unpolluted forest streams and suitable habitat is still available.

Population status: Has always been a rare species. Now considered to be “endangered” in China (Zhao, 1998).

Population trends: It has nearly completely disappeared in the food markets, indicating that wild populations have declined.

Threats: Main threat is over-collecting for the food trade. Deforestation, the construction of small hydro-electric plants, and the liming of streams within the range of this species cause habitat destruction and degradation.

Chinemys reevesii

Distribution: Widespread in China including Hebei, Shangdong, Henan, Shaanxi, Gansu, Sichuan, Yunnan, Guizhou, Hubei, Anhui, Jiangsu, Zhejiang, Jiangxi, Hunan, Fujian, Guangdong, and Guangxi provinces.

Habitat availability: This species lives in rivers, lakes, reservoirs, ponds, marshes, and paddy fields. There are still many suitable habitats left in China.

Population status: This species used to be the most common and widespread freshwater turtle in China. It is now considered to be “conservation dependent” in China (Zhao, 1998).

Population trends: Used to be the most common turtle in the Chinese food markets but has virtually disappeared, indicating that wild populations have declined drastically.

Threats: Main threat is over-collecting for the food trade. Urbanization, water pollution, and the increased use of fertilizers and pesticide cause habitat destruction and degradation.

Cuora amboinensis

Distribution: Reported from Guangdong and Guangxi provinces in southern China (Zhang et al., 1998). However, all the records are based on market animals or shells retained by people. So far this species has never been found in the wild in China despite the fact that it is a lowland species that can live in man-made water bodies in other countries. If it is native to China, chances are that it would have been recorded by earlier researchers.

Habitat availability: Reported to live in lowland marshes, ponds, rivers, and paddy fields (Ernst and Barbour, 1989). There are still numerous suitable habitats left in China.

Population status: Unknown. The few specimens recorded were from markets and probably originated from other countries.

Population trends: Not known.

Threats: Not certain as populations may not exist in China.

Cuora aurocapitata

Distribution: Restricted to Nanling, Yixian, Guangde, and Jingxian counties in Anhui province, central China.

Habitat availability: This species lives in unpolluted streams and ponds in the hills. Also ventures into the surrounding riparian habitats. There are still suitable habitats left.

Population status: This is a very rare and restricted turtle. It is considered to be “critically endangered” in China (Zhao, 1998).

Population trends: Used to be available in small numbers for the international pet trade. Now very few specimens, if at all, can be secured by pet dealers, indicating that the wild population has become depleted.

Threats: Main threat is exploitation for the pet and food trade.

Cuora flavomarginata

Distribution: Widespread in central and southern China, including Henan, Hubei, Anhui, Jiangsu, Zhejiang, Hunan, and Fujian provinces. Records from Guangdong and Guangxi provinces probably refer to animals brought in from the north for the food trade (Zhao, 1998).

Habitat availability: This species lives along forest edges and shrubland. Also reported to occur in moist areas near rivers and lakes. There are still numerous suitable habitats left in China.

Population status: This species is now considered to be “endangered” in China (Zhao, 1998).

Population trends: Populations are reported to be in decline (Chen, 1991; Zhao, 1998). Fewer animals turn up in the Chinese food markets, indicating that this species is in decline.

Threats: Main threat is over-collecting for the food trade. Deforestation and urbanization cause habitat destruction and degradation.

Cuora galbinifrons

Distribution: Restricted to Guangxi and Hainan provinces in southern China.

Habitat availability: This species lives in forest streams, ponds, and the surrounding moist terrestrial habitats. There are still suitable habitats left.

Population status: This species is now considered to be “endangered” in China (Zhao, 1998).

Population trends: This turtle is still being collected and trapped in Hainan (de Bruin and Artner, 1999), even within protected areas. The population is believed to be in decline.

Threats: Main threat is over-collecting for the food trade. Deforestation, construction of small hydro-electric plants, and the liming of streams cause habitat destruction and degradation.

Cuora mccordi

Distribution: This species is believed to be restricted to the Bose area in Guangxi province, south China. All the known specimens are either bought from the food markets or supplied by pet dealers, hence the exact area of occurrence is not certain.

