

# Conclusions from the Workshop on Trade in Tortoises and Freshwater Turtles in Asia

## ASIAN TURTLE TRADE WORKING GROUP

Report from the Workshop held 1–4 December 1999, Phnom Penh, Cambodia,  
under sponsorship of the World Wildlife Fund, the Wildlife Conservation Society, and TRAFFIC USA.

Recognizing the rapidly growing number of Asian turtle species that are considered threatened, it is clear that prompt action is necessary to prevent extinctions.

A combination of immediate and longer-term measures will be needed for the conservation of Asian turtles. The exploitation of populations in nature must be reduced to sustainable levels. This must be achieved by a collaborative coordinated strategy involving improved enforcement of existing legislation and regulations as well as improvement of current laws, raising public awareness and concern, the effective protection of natural habitats, the establishment of in situ and ex situ conservation breeding programs, and perhaps promotion of commercial farming operations. The immediate aim is to reduce or eliminate collection from native populations and reduce demand in consumer countries.

### Patterns of exploitation and trade, species in trade and trade impacts on natural populations

Two main types of trade in turtles occur in Asia. One is a high-volume, commodity-type trade in turtles or turtle parts for consumption; the other is the pet trade, which involves smaller numbers of animals, and often smaller animals, with high individual value. From a conservation perspective, the consumption trade can be further divided into the trade in commercially farmed turtles and the trade in turtles captured from nature. Each of these trade segments gives cause for concern, but the mass exploitation of wild-caught turtles for consumption is the more significant.

#### Consumption Trade

The trade in turtles for consumption generally originates in the source countries of Southeast and South Asia and ends in the consumer countries of East Asia. A certain proportion of turtles captured, in some locations a substantial proportion, is consumed locally for subsistence and in the restaurant trade, but the greater portion of capture is exported. Local consumption of turtles, or refusal to eat turtles, is often related to religion and ethnic culture. The intensity of exploitation of natural populations in source countries varies among countries and regions, depending on the quality and degree of enforcement of national legislation, status of turtle stocks and the available methods and routes to transport captured turtles. Traded turtles represent a luxury food, not a source of protein for the poor.

Which turtle species are actually collected for the food trade depends on which species occur in the region. In general, all turtles encountered will be collected and traded; professional turtle hunters as well as plantation workers who incidentally come across turtles take all species at all sizes. Softshell turtles are preferred because they fetch a higher price per kilogram, which may be six times the price of lamb or chicken in India. Small softshells are preferred over large animals, because they have a higher proportion of cartilage and gelatinous skin - the most valuable part. In addition, small whole softshells are preferred as restaurant servings, compared to parts of a large animal. The only constraint on which species are traded is the refusal by some traders to accept certain species because they are in very low market demand or are perceived to create problems when discovered in a shipment. Overall, almost every species is traded; only a very few Asian turtle species have not (yet) been reported in trade; these are exceptionally rare and in some cases sacred or probably extinct species.

A recurring pattern is for collection and export operations to become established at a particular location, collecting turtles through an extensive network of trappers, hunters and middlemen. Collection efforts and capture and export volumes increase rapidly, reach a peak and then decline as accessible populations become depleted and collectors need to venture into new, more distant areas. There is also a corresponding decline in the average size of animals that are traded. Such 'boom-and-bust' cycles at particular locations were noted for species such as *Callagur borneoensis*, *Indotestudo forstenii*, *Manouria emys* and *Cuora amboinensis* in Indonesia and *Morenia petersi*, *Geoclemys hamiltonii*, *Hardella thurjii* and *Indotestudo elongata* in Bangladesh.

Trade routes for wild-captured turtles for food are varied, complex and ever changing, but can be summarised by the observation that almost every available transport route between source and consumer countries is used. Transport by air is preferred, because the quality and survival rate of the traded turtles is optimal. Land routes are used where trails, roads and

border crossings exist, and some shipments are made by river boat or by sea. Consequently, a map of turtle trade routes will show routes along all existing air, land and sea routes from South and Southeast Asia to East Asia, converging at the major airports, border crossings and sea ports of the source countries, and diverging from the major airports and sea ports of the consumer countries.

