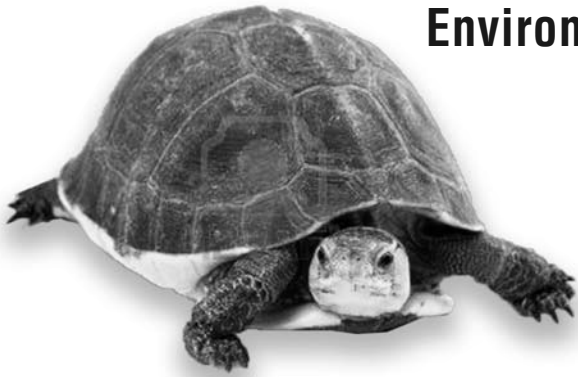


Asia's Turtle Crisis and Conservation

Environmental Education and Cultural Geography



Chinese Box Turtle (*Cuora flavomarginata*). ©123RF.com

By Bradley R. Reynolds and Thomas P. Wilson

Turtles are heavily exploited in Asia, not only for the pet trade, but also as a food source and for use in traditional Asian folk medicines. Along with habitat destruction, increased urbanization, and pollution, such overexploitation is driving what conservationists are calling the Asian turtle crisis, a precipitous decline in Asian turtle populations. Currently, over half of Asia's ninety turtle species are classified as endangered or critically endangered.¹ While it is true that the life history and reproductive strategy of the turtle plays a major role, the Asian turtle crisis is also a function of culture and geography. When considering the role played by cultural geography in the disappearance of Asian turtles, it is perhaps most helpful to consider China as a separate entity, along with Southeast Asia (e.g., Việt Nam, Cambodia, and Laos). In this article, we will highlight both areas and explain in some detail how one influences the other.

But first, why are freshwater turtles important? Freshwater turtles have significant ecological roles to play in their respective ecosystems. Because freshwater turtles are ecological indicators, their presence or absence gives clues about the overall health and well being of the environment. Freshwater turtles are important because they allow for long-term ecological studies that facilitate environmental monitoring. Without freshwater turtles, environmental monitoring is more difficult. As for why teachers and students should be concerned about the Asian turtle crisis, it is impossible to remove any one species without potentially influencing other species. Globally, over 40 percent of all turtle species are threatened with extinction.² Mass turtle extinctions could conceivably set off a cascade of extinctions, triggering instability. This could irreparably damage ecosystems and disrupt ecosystem services. Becoming more aware of such facts can help both teachers and students better understand the environment.

Of course, studying and appreciating freshwater turtles not only increases understanding of the environment, it also helps to cultivate an environmental ethic. Through environmental stewardship and education, conservationists hope that the inhabitants of Asia will become more concerned with the stability of wild turtle populations. Ultimately, the same biological principles and concepts that dictate and define the well being of wildlife populations also determine our own fate. Simply stated, because of the interconnectedness of life, when human beings jeopardize turtle populations, we in turn jeopardize ourselves. Even though the disappearance of Asian turtles is not a "canary in the coal mine" scenario, it does suggest that many of the modern-day inhabitants of Asia are not entirely concerned with protecting their environment, nor are they overly concerned with using their resources in a sustainable manner.

Western culture, at least now, routinely ascribes *intrinsic value* to turtles, or worth separate and distinct from anything they might do for us as human beings. The Chinese are typically more concerned with *direct use value*. Direct

use value has to do with goods that are consumed locally and with products sold in markets. In China, turtles are targeted for both food and medicine. The Chinese three-striped box turtle (*Cuora trifasciata*), for example, is in very high demand in China, given that the Chinese believe that its undershell (or plastron) can cure cancer. The Chinese use both dogs and traps to catch *Cuora trifasciata*. They then use the plastrons to make medicinal jellies and soups, which are then ingested by the cancer-stricken as a means of combating the disease.³ *Cuora trifasciata* has been heavily exploited for use in traditional folk medicine and is now considered critically endangered. A critically endangered species is one that "is facing an extremely high risk of extinction in the wild in the immediate future."⁴ The three-striped box turtle is also listed as CITES Appendix II, restricting and regulating its trade.⁵ CITES is the Convention on International Trade in Endangered Species, a respected treaty designed to ensure that the trade of endangered species does not threaten their survival.

