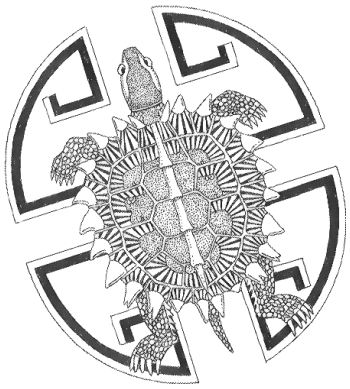
IUCN Asian Turtle Workshop: Developing Conservation Strategies Through Captive Management



Fort Worth, Texas, United States
26-28 January 2001

Hosted by:

Sponsored by:
Cleveland Metroparks Zoo
Zoo Atlanta
Fort Worth Zoo
Conservation International/Center for Applied Biodiversity Science
Chelonian Research Foundation
Wildlife Conservation Society
AZA Chelonian Advisory Group
Tortoise Reserve

James Barzyk and William McCord, DVM are gratefully acknowledged for their financial support for travel expenses for several of our Asian colleagues.

In Collaboration with:
The Conservation Breeding Specialist Group (IUCN/SSC)
The Tortoise and Freshwater Turtle Specialist Group (IUCN/SSC)

A contribution of the IUCN/SSC Conservation Breeding Specialist Group (CBSG) and Tortoise and Freshwater Turtle Specialist Group (TFTSG).

Cover photos by Rick Reed and Jim Barzyk. Drawing on Section Dividers by Renaldo G. Kuhler and Asian Turtle Consortium.

Hosted by the Fort Worth Zoo.

Sponsored by Cleveland Metroparks Zoo, Zoo Atlanta, Fort Worth Zoo, Conservation International/Center for Applied Biodiversity Science, Chelonian Research Foundation, Wildlife Conservation Society, AZA Chelonian Advisory Group and the Tortoise Reserve/Asian Turtle Consortium. James Barzyk and William McCord, DVM are gratefully acknowledged for their financial support for travel expenses for several of our Asian colleagues.

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Additional copies of this publication can be ordered through the IUCN/SSC Conservation Breeding Specialist Group, 12101 Johnny Cake Ridge Road, Apple Valley, MN 55124 USA for US $35.00/copy. Checks should be payable to CBSG and drawn on a United States bank. Funds may be wired to US Bank NA ABA 091000022 for credit to CBSG Account No. 1100 1210 1736. Visa or Mastercard are also accepted.

IUCN Asian Turtle Workshop: Developing Conservation Strategies Through Captive Management

FINAL REPORT

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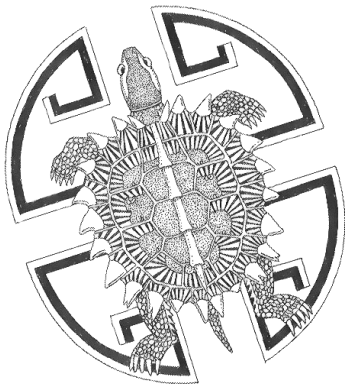

FINAL REPORT

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Section 1:
Executive Summary

Asian Turtle Workshop Executive Summary

In response to the ongoing Asian turtle crisis, a conservation planning workshop for Asian turtles was held in Fort Worth, Texas, from 26 – 28 January 2001 under the auspices of the World Conservation Union (IUCN). The *IUCN Asian Turtle Workshop: Developing Conservation Strategies Through Captive Management* was organized and hosted by the Fort Worth Zoo, and conducted by the Conservation Breeding Specialist Group (CBSG) in conjunction with the Tortoise and Freshwater Turtle Specialist Group (TFWTSG). Major funding support was received from the following organizations: Cleveland Metroparks Zoo, Conservation International, Zoo Atlanta, Chelonian Research Foundation, Fort Worth Zoo, Wildlife Conservation Society, The Tortoise Reserve, and the Chelonian Advisory Group of the American Zoo & Aquarium Association (AZA). This workshop brought together nearly 80 participants from eleven countries representing a wide range of disciplines including wildlife and range country biologists, conservationists, zoo managers, serious private hobbyists, academics, commercial interests, veterinarians and governmental authorities. The primary goal of this workshop was to develop a global comprehensive captive management strategy for the most endangered Asian chelonians.

Following a welcoming address from Fort Worth Zoo Director Gregg Hudson, Ulie Seal (CBSG) oversaw the group introductions where participants were queried as to (1) their individual goals and expectations for the workshop, (2) what they considered the most critical problem for the ex situ management of Asian turtles, and (3) what they were willing to do to address the problem. These responses, contained herein, were used as a basis for determining the topics that the various working groups would address during the course of the three - day workshop. Much of the rest of Day 1 was devoted to a series of keynote presentations representing the viewpoints and perspectives of some of the major "players" in response the Asian turtle situation. Speakers included Peter Paul van Dijk (TRAFFIC – Southeast Asia), Anders G.J. Rhodin (Chelonian Research Foundation and IUCN Turtle and Freshwater Turtle Specialist Group), John Behler (Wildlife Conservation Society and IUCN TFTSG), Peter C.H. Pritchard (Chelonian Research Institute), Kurt Buhlman (Conservation International), Dave Collins and Hugh Quinn (AZA Chelonian Advisory Group), Jim Barzyk (representing private sector interests), Leslie Lavine (Asian Turtle Consortium), Brad Shaffer, Phil Spinks, Tag Engstrom (UC Davis) and John Iverson (Earlham College), Bruce Weissgold (U.S. Fish & Wildlife Service) and Shi Haitao (Hainan Normal University).