### **Softshell Turtle Farming**

Large and small commercial operations to farm Chinese Softshell Turtles *Pelodiscus sinensis* exist in Thailand, Malaysia and Indonesia. The Chinese Softshell is native to temperate East Asia but grows and breeds rapidly in tropical climates, making it the most productive and economically attractive species to farm there. The species is also extensively farmed in mainland China and Taiwan. At present, farms produce an estimated 5,000 to 10,000 metric tons per year, approximately matching or exceeding the amount of wild-caught softshells in trade. Farmed Chinese Softshells are rarely marketed on the domestic markets of Southeast Asia; virtually the entire production is shipped by air to East Asian markets. While softshell turtle farming obviously contributes to meeting demand and thus helps relieve pressure on wild populations, it also has negative effects on wild turtle populations when native populations of Chinese Softshells are exploited for additional founder stock. In areas where the species is farmed outside its natural distribution, there is the likelihood that escaped animals will establish populations, with unknown effects on the local ecosystem, while mixing of genetically different stocks (i.e., genetic pollution) is a risk of farming within the range countries. Farmed softshell turtles are raised on a high-protein diet and their production actually represents a net protein reduction to satisfy a luxury demand. Wild-caught animals fetch much higher prices in the food trade and a market for wild-caught turtles will continue to exist alongside a market for farmed turtles.

### **Turtle Shell**

In addition to live turtles as food, turtle shell is also traded to supply the Traditional Chinese Medicine (TCM) industry. These shells are usually by-products from the consumption of turtles, but there have been some reports of the specific collection of turtle plastron, after which the rest of the animal was discarded (Jenkins, 1995) or perhaps used as food in crocodile farms. The limited quantitative data available suggest that the amount of turtle shell imported to Taiwan alone exceeds 100 metric tons per year, and the total trade may add up to several times this amount. Turtle shell represents about 5-20% of the weight of an average turtle; if the shell trade concerns plastron only, shell trade figures should be multiplied by a factor of 20 to estimate the total weight of animals affected. Turtle shell is used for the production of turtle jelly, a glue-like residue produced by long-term boiling of turtle shells and concentrated by evaporation. There are indications that this jelly is also manufactured outside East Asia in Indonesia and perhaps other source countries. This jelly is transported as a high-value, low-volume product, and it is impossible to check its composition. This creates problems for customs inspections, as well as consumer concerns about genuine content.

### **Pet Trade**

The collection of turtles as pets is an entirely different trade issue. The preferred species in the pet trade from Asia are rare and unusual species, such as Indian Star Tortoises *Geochelone elegans*, Australasian snake-necked turtles of the genus *Chelodina* and Pig-nosed Turtles *Carettochelys insculpta*. In addition, hatchlings and juveniles of other species from throughout the region are traded internationally in large numbers. Because pet turtles have a particular value per specimen, pet traders prefer small specimens that are easier and cheaper to ship.

The total numbers of Asian turtles traded specifically as pets are difficult to estimate, because their proportion is so small compared to the massive numbers of Red-eared Slider *Trachemys scripta* hatchlings in the trade and data are rarely collected on a species-by-species basis. The market for the relatively expensive Asian species and very expensive Australasian species is limited and partly illegal, but still involves hundreds to thousands of individuals for certain species per year, and may be significantly higher for hatchling Pig-nosed Turtles.

Because prices in the pet trade are directly related to the rarity of a species, the pet trade poses a particularly significant risk to rare species. Meanwhile, captive breeding of such species as pets becomes less attractive economically because of 'four-inch-rules' imposed by the United States, Canada and some European Union countries. These regulations make the import of hatchlings or juveniles under 10 cm shell length illegal and thus force the pet trade to deal in larger, wild-collected animals.

Species in the pet trade follow relatively consistent trade routes that depend on the area where the species occurs. Nearly all transport occurs by air, although some shipments are transported by land and sea routes to the main centres of the pet trade

in Jakarta, Singapore and Bangkok. From these locations most animals enter the global pet trade, while a proportion of the animals are sold in the local pet trade. Correspondingly, these cities are also the main distribution points for the mass trade in other exotic species, (i.e., birds, mammals and other reptiles) for the Southeast Asian domestic pet market.