Habitat availability: Exact habitat of this species is not known. It probably lives in forest and hill streams in remote hilly areas and hence was not discovered until recently.

Population status: Not certain. Since its discovery, only a small number of individuals have been available in the market despite the very high price commanded by this species. In the last few years, very few specimens could be obtained by animal dealers, indicating a very small extant population. This species is classified as “data deficient” in China (Zhao, 1998).

Population trends: Not certain. The number of individuals available in the international pet market has decreased to a handful (O. Shiu and R. Kan, *pers. comm.*), suggesting that the population is in decline.

Threats: Main threat is over-collecting for the pet and food trade. The habitats of this species may also be affected by deforestation, construction of small hydro-electric plants, and the liming of streams.

Cuora pani

Distribution: The type specimens were collected from Pingli county, Shaanxi province in central China. Some other specimens were also purchased from Yunnan but the exact locality is not known.

Habitat availability: Specimens were obtained in irrigation ditches alongside rice paddies at 420 m elevation. There should not be any shortage of suitable habitats within the range of this species.

Population status: Not certain. Since its discovery, only a small number of individuals have been collected from the wild or seen in the market, indicating a small population size. This species is considered to be “critically endangered” in China (Zhao, 1998).

Population trends: Not certain.

Threats: Main threat is over-collecting for the pet and food trade. The habitat of this turtle may also suffer from urbanization, water pollution, and the increased use of fertilizers and pesticides.

Cuora trifasciata

Distribution: Widely distributed in Guangdong, Hainan, Guangxi, and Fujian provinces in southern China.

Habitat availability: This species lives in hill streams and the surrounding forests or shrubland. There are still numerous suitable habitats left in China.

Population status: This species is classified as “critically endangered” in China (Zhao, 1998). Recent field surveys conducted in suitable habitats in Guangdong, Guangxi, and Hainan provinces failed to find any specimens in the wild. Only a few specimens were found offered for sale in Hainan in 1997 (de Bruin and Artner, 1999).

Population trends: The number of individuals exported from mainland China has decreased sharply (Zhao, 1998) in recent years, suggesting that the population is in decline. Also, according to local villagers in south China, it is now very difficult to collect any individuals in the wild.

Threats: Main threat is over-collecting for the food, traditional medicine, and pet trade. Deforestation, construction of small hydro-electric plants, and the liming of streams cause habitat destruction and degradation.

Cuora yunnanensis

Distribution: Only known from the the two localities of Dongchuan and Kunming, Yunnan Province, in southwest China.

Habitat availability: Specimens were obtained at high altitudes (from 2000 to 2260 m). The exact habitat of this turtle is not known. However, habitat of this species has probably been destroyed in Kunming, which

has become a big city. Suitable habitats may still exist at Dongchuan.

Population status: A very rare species that is only known from eight specimens collected in 1906. It is considered to be “probably extinct in the wild” in China (Zhao, 1998).

Population trends: Not certain. Probably extinct.

Threats: Not certain. Habitat destruction and habitat degradation in the Kunming area was probably a serious threat.

Cuora zhoui

Distribution: Exact distribution not known but the type specimens were obtained from markets in Nanning and Pingxiang, Guangxi Province. Additional specimens were reported to be bought from markets in Wuding and Yuanmou in Yunnan Province.

Habitat availability: Exact habitat of this species is not known. It probably lives in forest and hill streams in remote hilly areas and hence was not discovered until recently.

Population status: Not certain. This species is classified as “data deficient” in China (Zhao, 1998). Since its discovery, only a small number of individuals have been available in the market despite the high price commanded, indicating a small extant population.

Population trends: Not certain.

Threats: Main threat is over-collecting for the pet and food trade. The habitats of this species may also be affected by deforestation, construction of small hydro-electric plants, and the liming of streams.

Cyclemys dentata

Distribution: Reported from Yunnan and possibly Guangxi provinces in south China (Zhao, 1998). However, all records are from market animals. So far this species has never been confirmed in the wild in China.