Participants then divided themselves among nine initial Working Groups that dealt with the following topics: Captive Holdings, Population Management Plans, Systematics, Veterinary and Husbandry Issues, Facilities, Regulatory Constraints, Information, Linkages with Range Country Programs, and Founder Acquisition. A Funding subgroup broke out on Day 2. Each of these Working Group reports is contained herein. The group dynamics were exceedingly challenging as would be expected with an assemblage of such diverse and often conflicting motives. By the end of the second day, frustrations had become apparent and there were those that felt marginalized by the process and that their concerns were not being heard. Recognizing this underlying tension, the CBSG staff identified those issues at the beginning of Day 3 and got them "on the table" for discussion. Emerging from this process was a spirit of cooperation that pervaded the workshop and led to an Organizational Working Group composed of

representatives from each of the major sectors represented. These sectors included NGOs, commercial breeding operations, American Zoo Association/AZA, European Zoo Association/EAZA, IUCN/SSC, Legal Interests, Regulatory Agencies in U.S. and China, Range Country programs, U.S. private sector, European private sector, Veterinary Community, Academics and Public/Corporate sector. From this Working Group an alliance was forged, and the Chelonian Captive Survival Alliance (CCSA) was born. This group (since changed to the **Turtle Survival Alliance or TSA described in Section 3 below**) will function as a joint interdisciplinary working group of the IUCN/SSC Tortoise and Freshwater Turtle and Conservation Breeding Specialist Groups. The mission of the TSA is to *develop and maintain an inclusive, broad-based global network of collections of living tortoises and freshwater turtles with the primary goal of maintaining Chelonian species over the long term to provide maximum future options for the recovery of wild populations.*

Workshop participants signing in.

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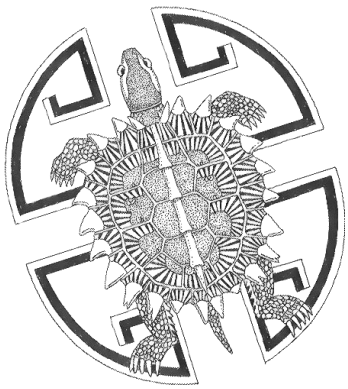

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Section 2:
Introduction to the Workshop Process

Conservation Breeding Specialist Group

Species Survival Commission
IUCN -- The World Conservation Union

U.S. Seal, CBSG Chairman

Dear Participant:

In response to the growing crisis situation with Asian chelonians, and given the prediction that some species may depend on captive stocks for their survival, the Fort Worth Zoo will host a workshop to draft a comprehensive management strategy for these turtles in captivity. This workshop will be a joint initiative of the IUCN Conservation Breeding Specialist Group (CBSG) and the Tortoise and Freshwater Turtle Specialist Group (TFTSG). The meeting dates are 26 – 28 January 2001 in Fort Worth, Texas, and will be sponsored by Conservation International and the Fort Worth, Atlanta and Cleveland Metroparks Zoos.

This workshop will bring together various members of the international turtle conservation community including field biologists, captive managers (both zoo and private; local and foreign), veterinarians, geneticists, U.S. Fish & Wildlife biologists and others. This will be an intensive three-day workshop that we hope will catalyze an effective and coordinated response to this critical situation. Facilitated by Dr. Ulie Seal, CBSG chairman, we will collectively produce an agenda for the establishment of captive populations and develop management guidelines for many of the most endangered Asian turtle species. By bringing together those members of the captive breeding specialist community that are already taking action in response to this crisis, this workshop will work to strengthen and further develop this network into a unified and cooperative action plan. It is anticipated that an Asian Turtle Breeding Consortium will emerge from this workshop that will operate under the umbrella of the IUCN, bound together by a cooperative management agreement. In addition, working groups will convene to address the many genetic, veterinary and husbandry issues that will emerge.

You are among approximately 70 invited participants to this workshop, and that list is enclosed. Due to space and monetary constraints, this is **by invitation only**. We have blocks of hotel rooms near the zoo (50 total, most @$69/double), and the **motel registration deadline is 4 January 2001**. There is no meeting registration fee, and we are making every effort to keep your expenses down. Your lunches and possibly some other meals will be provided. If you plan to attend, please contact me by e-mail and I will get information on hotel and airport transportation out to you. Your destination airport is Dallas/Fort Worth (DFW). My contact information is phone: 817-871-7431; e-mail: i***guanhudso@aol.com***.

Please confirm your participation by November 15. Looking forward to a productive workshop.