Việt Nam is actually helping to drive the exploitation of the Chinese three-striped box turtle, not only in southern China but also throughout the greater part of the turtle's range, which includes northern Việt Nam and Laos. In terms of geography, Việt Nam borders southern China and is in close physical proximity to many of the southern Chinese markets that effectively act as clearing-houses for Asian turtles and turtle products. Three-striped box turtles have traditionally been harvested in Việt Nam before being transported to markets in southern China. As turtles in Việt Nam have become scarce, Việt Nam has partnered with Laos and Cambodia in an effort to maintain a steady trade of turtles to southern China, facilitating the extinction of turtles in those countries. As a result, the Chinese three-striped box turtle is now facing a greater-than-average risk of extinction. Sadly, it is not alone. Other turtles are exploited in a similar manner. In fact, approximately 13,000 tons of turtles and turtle shells are shipped from Southeast Asia to China and East Asia every single year. Exact numbers are cloudy at best because accurate records are nonexistent. Complicating matters even further is the fact that turtle use has become more common throughout China, having spread from the country's southern regions.⁶

Also precariously perched on the brink of extinction in both southern China and northern Việt Nam is the critically endangered Yangtze giant soft-shell turtle (*Rafetus swinhoei*), which historically resided in the lower portions of the Chang Jiang River, as well as in neighboring lakes and wetlands. Currently, only a handful exists in captivity. Sightings in the wild are now so rare that for all practical purposes, this critically endangered species is now functionally extinct, if not outright extinct in the wild. A functionally extinct species is a species that exists in such low numbers that it has no impact on native prey populations and does not have the requisite population numbers to remain vi-



Figure 1. Two other casualties of the Asian turtle crisis compliments of the pet trade. Left: Spiny turtle (*Geoemydidae- Heosemys spinosa*, Gray 1831; CITES Appendix II); Right: Four-eyed turtle (*Geoemydidae- Sacalia quadriocellata*, Siebenrock 1903; CITES Appendix III). Museum specimens donated by George Mason University. (Photo by Thomas P. Wilson)

able. The Yangtze giant softshell is also listed as CITES Appendix III, which means that the source country has asked the international community for assistance in preventing further exploitation of the species.

Like the three-striped box turtle, the Yangtze giant softshell has been targeted for traditional medicines, although the upper shell, or carapace, is preferred rather than the plastron. Asian fishermen have likewise targeted this giant turtle as a source of food and for its eggs. In addition to being captured and killed for medicine and for food, the numbers of the Yangtze giant softshell have also crashed as a direct result of habitat degradation throughout its geographic range.⁷ Some rivers in China, for example, are heavily contaminated with arsenic, lead, and raw sewage. Habitat alteration is the number-one threat to biodiversity and is closely linked to pressures exerted by human population growth. Certainly China's population problems and rapid economic development are well documented and have possibly helped to doom not only the Yangtze giant softshell but other turtle species as well.

In Southeast Asia, the striped narrow-headed softshell turtle (*Chitra chitra*) and the Việt Nam leaf turtle (*Mauremys annamensis*) are both critically endangered. The current geographic range of *Chitra chitra* is the Mae Klong River Basin in western Thailand, while *Mauremys annamensis* is found only in central Việt Nam and nowhere else. Both of these turtles have been heavily exploited throughout the years for food and the pet trade (but see Figure 1). That the Việt Nam leaf turtle is in trouble should come as no surprise, given that its geographic range is so very limited. According to conservationist Richard Primack, because "some species occur at only one or a few sites in a restricted geographical range, if that whole range is affected by human activity, the species may become extinct."⁸

Although many of the turtles collected in Southeast Asia are destined for China, at least some of the harvested turtles are traded and consumed locally. Turtle eggs, for example, have been a popular food item in both Việt Nam and Cambodia for quite some time, and the meat and eggs of the river terrapin have been in high demand throughout much of Southeast Asia for many years (the meat less so in Malaysia because strict Muslim dietary law forbids the consumption of turtles). Although conservationists are at a loss when it comes to determining the exact numbers of turtles traded and consumed, this much is certain: large numbers of turtles are traded in Southeast Asia and China (Figure 2).

American herpetologists and conservationists Don and Edward Moll report that when researchers set out in the 1990s to carefully investigate the true

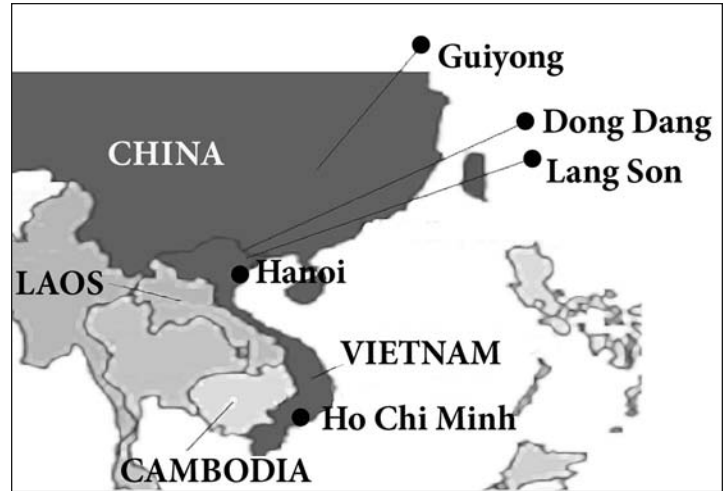


Figure 2. The influence of geography on the Asian turtle crisis; significant turtle trade routes exist in Southeast Asia and cross over into China. (Map constructed by Bradley R. Reynolds)