Habitat availability: Reported to live in streams and surrounding terrestrial habitats (Zhang et al., 1998). There are still suitable habitats left in China.

Population status: Is considered “endangered” in China (Zhao, 1998). The few specimens recorded were from markets and might have originated from other countries.

Population trends: Not known.

Threats: Not certain as populations may not exist in China.

Geoemyda spengleri

Distribution: Distributed in Guangdong, Guangxi, Hainan, and Hunan provinces in south and central China.

Habitat availability: This species usually inhabits moist, close-canopy forests. Also occurs in small streams and even pineapple fields. There are still suitable habitats left in China.

Population status: This species is now considered to be “endangered” in China (Zhao, 1998). It is now rarely seen in the wild except in very remote places.

Population trends: According to Zhao (1998), a certain number of individuals were available in Guangxi markets in

the 1950s but virtually disappeared in later years. When China opened its border in the 1980s, many live turtles of this species were imported from Vietnam to supply the market (Zhao, 1998). The population in China is believed to be in drastic decline.

Threats: Main threat is over-collecting for the food and pet trade. Deforestation also threatens this species.

Mauremys iversoni

Distribution: Restricted to Nanping and Jianyang in Fujian Province, and Guiyang in Guizhou Province. Specimens have also been purchased from local people near Nanning, Guangxi Province (Zhao and Adler, 1993).

Habitat availability: This species lives in slow-moving sections and backwaters of hill streams at elevations of about 500 m. There are still suitable habitats left in China.

Population status: This species is considered to be “data deficient” in China (Zhao, 1998). Only a few specimens of this turtle have been recorded since it was discovered, indicating that the wild population is small.

Population trends: Not certain.

Threats: Main threat is over-collecting for the pet and food trade. Deforestation, construction of small hydro-electric plants, and the liming of streams may pose further threats to this species.

Mauremys mutica

Distribution: Widespread in central and southern China, including Yunnan, Hubei, Anhui, Jiangsu, Zhejiang, Jiangxi, Hunan, Fujian, Guangdong, Guangxi, and Hainan provinces.

Habitat availability: This species lives in water bodies in basins and river valleys. There are still many suitable habitats left in China.

Population status: It is now considered to be “endangered” in China (Zhao, 1998).

Population trends: This species used to be one of the commonest turtles for sale in the Chinese food markets but has become uncommon in recent years, indicating that wild populations have declined substantially.

Threats: Main threat is over-collecting for the food trade. Urbanization, water pollution, and the increased use of fertilizers and pesticides cause habitat destruction and degradation.

Mauremys pritchardi

Distribution: Only recently discovered and in China is reported from Chin-hung in Yunnan Province. Specimens were not collected in the wild and the exact distribution is not known (McCord, 1997).

Habitat availability: Exact habitat not known.

Population status: Only a few specimens of this turtle have been recorded since it was discovered, indicating that the wild population is small.

Population trends: Not certain.

Threats: Main threat is over-collecting for the pet and food trade.

Ocadia glyphistoma

Distribution: This species is only known from the types that were purchased in southwest Guangxi near the Vietnam border. However, the specimens were reported to have originated from Vietnam (McCord and Iverson, 1994). The possibility of these turtles being hybrids produced in turtle farms cannot be ruled out.

Habitat availability: Exact habitat is not known.

Population status: This species is considered to be “data deficient” in China (Zhao, 1998). The few specimens recorded were from food markets and they may actually originate from outside China or may be hybrids produced in turtle farms.

Population trends: Not known.

Threats: Main threat is over-collecting for the pet and food trade.

Ocadia philippeni

Distribution: The type specimens were purchased near Dongfang County, west Hainan, in south China (McCord and Iverson, 1992). In 1999, another specimen was bought from the Haikou city market in north Hainan. The possibility of these turtles being hybrids produced in turtle farms cannot be ruled out.

Habitat availability: Exact habitat is not known.

Population status: This species is considered to be “data deficient” in China (Zhao, 1998). The few specimens recorded were from food markets and they may actually be hybrids produced in turtle farms. Specimens could not be located in 1997 in the wild near the type locality in Hainan despite intensive searching (de Bruin and Artner, 1999).