Rick Hudson
Conference Coordinator
Conservation Biologist
Fort Worth Zoo

Asian Turtle Workshop: Individual Introductions and Statements

Each individual was asked to write their response to three questions and then to introduce themselves and give their response to the questions. This process assists in establishing areas of shared interests and shared concerns as well as diiferent perspectives. It also establishes the principle that all are to participate and to be heard in a CBSG workshop. Consolidation of the themes provides a basis for establishing working groups as well.

I. Individual Workshop Goals / Expectations

- Find a specific piece of the problem to invest my energy in resolving. Develop a strategy plan as a group
- Learn as much as I can about what I can do to help
- To create a working plan to create a plan for actually putting together breeding groups of large populations (50-100 individuals) of every species of turtles / tortoises affected adversely by the Chinese food markets, in the hands of serious turtle people to keep them on the Earth, and at the same time to be fair and have a positive experience for those involved
- To see concern form into action and for there to be a sharing of expertise
- On a fact-finding mission – to find the best ways to hopefully set in place the mechanism to conserve Asian turtles
- To identify priority species of Asian turtles, who is going to work with what and what in-situ actions can be taken in the short-term, i.e. now. How are we going to fund this?
- A comprehensive workplan to support the conservation of threatened Asian turtles
- Communicate the US Fish and Wildlife position on issues before this group, particularly how CITES and US regulations would impact import of breeding stock. Learn what others are able and willing to do, and use that knowledge to help where and when we can
- To see a plan of prioritized, structured actions by which zoos and all turtle interest groups can significantly contribute to the management of the crisis. A plan for global action of zoos in the conservation community
- To become aware of the scope of the turtle crisis and how I might fin in as a private keeper with limited financial resources
- To help identify priority species that are threatened or under pressure, and to develop a management plan
- Create a structure (linking institutional and private breeders) to scientifically manage threatened Asian taxa for long-term ex-situ preservation to support future in-situ restoration – “red-shirting” Asian turtles
- To become familiar with the actual problems and challenges that we face and develop common goals and solutions that will be understood and supported by the various standpoints / stakeholders.
- To form a written document on how we as a group will achieve saving the Asian turtles. Reform a Master Plan on who, what species, how we will implement this.
- The establishment of ex-situ conservation priorities and a loan of action that will directly affect and influence ongoing efforts in Asia
- Define a masterplan for involvement with the Asian Conservation Project to take back to Disney’s Animal Kingdom and implement. To develop relationships and partnerships for turtle conservation.
- Receive or give all the information on the subject – share my expertise and experiences with hopes of contributing to solving the problem of the Asian turtle crisis
- To determine the state of current efforts in captive breeding of Asian turtles. To insure a genetic component in management

I. Individual Workshop Goals / Expectations (Contd)

- To familiarize myself with the issues and to identify how my particular expertise can be put to good use with the goals set by the group
- To identify specific problems and needs with husbandry and reproduction of captive populations, and to establish goals and guidelines for captive husbandry
- Identify species in need to urgent management and to meet people working with Asian turtle species
- To develop a strategy for forming a working partnership among the many organizations and individuals attending this meeting, with the goal of finding effective ways of dealing with the Asian turtle crisis – develop an MOU?
- To define a specific project for which my medical skills may be of use in establishing captive breeding groups
- The workshop should coordinate the cooperation of a variety of groups of people with a vast among of resources and knowledge to help resolve the Asian turtle crisis.
- Develop mandates and mechanisms for public/private partnerships in ex-situ programs
- Become part of a global network. Finding tools for the establishment of respect and insight in each others' experiences in both zoos and private collections
- To get to know and to be a part of a network of people and organizations working on captive breeding of Asian turtles
- Build bridges between ex-situ and in-situ conservation efforts
- To come in contact with American scientists and turtle breeders, to exchange captive-born individuals of endangered species in the future
- Get first-hand knowledge about the actual situation among Asian turtles world-wide; Start of a worldwide initiative of combined efforts to conserve as many species as possible
- Use my knowledge for future cooperation
- To meet people sharing my interest in Asian turtles; establish conservation breeding programs for the most endangered Asian turtle species
- Develop a comprehensive and realistic strategy to implement coordinated ex-situ conservation breeding of Asian tortoises and freshwater turtles
- Better understand the available disciplinary resources
- To develop a sound action plan to guide the long-term captive management of Asian geomydid turtles
- To reach consensus among the various and diverse groups and reach a cooperative and mutually beneficial working relationship
- Establish a framework for the conservation of Asian turtles that incorporate data from field biologists with the existing breeding experience of small private collections, zoos, and large-scale farms into a viable, collaborative program that can be applied to the global turtle conservation effort.
- Identify, as completely as possible, currently available tissue that can be used for molecular genetic analyses.
- Achieve conceptual clarity on the global turtle conservation problem.
- Form a working partnership between government agencies, zoos and private breeders and individuals.
- Achieve awareness of players beyond current knowledge and bridge the gap between *in situ* and *ex situ* communities.
- Gain realization that we can work together to attain the goal of establishing populations of Asian turtles that will eventually be the stock for repatriation to the wild. And to have a clear picture of what projects Conservation International can fund.
- Form an agreement to support effectively the captive breeding and conservation of China, which the most important area is conserving turtles in the wild.
- To establish a cooperative relationship between private breeders and public institutions and to elicit a recognition of private breeders as a viable conservation effort.
- Begin to organize a tissue depository for Asian turtles.