In recent years, there has been a high-profile trade in turtles known or thought to represent new species. Such animals, usually known only from very few individuals, fetch prices of several hundred to several thousand US dollars per animal. It has generally been assumed that this high-end pet trade in potentially new species was a matter of traders' agents picking out unusual animals from large shipments of food turtles. There are, however, indications that traders also send agents to remote source areas to purchase rare turtles from the local villagers. This not only causes the depletion of the target species, but also other chelonian species as the locals often cannot tell the turtle species apart. Once the links are established, the trade continues until yet another source area has been vacuumed of its turtles.

### **Accuracy of Available Trade Data**

While some data are available for the numbers or shipment weights of turtles traded, the available data are incomplete, making it difficult to form a precise picture of the trade. Under-reporting is common practice, species are incorrectly identified, some countries do not compile statistics for certain categories, and some of the trade is carried out illegally. The data on trade in farmed Chinese Softshell Turtles are reasonably accurate, while data on wild-caught turtles for food are more likely to be underestimates, and data on the pet trade in native and unusual species is buried within the mass trade in Red-eared Sliders farmed in North America and in the region.

### **Effects of Trade on Native Turtle Populations**

The paucity of trade data, natural history data and particularly long-term status data makes it difficult to judge the effects of trade on native turtle populations. It is clear, though, that trade is at least a contributing factor in the decline of most species and in many cases it is the main cause. The workshop participants spent two evenings evaluating the current conservation status of the region's tortoises and freshwater turtles and found that trade was a factor in the threatened assessment for 52 species. Of 84 species evaluated, it was recommended that 63 species should be considered as threatened following the IUCN Red List criteria.

## **Legislation, Regulations and other Controls on Turtle Trade**

### **Existing Legislation**

At present, every country in the region has national legislation that affords at least some protection to at least some turtle species. In addition, all countries except Bhutan and Lao PDR are signatories to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the provisions of which should be implemented through national legislation. Overall, the scope and extent of the existing laws is adequate to protect most turtle species, though not all.

### **Enforcement**

By contrast, enforcement of existing legislation and regulations is frequently insufficient. One representative referred to his country's conservation laws as a 'paper tiger'. In every country, the inability of customs officers, wildlife enforcement agency staff and others to identify turtle species with any accuracy is a serious obstruction to effective enforcement. Without being able to identify animals in trade, it is nearly impossible to determine which species are traded legally and which are illegal. This problem is exploited by traders, who intentionally misidentify and make false declarations of the contents of shipments.

Five key recommendations for improvement of the legal protection of turtles and control of the turtle trade emerged in almost every country presentation and discussion session:

- Increased enforcement of existing legislation and regulations;
- Provision of turtle identification materials in local languages;
- Training of customs, law enforcement and wildlife conservation personnel;
- Review and, where necessary, clarification and improvement of national legislation.

## **Monitoring and regular review of quotas and other regulations**

Capacity building is obviously essential if enforcement is to be improved. Providing additional resources such as staff, office and equipment facilities and improved funding for work outside the office are primarily the responsibility of the respective governments. Other organisations have an important role in organising and providing training, preparing and distributing identification materials, and giving other practical assistance.

The International Air Transport Association (IATA) has detailed guidelines for the transport of live animals by air, including precise shipping requirements for live turtles. These regulations, which were recently updated, are rarely observed when shipping live turtles for the food trade. Enforcement of IATA cargo regulations on carrier airlines is strongly recommended and could be encouraged significantly by pressure from airline business partners, authorities and the general public.

The existing mechanisms to impose fines and other penalties on those individuals, companies and organisations who knowingly breach laws and regulations should be implemented. A proportion of the fines resulting from confiscations and prosecutions could be transferred directly to the budget of the specific enforcement agencies, with a possibility of bonus pay, which would provide a very effective incentive for improved enforcement. In countries where there is a shortage of funds to hire the necessary staff and provide the facilities needed to enforce the legislation and regulations, a tax on the cross-border trade of turtles can be imposed to supplement funding for the enforcement authorities.