Population trends: Not known.

Threats: Main threat is over-collecting for the pet and food trade.

Ocadia sinensis

Distribution: Distributed in Jiangsu, Zhejiang, Fujian, Guangdong, Guangxi, and Hainan provinces in southeastern China.

Habitat availability: This species lives in low-altitude water bodies such as rivers, canals, and ponds. There are still suitable habitats left in China.

Population status: This species is considered to be “endangered” in China (Zhao, 1998).

Population trends: Its abundance has sharply decreased in the wild (Zhao, 1998). Hainan still has a considerable population of this turtle but trapping and collecting is widespread. The number of animals appearing in the food markets has also decreased.

Threats: Main threat is over-collecting for the food trade. Urbanization, water pollution, and the increased use of fertilizers and pesticides pose further threats to this species.

Pyxidea mouhotii

Distribution: Distributed in Yunnan, Hunan, Guangdong, Guangxi, and Hainan provinces in south and central China.

Habitat availability: This species lives in hill forests. There are still suitable habitats left in China.

Population status: This species is considered to be “endangered” in China and is rarely seen in the wild (Zhao, 1998).

Population trends: Populations have probably declined drastically. Villagers in Hainan reported that this species used to be very common but is now difficult to obtain. Although this species can still be found in Hainan, trapping and collecting is widespread on the island (de Bruin and Artner, 1999).

Threats: Main threat is over-collecting for the food trade. Deforestation poses a further threat to this species.

Sacalia bealei

Distribution: Reported from Guizhou, Anhui, Jiangxi, Fujian, Guangdong, Hainan, and Guangxi provinces in central and south China. However, in the past this species and *Sacalia quadriocellata* were often considered to be conspecific and some of the records might refer to *S. quadriocellata* instead. For instance, this species has been reported from Hainan but recent field surveys and market surveys only found *S. quadriocellata* and not *S. bealei* (de Bruin and Artner, 1999).

Habitat availability: This species lives in hill streams and irrigation ditches; the animals also forage in paddy fields and ponds in the summer. There are still suitable habitats left in China.

Population status: This species is considered to be “endangered” in China (Zhao, 1998).

Population trends: Populations have declined (Zhao, 1998). This species was regularly seen in the market in the past but now is very rarely found, indicating a drastic population decline in the wild.

Threats: Main threat is over-collecting for the food trade. Deforestation, construction of small hydro-electric plants, water pollution, and liming of streams pose further threats to this species.

Sacalia pseudocellata

Distribution: This species is only known from several specimens purchased from villagers in Dongfang County, west Hainan, in south China. The possibility of these turtles being hybrids produced from turtle farms cannot be ruled out.

Habitat availability: Exact habitat is not known.

Population status: This species is considered to be “data deficient” in China (Zhao, 1998). The few specimens recorded were from food markets and they may actually be hybrids produced from turtle farms. No specimens were found on a field survey in Hainan in 1997 (de Bruin and Artner, 1999).

Population trends: Not known.

Threats: Main threat is over-collecting for the pet and food trade.

Sacalia quadriocellata

Distribution: Reported from Jiangxi, Fujian, Guangdong, Hainan, and Guangxi provinces in central and south China.

However, in the past this species and *Sacalia bealei* were often considered to be conspecific and some of the records might refer to *S. bealei* instead. This species has been observed in the wild in Guangdong, Hainan, and Guangxi provinces.

Habitat availability: This species lives in hill streams and there is suitable habitat available in China.

Population status: Zhao (1998) considered this species to be rare and “endangered” in China. However, a fairly healthy population still exists on Hainan but is subject to trapping and collecting (de Bruin and Artner, 1999).

Population trends: According to Zhao (1998), populations have declined.

Threats: Main threats are over-collecting for the food trade and habitat destruction or degradation as a result of deforestation, construction of small hydro-electric plants, water pollution, and liming of streams.

Indotestudo elongata

Distribution: Reported from Yunnan and Guangxi provinces in south China. Records from Yunnan are based on market animals that may have originated from neighboring countries such as Myanmar.