I. Individual Workshop Goals / Expectations (Contd)

- I have come here without expectation. I come from outside the field and expected to get riled up and come out with a focused goal.
- Main expectation is to arrive at a unified conservation masterplan strategy to deal with crisis; to understand cultural and political issues that may affect implementation of any conservation strategy; reach understanding with other private/zoo personnel, etc.; assign faces to the names of people I've heard of.
- To find avenues to share information and resources.
- Define the problem and outline action plans for remediation of problems; get commitments for implementation of such from interested and motivated participants.
- To establish a network of interested parties that are all on the same page as far as conservation and captive breeding. For us as a whole to set aside our personal agendas and instead think of each threatened species as valuable and important enough for us to come together.
- Stop talking about the crisis. We are fully aware of the urgency. Put some well-organized international effort (with target time frame) to take action.
- To establish what the most constructive pathway forward would be for the facilities/staff of the KFBG with regard to turtle conservation. We have many ideas and suggestions but need to put these In a coordinated global context. One facility can't save a species.
- Development of understanding of the issues at play.
- Help you develop a collaborative strategic plan with achievable priorities.
- See improved cooperation between private breeders, governmental organizations, *in situ* organizations and zoological facilities.
- Working relationship among various groups.
- To work to get a consensus for a captive reproduction goal of each species (or genus) of Asian turtle and to help establish an organized set of guidelines to accomplish these goals.
- My goal is to meet other stakeholders and find common ground to promote *ex situ* populations.
- To get a more refined focus of this problem and to decide exactly how individual efforts and resources can fit in best with the solutions.
- To develop a unified captive breeding program for endangered Asian turtles in North America.
- I want meeting participants to be aware that the Tortoise Reserve is committed to the long-range conservation of Asian turtles and want to learn and work with institutions, organizations and private individuals who are also committed to helping Asian turtles.
- To work with a diverse group of turtle biologists, breeders and enthusiasts to gain better cooperation in a major captive propagation and conservation project for Asian turtles.
- I hope to learn from other workshop participants, their perspectives on what are the most important issues and critical actions that need to happen now, and to be part of drafting a workable action plan and initiating its implementation.
- Prioritization of species in need of captive work.
- To meet as many of you as I can and become much better informed regarding the Asian turtle crisis and our options for *ex situ* management.
- To provide a framework for an organized, cooperative effort to be followed in addressing the Asian turtle crisis.
- To come away with a working plan on how to proceed with solving the problem.
- To develop a consensus plan to conserve Asian turtles that will be able to attract major funding support.
- To develop an institutional blueprint for action and to <u>keep hope alive</u>.
- To establish an over-riding structure for a long-term international conservation program to preserve turtles as components of natural communities.
- To open lines of communication between various diverse groups – to put everyone on the same page.

- Establishment of a cooperative and trustful relationship among private and institutional stakeholders, with less emphasis upon ownership of specimens and more upon cooperative conservation action.
- To develop a sense of commonality of purpose in addressing the Asian turtle survival crisis.

II. Most Critical Problem for the Ex-Situ Management of Asian Turtles

- Finding the funding to support an ex-situ program
- To get the private sector and zoos to work together. What do we do with non-Asian species surplus?
- Funding – where does the money go?
- Funding and division of responsibility
- Funding. Obtaining some of the rarer species in workable numbers
- Do we have all the turtles we need and holding space to undertake ex-situ management. Do we have turtles from know wild locations?
- Identify space in captivity for a viable genetic safety net for critically endangered species of Asian turtles
- Develop a list of species to work with and how to engage trading countries in conservation actions. We need to understand our limitations – we will have some successes and failures in this process
- Given lack of resources – time, space, and money – good communication and cooperation between the many and varied captive turtle managers in organization, transfer, and husbandry of the threatened species, and expansion of resources
- Availability of species wildlife law. Acceptance of commercialization. Freedom-oriented solutions
- Identifying which species are under pressure, and obtaining viable breeding groups of those species with responsible locality data when possible
- Establishing appropriate protocols for joint institutional / private long-term ex-situ sustainability of threatened taxa
- To be aware of the facts and status of the turtles in the various Asian countries that we are dealing with so that we may develop the optimal possible environment for the ex-situ collections
- Can we designate how many species to work with and do we as a group have the resources / space to maintain such large numbers
- Linking ex-situ propagation with in-situ efforts such as the establishment of protected areas, improvement of protected species legislation, reintroduction efforts, etc.
- For all of the groups, parties, and individuals to come together
- A lack of habitat for animals to be reintroduced in the wild
- Lack of coordinated and trustful effort across institutional / private captive breeding successful on multiple generations
- Institutional commitment – space, staff., facilities, tools for a non-charismatic program
- Resources – time, money and space
- To develop a strategy to work with a network of concerned parties to manage target species
- The sheer numbers of animals involved, and the space and money required to manage these ex-situ populations. Record keeping also a daunting problem
- Establishment of healthy, disease-free individuals of known locality
- Lack of funds and facilities
- Space
- Achieving genetically sound ex-situ populations suitable for possible future reintroductions
- To establish viable breeding populations of the large soft-shell and river turtles
- Prioritizing and coordinating conservation efforts
- To avoid inbreeding for a long period of time to build up stable populations in captivity; we need good working studbooks
- Too many species and very poor data about most species