Enforcement training for the turtle trade could also be incorporated in general wildlife enforcement programs; the relatively low charismatic value of turtles (compared to mammals or birds) and resultant lesser priority could be balanced by access to more funding for general programs. The importance of turtle conservation as a priority for enforcement should be emphasized in training programs and general awareness development.

## **Confiscated Turtles**

Practical difficulties result from confiscation of large shipments of live turtles. Authorities usually do not have the necessary facilities and resources to house and care for the animals. The options available for placing or relocating confiscated turtles should be investigated and discussed and collaboration with government or NGO rescue centres and facilities is recommended. The eventual destiny of the animals should be decided with reference to the IUCN Draft Guidelines on Placement of Confiscated Animals. Some confiscated animals may contribute to conservation breeding programs. The IUCN Guidelines for Re-introduction should be applied if turtles are repatriated to their country of origin, particularly if return to the wild is anticipated. It is reasonable to insist that those responsible for illegal or inappropriate shipments will cover the costs of efforts to solve these problems.

Clarification of Legislation Enforcement is hampered by overlapping, competing or undefined responsibilities of different government authorities. Such overlapping authorities may involve species conservation and protected areas management divisions of forestry departments, aquaculture and fisheries departments, veterinary health departments, coastal management authorities and security forces. Certain authorities may be assigned specific jurisdiction over certain species, while another authority is responsible for its habitat management and yet another authority has exclusive control over trade in the species. In many countries, the specific details may not be spelled out in law, leading to different interpretations of authority. Where such complications exist, review of national legislation is urgently recommended to clarify the precise duties and responsibilities of various authorities, and procedures should be developed to increase cooperation between these authorities.

In addition, existing laws that restrict trade in, and shipment of, farmed turtles under 10cm shell length need to be critically re-examined for their indirect impact on the conservation of wild populations. These regulations were passed either to reduce the risk of humans contracting Salmonellosis from infected turtles, or as animal welfare measures to curb the trade in 'toy turtles'.

## **Other Legislation Concerning Turtles**

Clearly, regulation of the trade in turtles is only one aspect of the overall legislation that affects turtles. Legislation establishing and implementing Protected Areas is essential for the survival of populations of turtles and other organisms in their natural habitat. These laws must be implemented to the maximum extent and expanded where appropriate. Restraining or preventing infrastructure development in remaining natural areas will reduce accessibility and consequently reduce exploitation pressure for trade and subsistence. However, it will also impede enforcement efforts.

## Trade Monitoring

There is an urgent need for more data on turtle trade. Information is needed on species and volumes of turtles shipped from different regions, and species composition and volumes traded in consumer markets. Information on the extent of hard-shelled turtle farming in China is also necessary. Equally important is knowledge of the use of turtle parts and products, the places of manufacture and trade routes, and the volumes traded. It would probably be most effective if a single organisation coordinates the compilation and analysis of the trade data collected. At the same time, status surveys of native populations by field scientists, NGOs and other conservation groups are recommended, as are studies of the biology of the species. All these are essential components towards identifying trends in the trade and the impacts of trade on species.

## Other Priority Projects and Next Steps for Turtle Conservation

Improved enforcement of existing and updated legislation is a key component of efforts to conserve tortoises and freshwater turtles in Asia. Much more needs to be done, however, if the ultimate goal - the survival of secure populations of all regional turtle species in their natural habitats - is to be achieved. A variety of projects and topics for consideration are presented below.

### CITES Listing of Asian or All Turtles

The workshop participants support the current proposal by Germany and the United States to include all species of Asian Box Turtles (genus *Cuora*) in Appendix II of the Convention on International Trade in Endangered Species of Fauna and Flora (CITES). A groundswell of support formed among the workshop participants for the concept of listing all turtle species native to the Indomalayan, eastern Palearctic and Australasian Realms in at least Appendix II of CITES. There was also support for the concept of listing all turtle species of the world in at least Appendix II of CITES. This support was obviously tempered by the acknowledgement that this would include many turtle species beyond the capacity of the workshop and currently not involved in the East Asian food trade.