Habitat availability: This species lives in hilly areas and suitable habitat is still available.

Population status: This species is considered to be “endangered” in China (Zhao, 1998).

Population trends: The species is believed to have declined drastically due to its limited range and over-exploitation.

Threats: Main threat is over-collecting for the food trade. Deforestation poses another threat.

Manouria impressa

Distribution: Reported from Yunnan, Hunan, Guangxi, and Hainan provinces in south China (Zhao and Adler, 1993). The Hunan record is based on one specimen found in Shaoyang city (Zhao, 1998) and probably was a market animal. Similarly, this species has never been recorded in the wild in either Guangxi or Hainan, and the market records should be treated with caution due to the extensive cross-border turtle trade.

Habitat availability: This species lives in hill forests and suitable habitat is still available.

Population status: This species is considered to be “endangered” and rare in China (Zhao, 1998).

Population trends: The species is believed to have declined drastically due to its limited range and over-exploitation.

Threats: Main threats are over-collecting for the food trade and deforestation.

Testudo horsfieldii

Distribution: Restricted to the western part of Xinjiang province in northwest China.

Habitat availability: This species lives in semi-desert meadows between 700 and 1000 m elevation, and also occurs in surrounding dry fields. There is still suitable habitat in China.

Population status: This species is considered to be “critically endangered” with about 1000 individuals left in the wild in Xinjiang (Zhao, 1998). The 350 km² Huo Cheng nature reserve was created in 1983 specifically for the protection of this species and its habitat, but the area is heavily cultivated (McKinnon et al., 1996).

Population trends: The Chinese population has declined drastically. In the early 1960s, density could reach more than 4000 animals per km². However, in the early 1990s, density decreased to 6 animals per km². The range of this species also dropped from 500 km² in the early 1960s to 180 km² in the early 1990s (SH, *pers. obs.*)

Threats: Main threats are over-collecting for the food trade and habitat degradation due to the conversion of meadow into dry fields.

Palea steindachneri

Distribution: Distributed in Yunnan, Guizhou, Guangdong, Hainan, and Guangxi provinces in central and south China.

Habitat availability: This species lives in large hill streams, creeks, and small rivers. There are still suitable habitats left in China.

Population status: This species is considered to be “endangered” in China (Zhao, 1998).

Population trends: According to Zhao (1998), populations have declined as indicated by the continual reduction in the number of animals harvested each year.

Threats: Main threat is over-collecting for the food trade. Habitat destruction or degradation as a result of construction of small hydro-electric plants, water pollution, and liming of streams also pose threats to this species.

Pelochelys cantorii

Distribution: Distributed in Yunnan, Jiangsu, Zhejiang, Fujian, Guangdong, Hainan, and Guangxi provinces in central and south China. Historically also occurred in Anhui (Chen, 1991). In the past, the name *Pelochelys bibroni* was used for the Chinese populations, but that name is now restricted to southern New Guinea populations.

Habitat availability: This species normally lives in rivers and lakes, and is also found in reservoirs. There are still suitable habitats left in China.

Population status: This species is considered to be “extinct in the wild” in China (Zhao, 1998).

Population trends: According to Zhao (1998), both the population and range of this species in China have become significantly reduced. The Zhejiang population is close to extinction (Huang et al., 1990).

Threats: Main threats are over-collecting for the food trade and habitat destruction or degradation as a result of urbanization, water pollution, and over-fishing.

Pelodiscus sinensis

Distribution: Widespread in China and has been reported from nearly all provinces except Xinjiang, Qinghai, Xizang (Tibet), and Ningxia.

Habitat availability: This species lives in rivers, creeks, lakes, reservoirs, ponds, and the surrounding ditches and paddy fields. There are still numerous habitats left in China.

Population status: This species is considered to be “vulnerable” in China (Zhao, 1998).

Population trends: Populations have declined rapidly (Chen, 1991; Zhao, 1998).

Threats: Main threat is over-collecting for the food trade. Habitat destruction or degradation as a result of urbanization, water pollution, and the increased use of fertilizers and pesticides also threaten this species. There are numerous farms in China raising this species for commercial exploitation, but detailed information on these softshell turtle farms is lacking.