II. Most Critical Problem for the Ex-Situ Management of Asian Turtles (Contd)

- Successful breeding; rearing and maintenance of offspring; lack of suitable facilities
- Lack of time left for Asian turtle species; not enough captive specimens present to ensure sufficient genetic exchange for long-term success
- Lack of coordination and information-sharing between breeders in different countries and institutions
- Establishing a community of healthy, reproductive populations and to prepare for success of captive breeding efforts, where offspring can go in the coming years without overwhelming existing facilities
- Lack of a complete understanding of the genetic, evolutionary and taxonomic relationships among all of the Asian taxa; lack of a complete life-history dataset for even a single Asian species
- That the various conservation groups, including the private sector, in terms of providing remedies are far outpacing the status quo of conservation law, convention and politics
- Maintaining genetic diversity without compromising animal and population health for short-term gains
- Prioritization of species, including putative hybrid species.
- The "professionalization" of the amateur turtle community.
- Governmental regulations.
- Understanding PMPs by private sector, organizing founder stock and gaining working trust about animal transfers.
- Maintaining a long-term focus, yet allowing this process to move forward utilizing multiple strategies that satisfy the goals of the diverse individuals here.
- Lack of scientific guide for turtle farmers.
- Acquiring suitable numbers of founder breeding stock to ensure genetic viability for long-term *ex situ* captive breeding.
- Determine what are and what are not valid species.
- Deciding which species on which to concentrate our limited resources in order to best conserve biodiversity of Asian turtles.
- Space limitations; facilities and funding; availability of species and priorities.
- Integration of different interest groups and financial support of efforts.
- Health and genetics. First, we must have populations that are physically capable of reproducing. This means that environmental, husbandry and medical issues must be determined and mitigated.
- The most critical problem for captive breeding is for wild caught breeding stock to adapt to captivity to the point where they reproduce regularly. Habitat design and health of stock is important.
- Who is keeping what and what we, in Hong Kong, being within the geographic range of many endangered species, should breed.
- Stock procurement and point of origin. We need to establish providenced stock before leaping in with a species. We need to establish if this is even possible for some species. Space availability.
- Increase understanding of natural history and how nutrition plays a role in successful *ex situ* propagation.
- Developing programs that really will offset Asian turtle species depletion.
- Obtaining healthy specimens with known locality and genetic data for breeding groups.
- Resources.
- Establish captive populations of each of the endangered species and then establish a forum for communication about captive husbandry and reproduction among participants for these species.
- The most critical problem for *ex situ* programs is the lack of founder stock for many species because of legal prohibitions in countries of origin.
- How to keep cooperation between public and private sector as regards long term financial and genetic management (sales, studbooks, disposition of offspring).
- Having all factions represented at this meeting work together to develop a unified captive breeding program for endangered Asian turtles in North America.

II. Most Critical Problem for the Ex-Situ Management of Asian Turtles (Contd)

- Time! Both the protracted time frame that captive populations will need to be maintained and the unknown factors resulting from changing political, cultural and legal issues that will require extreme flexibility in any programs we initiate.
- The logistics of managing large multiple populations to ensure genetic viability of the Asian species and work toward providing captive habitat for each species.
- Coming to agreement on priorities, a concerted action plan and funding sources.
- Health-related issues and husbandry/management practices; how to manage success – where are offspring to be placed?
- Difficulty in fostering and maintaining regional and global cooperation within the *ex situ* community.
- To arrive at a mutually acceptable protocol for *ex situ* management of Asian turtles.
- Resources – money, time and space.
- Lack of space and resources.
- Harnessing the energy of the group to address our common cause. Where will we find the money to support he mission of whatever institution we develop?
- To develop a means of coordinating the establishment of captive populations without further jeopardizing wild populations and which yield biologically valuable stock.
- Obtaining healthy founder stock and natural history information.
- Production of captive-raised stock capable of surviving competitively in the wild; and provision of adequate habitat to receive such animals.
- How to insure long-term integration and synergy of *ex situ* with *in situ* conservation programs