nature of the turtle trade in Southeast Asia, they discovered that most of the turtles collected in southern Việt Nam and in Cambodia were first transported to Hồ Chí Minh City. Other turtles were shipped in from Phan Thiet in southeastern Việt Nam to Hồ Chí Minh as well. Hồ Chí Minh's centralized position in the southern portion of the country makes for a convenient collection point. From there, turtles were shipped to upper central Việt Nam, where they were housed with more turtles. The additional turtles had been collected along the Laotian High Plateau and the Laotian tributaries of the Mekong River. After being shipped to Hanoi, the next stop was Lang Son and Dong Dang along the Chinese border. From there, the turtles were transported into Bang Tuong and Guiyong.⁹ Such trade is clearly not sustainable and negatively impacts free-ranging turtle populations; the evidence of this is in the sharp turtle population declines ravaging Southeast Asia. Turtles are long lived, and their ability to successfully reproduce over many years makes up for the high juvenile mortality common to turtle species. In other words, fertile adults reproducing over many years can overcome high juvenile mortality. But it takes adult turtles many years to reach sexual maturity—upwards of fifty years for some species—and when high juvenile mortality is combined with the overexploitation of adult turtles stemming from both legal and illegal harvest, significant population declines are inevitable.

One of the more ironic aspects of the Asian turtle crisis is that the inhabitants of Asia continue to revere the turtle for its longevity and wisdom and even ascribe religious significance to it. All the while, the exploitation and persecution of Asian turtles continues. Asian cultures that exploit turtles must come to terms with the inevitable outcome of such overexploitation: the overuse of turtles for food and medicine eventually ensures that such food and medicine will one day no longer be available. Biodiversity is indeed a resource in that it fulfills basic human needs. As a finite resource, the turtles of Asia must be protected and managed. The only way to properly manage Asian turtles is to ensure that they are not captured and consumed faster than they can replace themselves. Admittedly, this will be difficult to achieve. It may even prove impossible without government intervention and regulation. The status of a country's natural resources is a reflection of that country's ability to govern. Asian governments must become more proactive in dealing with the Asian turtle crisis.

Conservationists can assist governments by developing and promoting adaptive conservation and management strategies to better conserve turtle species in Asia and abroad. Obviously, many stakeholders must come together to make this

happen (Figure 3). In order to achieve such broad-based conservation, integrated landscape conservation programs that curtail the primary causes of habitat alteration must be developed. Conservationists must also encourage governments to control exploitation by imposing a moratorium on trade and work to improve regulatory frameworks at the national and international level. Finally, conservationists must strive to reduce and reorient the market for turtles and turtle products by better showcasing the role of turtles in the environment.

Although the situation is indeed bleak all across Asia, several groups are dedicated to combating the Asian turtle crisis. The Asian Turtle Consortium is “an independent network of individuals, organizations, and businesses . . . committed to the conservation of all Asian freshwater turtles and tortoise species.”¹⁰ The Asian Turtle Consortium seeks to manage captive breeding programs and works through assurance colonies, collections of threatened and endangered turtles kept by a variety of individuals and entities interested in conservation. The ultimate goal is to reintroduce turtle species back into their native habitats and to augment existing populations. The Asian Turtle Conservation Network (ATCN) is another nonprofit consortium based in Asia.¹¹ The ATCN seeks to promote conservation, facilitate communication among conservationists, and share information.