Rafetus swinhoei

Distribution: Reported from the lower reaches of Chang Jiang and Tai Hu drainage systems in Shanghai and Jiangsu provinces, central China and possibly Yunnan Province in southwest China (Zhao, 1998).

Habitat availability: This species lives in big rivers and lakes. There are still suitable habitats left in China.

Population status: Only known from a small number of specimens. A few specimens are in captivity in zoos and temples. This species is considered to be either “critically endangered” or “extinct in the wild” in China (Zhao, 1998).

Population trends: Not known.

Threats: Not certain. Over-collecting and habitat destruction or degradation probably have been serious impacts.

LITERATURE CITED

- CHEN, B. 1991. The Amphibian and Reptilian Fauna of Anhui. Hefei: Anhui Publishing House of Science and Technology.
- DE BRUIN, R.W.F. AND ARTNER, H.G. 1999. On the turtles of Hainan Island, southern China. *Chelonian Conservation and Biology* 3(3):479-486.
- ERNST, C.H. AND BARBOUR, R.W. 1989. *Turtles of the World*. Smithsonian Institution Press, Washington D.C.
- GUO, C.-W., NIE, L.-W., AND WANG, M. (1997). The karyotypes and NORs of two species of *Chinemys*. *Sichuan Journal of Zoology* 15 (Suppl.):97-104.
- HUANG, M., CAI, C., JIN, Y., GU, H., ZHANG, S., GUO, H., AND WEI, J. 1990. *Fauna of Zhejiang, Amphibia Reptilia*. Hangzhou: Zhejiang Science and Technology Publishing House.
- IVERSON, J.B., ERNST, C.H., GOTTE, S.W., AND LOVICH, J.E. 1989. The validity of *Chinemys megaloccephala* (Testudines: Batagurinae). *Copeia* 1989(2):494-498.
- LI, Y. AND LI, D. 1997. The investigation on wildlife trade across Guangxi borders between China and Vietnam. *Conserving China's Biodiversity – Reports of the Biodiversity Working group, China Council for International Cooperation on Environment and Development*, pp. 118-127.
- LI, Y. AND LI, D. 1998. The dynamics of trade in live wildlife across the Guangxi border between China and Vietnam during 1993-1996 and its control strategies. *Biodiversity Conservation* 7:895-914.
- MACKINNON, J., MENG, S., CHEUNG, C., CAREY, G., ZHU, X., AND MELVILLE, D. 1996. *A Biodiversity Review of China*. Hong Kong: World Wide Fund for Nature International, WWF China Programme.
- MCCORD, W.P. 1997. *Mauremys pritchardi*, a new batagurid turtle from Myanmar and Yunnan, China. *Chelonian Conservation and Biology* 2(4):555-562.
- MCCORD, W.P. AND IVERSON, J.B. 1992. A new species of *Ocadia* (Testudines: Bataguridae) from Hainan Island. *Proceedings of the Biological Society of Washington* 105(1):13-18.
- MCCORD, W.P. AND IVERSON, J.B. 1994. A new species of *Ocadia* (Testudines: Bataguridae) from southwestern China. *Proceedings of the Biological Society of Washington* 107(1):52-59.
- ZHANG, H. AND ZHANG, C. 1998. Turtle plastron extract's nutritional value and its effect on dividing cancer cells. *Hong Kong Pharmaceutical Journal* 7:104-107.
- ZHANG, M., ZONG, Y., AND MA, J. 1998. *Fauna Sinica, Reptilia Vol. 1*. Beijing: Science Press.
- ZHAO, E. 1998. *China Red Data Book of Endangered Animals: Amphibia and Reptilia*. Beijing: Science Press.
- ZHAO, E. AND ADLER, K. 1993. *Herpetology of China*. Soc. Study Amphib. Reptiles, Contr. Herpetol. No. 10, 522 pp.
- ZHOU, J. AND ZHOU, T. 1992. *Chinese Chelonians Illustrated*. Nanjing: Jiangsu Science and Technology Publishing House.