III. What Can You Do to Address the Problem?

- To assist people from the diverse sectors involved here (academic, private, AZA and government) to meet and interact to find ways to "pull the rope the right way".
- Present the material to management and get them to get along with what is resolved at this workshop
- Reproduce as many Asian turtles as possible
- To help in any way that I can
- Design, build and manage the infrastructure for breeding groups of Asian herps, then breed and maintain their offspring
- Support in-situ conservation in Asia and provide space in Australasian zoos for turtles
- Recommend institutional support for ex-situ captive breeding programs for up to five species of critically endangered Asian turtles
- Lobby within US Fish and Wildlife Service and US government to stay engaged in this issue, and provide resources and expertise when and where possible. Take the plan that this group creates back to our permit folks to facilitate permit review.
- Manage and plan the jersey Zoo collection to maximize resources for critical Asian species and encourage the Trust to assist in the development of Recovery Programs where possible. And to push hard for EAZA-wide prioritization of Asian turtles in zoo collections
- Continue my private breeding of M. emys which is solely financed by sales of offspring. Willing to use part of my facility for long-term breeding projects in a conservation / self-supporting program.
- Offer first-hand experience and advice with regards to the trade for consumption and pets
- Continue fieldwork in Asia to establish ex-situ priorities and needs and identify restoration opportunities. Train / collaborate with Asian scientists to work with Hawaiian zoos (Honolulu, Hilo)
- I would like to become familiar with various work and experience that everyone has achieved and I would like to share what I know about the status of turtle trade and turtle ecology in Japan

III. What Can You Do to Address the Problem? (Contd)

- Encourage / allocate resources (propagation / husbandry / enclosures) to help aid in rearing / holding of specific species that are designated
- I am willing to continue to document trade levels, so seek increased protection for these species in their range and through CITES, and to pursue funding for these efforts, to help prioritize commitments to ex-situ conservation
- I am personally committed to encourage Disney's Animal Kingdom to become more deeply involved and to support the Asian turtle conservation effort through conservation and education
- Collect and disseminate information on the trade in Asian turtles. Try to direct my agency's resources to assist in this effort.
- Provide DNA marker assessment; provide current collaboratively-held captive collections for integration with broader efforts; continue to collect field samples and data linking provenance data to our genetic data from animals without locality data
- To encourage FWZ management to make Asian turtle propagation a priority and to encourage then allocate adequate resources to achieve the goal; to disseminate the message within AZA.
- To commit time and energy both as a FWZ staff member and a private individual to promote and follow the goals and guidelines established at these proceedings.
- Provide space and resources to manage target species and provide assistance to group efforts
- Small population management and education initiatives within the Baltimore Zoo.
- I am prepared to offer my medical knowledge, skill, and time to help ensure that as many imported animals as possible are rehabilitated, and that as much information as possible is obtained from deceased specimens
- I can collect and report data on captive populations of *Manouria emys* and *M. impressa* in my studbook
- Focus institutional resources toward workshop recommendations
- The establishment of cooperation between zoos and private keepers / breeders in respect to captive breeding programs in Europe
- Cooperate with projects and facilities
- Continue with efforts in Vietnam, as well as play a role in this broader conservation effort
- To build up a breeding center for endangered Asian turtle species, especially Cuora species in Munster Zoo in Germany
- Bring in my knowledge and concentrate on one or two species with my facilities; gather field data by personal field trips
- Motivate private keeps and breeders and institutions in the Netherlands to help accomplish the workshop goals and to try and find funding for it.
- Publish as many breeding reports as possible; exchange animals in order to establish breeding groups and report ALL breeding results to a central studbook keeper
- Facilitate Asian ecological information to be accessible to the *ex-situ* breeding efforts, and assist in prioritizing selection of target species
- Maintain captive populations and work closely with veterinary resources to maximize survival of individuals in founder stock; develop internship programs between the US and southeast Asia
- Present and attempt to clarify everything we know about the genetic and evolutionary relationships among the Asian turtles; assist in the extraction of the life-history parameters necessary for population viability modeling based on available information
- Participate in ways which I may not have considered prior to this meeting
- Share scientific knowledge of physiology and field biology and personal experience with care and breeding of rare turtle species
- Conduct molecular analyses to determine both phylogenetic relationships of species and the native and composition of putative hybrid taxa.