The justification for at least Appendix II listing of all regional species is two-fold: the non-discriminatory nature of the food trade, and look-alike reasons.

All available trade data indicate that the turtle food trade has shifted its source regions and therefore the species traded several times during the past decade. While this results in relatively stable (though high) long-term overall trade, the effect on the turtle populations of particular regions is devastating. The country reports and regional overview discussions documented several species whose trade volumes in successive years showed sharp increases followed by even sharper declines, indicating the overexploitation and commercial extinction of particular species. Such patterns are most obvious in restricted-range species such as *Heosemys yuwonoi* and the *Morenia* species, and are less obvious in widespread species like the Southeast Asian Softshell Turtle *Amyda cartilaginea*. Correspondingly, available information from source regions consistently shows declines in number and average size of animals supplied to traders, which may amount to 50% in three years.

Country and regional presentations consistently noted the inability of personnel of supervisory and enforcement authorities to identify turtle species in trade. This inability leads to virtually unrestrained trade in species protected under the CITES Appendices as well as under national legislation. Evidence was presented of ongoing illegal trade in every CITES-listed tortoise and freshwater turtle species in the region, except *Aspideretes nigricans*. Annex 2b of CITES Res. Conf. 9.24 states that a species should be included in Appendix II if it resembles a species which is included in Appendix II because of threats from trade, or a species included in Appendix I, and the resemblance is such that a non-expert, with reasonable effort, is unlikely to be able to distinguish between them.

The justification for listing all the world's turtle species in at least CITES Appendix II is based on the same criteria of trade shifts in source regions and species identification issues. Given the history of the turtle food trade and the continuing demand for turtles for consumption, it is highly likely that any regional reduction in turtle trade effected by CITES regulations will be compensated for by new sources developed beyond the Asian region. Identification problems will only become more complicated when source regions become more diverse. By listing all turtles in at least CITES Appendix II, every traded turtle needs to be accompanied by appropriate documentation, and it becomes much easier for the authorities of both source and consumer countries to insist on the required documents.

Several precedents exist for listing an entire group in a CITES Appendix — all primates, all wild cats, all owls and raptors, all crocodiles and all hard corals are included in the appendices. Within turtles, already two of twelve families, Testudinidae

and Cheloniidae, are included as a whole in the appendices, and two more families are essentially included completely by the listing of their single species, the Leatherback Turtle *Dermochelys coriacea* and the Central American River Turtle *Dermatemys mawii*.

CITES listing of all turtles will not solve the turtle trade problem on its own. It will, however, result in a much more straightforward situation for inspection and enforcement authorities: if you are trading turtles, you would need to show documents, period. Identification of Appendix I species in commercial trade is much more likely when every shipment of turtles is documented and inspected.

The workshop participants recognized that each of these suggestions would lead to the inclusion in CITES Appendix II of species that are farmed in economically important quantities and are traded internationally. Concern was expressed that inclusion of these species in CITES would generate administrative and other delays and constraints. These concerns need to be addressed, either by certification of farms and streamlining the administrative procedures in the trading nations, or by excluding a small number of turtle species from CITES Appendix II. In the latter case, the identification problem would persist, but in a more manageable form, whereby inspecting authorities would only need to positively recognize two or three species.

The appropriateness of proposing some species for inclusion in CITES Appendix I was discussed. A substantial number of species was considered to meet the IUCN criteria for 'Critically Endangered' in part or exclusively through exploitation for international trade. However, it was also recognised that the stronger protection afforded by inclusion in Appendix I could be counterbalanced by the practical constraints it would impose on the international movements of animals as part of ex situ conservation breeding and recovery programs. It was decided that further consideration of this issue is needed, as a consultation process between the CITES scientific authorities and the IUCN SSC Tortoise and Freshwater Turtle Specialist Group.