Education is crucial to the success of any sustainable conservation effort, and some researchers insist that more individuals must be educated in how to identify, classify, and monitor biodiversity. Others insist that more research institutes must be established, especially in developing nations.¹² Fortunately, a variety of individuals and entities are working tirelessly to make this happen. For example, the Asian Turtle Program of Cleveland Metroparks Zoo has in recent years offered a variety of training courses designed to teach valuable field skills to budding Asian conservationists. These courses, which have been conducted in countries as diverse as Việt Nam, Myanmar, Cambodia, and Indonesia, make it possible for select Asian scholars to learn how to properly conduct research. The future scientists are likewise schooled in the basics of turtle biology,

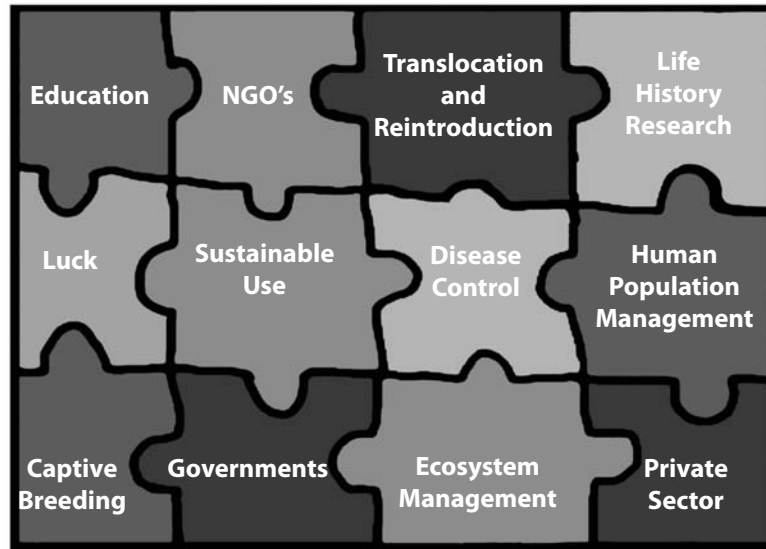


Figure 3. The Conservation Puzzle: The success of any conservation education program is contingent upon the cooperation of the various stakeholders (those that hold the pieces of the puzzle). Therein lies uncertainty. NOTE: NGO stands for Non-Governmental Organization. (Graphic design by Stephan Moss)

various field methods, and conservation planning.¹³ Conservation International has in recent years sponsored and mentored a group of Cambodian students

charged with the task of conducting turtle surveys in the forests of Cambodia. In addition to providing instruction to Vietnamese university students, this student-led group has even started to branch out by teaching Cambodian villagers about the importance of turtle conservation and by developing conservation materials for government rangers.¹⁴

Finally, consider the Asian Scholarship Program for in situ Chelonian Conservation. The Asian Scholarship Program is based at Stone Harbor, New Jersey’s Wetland Institute and is funded primarily by donations. Thus far, the Asian Scholarship Program has made it possible for seventeen Asian scholars from a variety of countries (including China, Việt Nam, Cambodia, India, Pakistan, and Bangladesh) to come to the US and acquire training (Figure 4). Once in the US, these young men and women learn important conservation skills. For example, Asian scholars working at the University of Tennessee at Chattanooga, an Asian Scholarship Program affiliate, learn and practice new skills while studying the ecology of freshwater turtles common to the Tennessee River. At the University of Georgia’s Savannah River Ecology Laboratory, another program affiliate, Asian scholars capture, study, mark, and release freshwater turtles common to the Savannah River.¹⁵ The southeastern United States is an especially appropriate venue for study. In recent years, freshwater turtle populations in the southeastern United States have gone the same path as those in Việt Nam, Cambodia, and Laos, in large part due to habitat alteration, pollution, and unsustainable use.

When pebbles are dropped in calm, still bodies of water, ripples are created. These ripples pulse outward, away from the disturbances that created



Figure 4. Asian Scholarship Program for in situ Chelonian Conservation—an Asian scholar is receiving additional stateside training while working with researchers from the University of Tennessee at Chattanooga on a long-term ecological research project involving freshwater turtles in the Tennessee River. Left: Researcher setting a trap on day one. Right: Researcher checking a trap on day two. (Photos by Thomas P. Wilson)

them. Such a ripple effect serves as an excellent metaphor for what American conservationists working with gifted Asian scholars hope to accomplish. By educating Asian scholars about the importance of freshwater turtles and by equipping them with the knowledge and skill sets necessary to help turtle populations, it is more likely that when these young men and women return to their home countries, they will be able to promote conservation and enact positive change. We hope this experience will enable them to “pay it forward” by training and informing others, who will in turn train and inform others. By recruiting and training some of Asia’s finest young minds, knowledge of the Asian turtle crisis will spread, and a potential environmental catastrophe of epic proportions will be averted. In averting this catastrophe, not only will the natural sciences have to be skillfully wielded by Asian scholars, American conservationists will have to rely heavily on the social sciences in their efforts, given that “social sciences, such as anthropology, sociology, and geography, provide methods to understand the actions of local people and involve them in protecting their immediate environment.”¹⁶ ■

NOTES

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9. Moll and Moll, 173, 174, 187–189.
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16. Primack, 38.

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