III. What Can You Do to Address the Problem? (Contd)

- Create an institution to achieve the professionalization of the amateur turtle community and find a full time job to do this.
- I will share information with those managing zoological collections and with those working with private collections.
- Coordinate in situ conservation with Asian capacity building program, provide studbook record keeping skills and collect natural history data through the eyes of a husbandry program.
- Be open to all concerns and suggestions. Physically conduct field studies that obtain natural history, distribution and ecology information about Asian turtles in the wild.
- Survey and summarize and study the status of captive breeding and conservation of Chinese turtles.
- Invest my own time, effort and passion into establishing viable breeding groups of my own and coordinating with other breeders, both private and institutional, to ensure breeding success.
- I will help determine the species composition of the turtle family Geoemydidae through molecular genetic research. Genetic data may also allow us to determine locality of individuals.
- My expertise is in the use of molecular tools for phylogenetic reconstruction. I feel that understanding biodiversity is one key to deciding conservation priorities. I am willing to make these skills available to this group. I also am aware that on-the-ground field surveys of where the critters are and how many there are is essential. I also am willing to give my time and expertise in the field to do this work.
- Increase representation of Asian species in our zoo collection; follow recommendations of this workshop and the AZA Chelonian Advisory Group; make sure that my institution does its fair share in dealing with this crisis.
- Share my knowledge, offer my time and full commitment to goal of ensuring survival, by whatever means, of unique and irreplaceable Asian Chelonians currently at risk.
- Attempt to collate and disseminate information based on my expertise as a veterinarian.
- Continue to loan bloodlines to zoos, private individuals and institutions using an application system to place each animal to an existing breeding colony.
- Being a part of China, with a bit more freedom, liaise with mainland Chinese government for oversees experts to do captive breeding of species allocated to us.
- KFBG is already committed to working with captive management. I can only return with recommendations to KFBG. We will, however, commit to establishing firm communication and education channels to assist all matters of Chelonia conservation. To listen for suggestions to do best to support the ideas and continue to develop existing field and captive conservation and education work.
- Begin and continue involvement as needed.
- I work with the Chinese zoos a lot. I will push this agenda and the need for public education with Chinese zoo directors, staff and the Chinese Association of Zoos and Aquariums.
- Provide medical care, advice and work with my institution with various species.
- Asian box turtle studbook.
- Convince my institution to allocate resources to establish more captive turtle populations at my institution and to allocate funds to support *in situ* conservation initiatives.
- I have large infrastructure for holding many species in near natural conditions, including large riverine species. This currently includes approximately 30 species, and 800 individual breeders and we are producing hatchlings.
- Continue contributing private resources to acquiring and breeding Asian species in our collection and sharing information with others as well as doing public education.
- Come to the table with a positive, open mind, determined to find a way to develop a unified captive breeding program for endangered Asian turtles in North America that embraces all factions represented at this meeting.
- We have set up an umbrella network of private turtle breeders to assist in long term conservation.

- Our facility plans to construct ponds and begin educational programs for Asian turtles. We are preparing to be a partner in the captive propagation of several species that are available.
- Put in much time and effort, try to work between groups, try to understand the perspectives of the different stakeholders and come to consensus, serve as a safehouse for confidential information, develop a legal structure that will facilitate public-private cooperation and appropriately use it for the purposes of the group.
- Prepared to collect data and report findings.
- Provide guidance and advice on the scientific basis for genetic and demographic management of *ex situ* populations.
- To participate in meetings such as this one; to encourage the local (Santa Barbara, CA) zoo to participate in the programs which are recommended by this, and other, groups.
- Ensure that my institution devotes its share of the necessary resources.
- Write grants to raise funds to help support these conservation initiatives.
- Commit my institutional resources toward the fulfillment of the new Chelonian alliance's missions.
- I will focus my work in supporting the establishment of regional Chelonian conservation committees.
- To personally facilitate the information exchange necessary to develop ex situ breeding groups, provide a template or focus on the problem via general education as well as personally continue involvement with direct propagation efforts.
- Continuation of field work and data gathering in remote places; provision of bibliographic and systematics collections and resources; and potentially provision of space and resources for captive colony maintenance
- My organization, Chelonia Research Foundation, has and will continue to provide support for turtle conservation efforts and to provide a public forum for publication of conservation-relevant materials.

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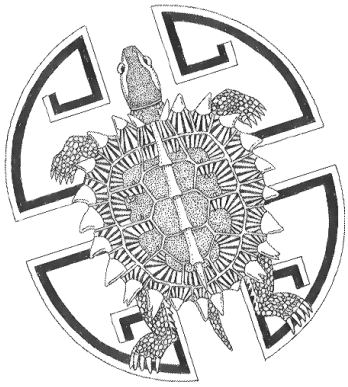
IUCN Asian Turtle Workshop: Developing Conservation Strategies Through Captive Management



FINAL REPORT

Fort Worth, Texas, United States
26-28 January 2001

Section 3:
Post Workshop Activities

Turtle Survival Alliance (TSA)

An IUCN Partnership Network for Sustainable Captive Management of Freshwater Turtles and Tortoises: Preserving Options for the Recovery of Wild Populations.

A Joint Initiative of the IUCN/SSC Tortoise and Freshwater Turtle and Conservation Breeding Specialist Groups

Mission of the TSA: Develop and maintain an inclusive, broad-based global network of collections of living tortoises and freshwater turtles with the primary goal of maintaining Chelonian species over the long term to provide maximum future options for the recovery of wild populations.

*Although the initial focus and organizing principal of the TSA was Asian Turtles, this Alliance is designed to respond to turtle conservation issues worldwide, particularly when captive management becomes a necessary component in a species' overall survival strategy.

Organizational Structure

TURTLE SURVIVAL ALLIANCE

Steering Committee

A Joint Interdisciplinary Working Group of the
IUCN/SSC Conservation Breeding Specialist Group and
Tortoise and Freshwater Turtle Specialist Group

Steering Committee Co-Chairs:
Kurt A. Buhlmann
Rick Hudson

Membership:

IUCN/SSC Sector
Anders G.J. Rhodin
Chelonian Research Foundation

Rick Hudson
Ft. Worth Zoo

NGO Sector
Kurt A. Buhlmann
Conservation International

John L. Behler
Wildlife Conservation Society

Zoo Sector
Hugh Quinn
Cleveland Metroparks Zoo

Richard Gibson
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Matt Vincent
Melbourne Zoo

Private Sector
James Barzyk
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Harald Artner
Austria

Commercial Sector
Al Weinberg
South Florida Reptile Exchange, Inc.