### **Traditional Chinese Medicine**

Great quantities of turtle shell are used as an ingredient in Traditional Chinese Medicine (TCM). For example, Taiwan declared that 940 tons of hardshelled turtle bone and 200 tons of softshell turtle bones were imported from 1992 to 1998; prices remained stable throughout this period. The great majority of turtle bone used in TCM prescriptions is plastron. This use of plastron is based on centuries of traditional custom, tracing back to a time when available quantities of turtle shell led to a preference among TCM practitioners for roast plastron bone that had been used in divination ceremonies. A participating TCM scientist, however, argued that there is no difference in utility and efficacy between plastron and carapace bone. Acceptance and use of both plastron and carapace bone would reduce the number of turtles required to make a certain amount of TCM prescriptions by at least 50%.

Current TCM research also suggests that there is no difference in the pharmaceutical effects of bone from animals produced in farms compared to animals captured in nature. Farm production of turtle bone for TCM or as a by-product from farming for consumption appears feasible. Finally, herbal or other ingredients may be identified through continuing TCM research as alternatives to turtle bone. Gaining acceptance for such alternatives among TCM practitioners and pharmacists, who work in a very old and stable tradition, will be critical to success. If these alternative ingredients can be harvested sustainably, they represent an encouraging possibility to eliminate or at least reduce the demand for turtle bone. Whether western industrial pharmacology or homeopathy can contribute alternatives to prescriptions containing turtle bone should be explored in a culture-sensitive dialogue between the various interest groups. These groups include the TCM establishment, the pharmaceutical industry, turtle and other conservationists, and consumer groups.

Pharmaceutical properties of turtles claimed by some traders, such as the reputed cancer-curing effects of the Three-striped Box Turtle *Cuora trifasciata*, should be examined and tested scientifically. If turtles do possess such properties, industrial synthesis of the active compounds, alternative herbal medicine, and turtle farming should be explored to reduce the demand for animals from the wild. If such claims are ill founded, a publicity campaign should be launched together with TCM practitioners to provide the general public with accurate information.

### **Conservation Breeding Programs for Endangered Turtle Species**

Given that current levels of trade directly threaten a number of turtle species with extinction in their natural range, it is essential that species recovery programs be formulated. Such programs are likely to involve both in situ and ex situ conservation breeding efforts. Many details of such recovery programs range beyond the scope of the workshop. However, we note that the space, care and other resources available in zoos and dedicated, organised amateur circles represent a

valuable component in genetic management of endangered turtle species. Indeed, studbook programs and other initiatives have already taken shape in Europe and the US, and there has been extensive communication between zoo and conservation personnel in Europe, Australia, the United States and Vietnam over the past two years to explore coordinated recovery programs. Exchange of animals between breeding groups inside and outside range countries will inevitably be affected by the proposed tightening of legal protection, but should remain possible through the appropriate channels.

### **Commercial Farming of Freshwater Turtles**

Commercial farming of freshwater turtles to provide luxury food, animals for the pet trade and for local religious release is well established and represents a large proportion of the regional and global trade in turtles. While farming is an economic activity undertaken for financial gain and is often a closed-cycle production process, it is not without effects on native turtle populations. Farming of species within their native range is likely to create pressure on natural populations as additional founder stock is collected. Farming non-native species carries the inherent risk of escape and establishment of exotic species. On the positive side, a substantial and reliable supply of farmed turtles is likely to keep market prices stable and may thus lead to a correspondingly stable maximum price for wild-collected turtles, which will likely be higher than for farmed turtles. Once a price ceiling is established, wholesale prices and the prices paid to collectors should remain stable. In turn, this would prompt a local hunter to make an economic decision whether it is really worth spending a certain amount of time to capture a turtle, or pursue an alternative income-generating activity. Depending on local conditions, a point is reached where it is no longer profitable to spend great amounts of time looking for the very last individuals of a depleted population, or to travel vast distances from roads or middleman depots. The result should be the survival of some populations of turtles in some inaccessible regions, in contrast to the current situation with regard to the Three-striped Box Turtle *Cuora trifasciata* where it is still profitable to spend a whole year searching for just a single animal. In addition, the possibility exists that organised turtle farmers would push for a ban on trade in wild-caught turtles.

Farming of Chinese Soft-shelled Turtles *Pelodiscus sinensis* has grown rapidly in recent years and is well enough developed that it could obviate the need for mass collection of softshells from nature. Red-eared Sliders *Trachemys scripta*, native to the United States but now with established populations in Asia, are similarly farmed in massive numbers, and animals could be raised to supply the food trade and the demand for turtle bone as a TCM ingredient. Another promising hard-shelled species for farming operations to produce turtles for the food and TCM trade is the Chinese Striped-necked Turtle *Ocadia sinensis*; in some farms in Taiwan up to 50,000 hatchlings are produced per year. The decision to farm particular hard-shelled turtle species would need to consider consumer preferences for or against particular species, as well as husbandry practices.

Commercial turtle farming is a complex issue that has great potential to relieve the exploitation pressure on wild populations, but also has the potential for significant negative impacts on native populations. More study and discussion of the issue is required.

### **Availability of Turtle Population and Natural History Data, Increased Scientific Expertise and Encouragement in Range States**

The necessity to survey the distribution, to monitor the status of known populations, and to study the ecology of turtle species in their natural habitat emerged from all presentations and discussions. Survey work inside protected areas is particularly appropriate as these areas generally offer some reprieve from collection for subsistence and trade. Surveys of species coexisting with humans in stable agricultural landscapes or man-made water bodies are also useful to identify species with adequate populations and thus of lesser conservation concern. Field studies are essential components of species management plans and recovery programs. Field study data directly contribute to the success of ex situ captive maintenance, while observations of captive animals will suggest new avenues for field research. The successful reintroductions of species from ex-situ conservation programs will require knowledge of the species' native distributions, habitats and basic ecology.

Much of this survey work would be best carried out by local scientists and wildlife authorities. International organisations have a significant role to play by participating in joint fieldwork and so providing training and expert skills, as well as by contributing literature, equipment and other resources and establishing and maintaining a communications network. A turtle conservation Web site can be a very rich source of information, though not all turtle conservationists have access to the internet.

Taxonomic studies of particular groups of turtles are needed, because they have a direct bearing on the identification of priority species. Whether the Sulawesi population of the tortoise *Indotestudo forstenii* is taxonomically identical to the *Indotestudo* tortoise population of south-western India (formerly recognized as a separate species, *I. travancorica*) deter-

mines whether there is one species considered 'Vulnerable', or two species respectively considered 'Endangered' and 'Vulnerable' under the IUCN Red List criteria. Similar cases of widespread species groups of low conservation concern, which likely include one or more taxa of much higher concern, include the *Cyclemys dentata*, *Pelochelys cantorii* and *Pelodiscus sinensis* complexes. At the same time, the recognition of a particular population as a separate species may increase collection pressure for the pet trade. In the case of a restricted-range species, like the Roti Snakeneck Turtle *Chelodina mccordi*, this pressure was intense enough that traders now consider it commercially extinct and conservationists suggest moving the species from 'Vulnerable' in 1996 to 'Critically Endangered' in the present Red List.

### **Public Awareness of the Extent and Impacts of the Turtle Trade**

Public awareness and education are important tools in any long-term conservation strategy. Awareness of the trade in turtles and other wildlife works at different levels. Culturally and emotionally, unsustainable trade leads to the loss of a group of species from peoples' daily lives, customs and conceptual world, thus leaving a poorer world for their children. Financially, short-term exploitation of a limited resource with very slow recovery is inappropriate, particularly since local collectors gain very little financial benefit from selling off their resources and compromise their options for sustainable developments like eco-tourism or perhaps wildlife ranching. Ecologically, the role of Asian turtles is almost unknown, and it will be close to impossible to ever obtain that knowledge or restore this role once a species has disappeared from the wild. Turtles can serve as a focal point in general conservation awareness programs. Conservation can be presented on television and integrated in global marketing and donor aid programs. Turtles must be portrayed as a conservation priority, as animals with an intrinsic value to share the Earth, not just a commodity to be exploited. Culture-sensitive information can contribute greatly to turtle conservation in source and consumer countries.

### **References**

Jenkins, Martin D. 1995. Tortoises and freshwater Turtles: The trade in Southeast Asia. TRAFFIC International, United Kingdom. iv + 48 pp.

### **Recommendations from the Workshop on Trade in Tortoises and Freshwater Turtles in Asia**

- 1 The delegates recognize that legislation and regulations to protect turtles from harvest and trade exist in Asian countries. This legislation is usually adequate, but the enforcement of this legislation is currently often inadequate. The delegates strongly urge all local, state and national governments to enforce, at all levels and as expeditiously as possible, the existing legislation concerning the conservation of turtles.
- 2 The delegates recognize that national legislation in some countries leaves gaps or creates overlapping responsibilities for enforcement authorities. The delegates support efforts to review, clarify and improve national legislation for effective protection of turtles in the region.
- 3 Recognising that transport by air is the most significant method of shipping turtles, the delegates request that all national governments implement and enforce IATA regulations as a high priority.
- 4 The delegates realise that placement of confiscated turtles will be a significant issue when increased enforcement takes effect, and request the IUCN Tortoise & Freshwater Turtle Specialist Group to develop guidelines and realistic solutions to assist authorities to adequately deal with confiscated turtles.
- 5 The delegates strongly recommend that each and every one of the currently recognized 93 turtle species native to the Indomalayan, eastern Palearctic, and Australasian biogeographic regions be listed in CITES Appendix II (noting that some species already are and should remain listed on CITES Appendix I and some others should be proposed for inclusion in Appendix I).
- 6 Considering the regular shifts in source countries to supply the Asian mass turtle trade, and enforcement staff often not being able to easily identify many chelonian species, the delegates recommend an examination of the value and feasibility of a proposal to list all species of chelonians worldwide in at least CITES Appendix II.
- 7 The delegates recognize that trade is the major concern for the conservation of tortoises and freshwater turtles in the region, and therefore recommend further and continuing studies in the following topics:
  - Trade of tortoises and freshwater turtles in both source and consumer countries.
  - Status and distribution, with particular attention to protected areas in which they occur.

- Natural history and ecology, with particular reference to species management plans.
- Systematic studies of the tortoises and freshwater turtles of the region, especially those where taxonomic status has direct bearing on conservation status.

These studies would contribute both directly and indirectly to identification of priority species and areas, as well as understanding the conservation needs of the region's tortoises and freshwater turtles.

- 8 The delegates specifically recommend further and continuing collection of market and field data in China to make the need for tortoise and freshwater turtle conservation clear to the Chinese authorities.
- 9 The delegates recognize that in situ and ex situ conservation breeding programs exist. We support these efforts and encourage expansion of these programs to assist in preserving maximum genetic diversity as a contribution to collaborative coordinated programs to preserve species in their natural habitats.
- 10 The delegates support the concept of freshwater turtle farming as part of a package of conservation measures, but recognize that farming needs to be investigated comprehensively for its actual and potential impacts, positive and negative, on native populations of turtles and other organisms. The delegates also recognize that farming needs to be regulated and monitored.
- 11 The delegates are encouraged by the efforts made in Traditional Chinese Medicine (TCM) research to develop herbal alternatives for turtle shell as a TCM ingredient, with due concern for the sustainability of collection of all ingredients used. Until effective substitutes to turtle shell in TCM are found, the delegates urge that turtle shell be produced sustainably through farming, subject to Recommendation 10, and ensuring no detrimental impacts, either real or potential, on wild turtle populations. The delegates further suggest that recent claims of cancer-curing potential of turtles should be investigated scientifically, and that the results should be used in a manner that will not harm turtle populations, by either chemical synthesis of pharmaceutically active compounds or by working with the TCM establishment to dispel false claims.
- 12 The delegates recognize that outreach programs need to be developed to highlight the magnitude of the turtle trade and its consequences to the global community. We recommend collaboration with media, schools and other institutions, to develop popularized market campaigns that boost awareness in all sectors of the community and generate financial returns to support the conservation of native turtle populations. It is imperative that levels of awareness be raised within both source and user countries, notably at the local community level.