Regional NGO Centers Sector
David Lee
Tortoise Reserve

Doug Hendrie
Cuc Phuong Conservation Project

Range States Sector
Peter Paul van Dijk
TRAFFIC Southeast Asia

Corporate Sector
Lonnie McCaskill
Disney's Animal Kingdom

Academic Sector
John B. Iverson
Earlham College

Veterinary Sector
Barbara Bonner
The Turtle Hospital

Advisory Consultants

Legal
Brett Stearns
Institute for Herpetological Research

Regulatory
Bruce Weissgold
USFWS USA

Wan Zi Ming
CITES China

Records
Annabel Ross, Registrar
Fort Worth Zoo

Early Progress made by the Turtle Survival Alliance (TSA):

1) TSA steering committee meets in Chattanooga, TN to draft operating guidelines and procedures that will provide a framework under which to function.

2) The Taxon Management Group (TMG) concept is developed as the functioning unit under which species are managed as part of the TSA. TMGs begin to organize in July 2001 with a goal of having management plans written for the Top 17 IUCN Red Listed Critically Endangered Asian turtles by January 2002. TSA co-chair Rick Hudson is heading up this aspect of the program.

3) TSA co-chair Kurt Buhlmann begins working extensively with regulatory agencies (USFWS, CITES Hong Kong) to develop a mechanism and network to channel confiscated turtles of special concern through the TSA. Kurt meets with the USFWS Division of Law Enforcement and head of port inspectors to discuss the routing of turtle seizures through the TSA network.

4) In an effort to promote the TSA and expand general awareness for its mission and goals, both Kurt and Rick have made presentations to diverse audiences including the International Herpetological Symposium, AZA Chelonian Advisory Group, Society for the Study of Amphibians and Reptiles, and the International Reptile Breeder's Expo.

Results of Steering Committee Meeting, Chattanooga, Tennessee 2-3 April 2001

Attendees: Rick Hudson (co-chair), Kurt Buhlmann (co-chair), Jim Barzyk, Dwight Lawson (observer), Anders Rhodin, John Behler, Al Weinberg, Bruce Weissgold (advisor), Hugh Quinn, Dave Lee.

Steering Committee members who responded to emails sent during the meeting included: Richard Gibson, Matt Vincent, Barb Bonner, Harald Artner, Peter Paul Van Dijk

Initial Business Concerns that Addressed the Function and Structure of the Steering Committee:

1) We invited Darrell Senneke to become the Communications Advisor for managing the TSA Listserves. He would become an advisor to the Steering Committee.

2) We designated a new category of membership for the Steering Committee that includes Corporate Sector partners. Disney's Animal Kingdom, represented by Lonnie McCaskill, will become a member of the Steering Committee.

3) We designated a Registrar advisor that would assist the group with record keeping, breeding loans and other related duties. Annabel Ross, Fort Worth Zoo Registrar, has been approved by the Steering Committee's and accepted this responsibility.

4) Leslie Levin recently informed us of her need to postpone involvement in the TSA. The Steering Committee agreed that Brett Stearns should be invited to replace Leslie as the Legal Advisor to the TSA. Brett has agreed to accept this responsibility.

5) It was determined that the TSA will eventually need to form a Funding Sub-Committee which can reach out to potential donors about the mission and goals of the TSA.

6) For now, the Steering Committee shall function as the Ethics Committee. It was suggested that an Ethics Committee be formed at a later time.

7) A document will be drafted by the Steering Committee that identifies the goals and objectives of the TSA for interested persons, government officials, potential donors, and the general public.

8) Subsequent to the Steering Committee meeting, Anders Rhodin drafted TSA letterhead that will be circulated for review. He proposes that our web site be www.turtlesurvival.org, and suggests that we register that name soon. Comments are hereby requested regarding that name.

9) We need to make this group better known throughout the Species Survival Commission (SSC) in order to gain their support. This document should be circulated to George Rabb (past SSC chair), David Brackett (SSC chair) and Russ Mittermeier.

Voting Functions of the Steering Committee

1) A three - quarter majority of the Steering Committee is required for action to be approved. In the cases where a vote is requested via email, the vote will be approved if ¾ of the members reply by the deadlines as set by the chairs. No motion will be carried with less than 12 responses, and ¾ of however many votes are cast (over 12) will be required. Time frame for response will be flexible, and not less than one week. There are currently 17 TSA Steering Committee members.

Levels of Participation in the Turtle Survival Alliance (TSA)

1. **Steering Committee**: The original SC was appointed by the group present at the Fort Worth Zoo workshop. Steering Committee members are also TSA Partners (see below) and hence IUCN/SSC members.

    - The Steering Committee represents each of the Sectors (zoos, private, NGO, etc) present in Fort Worth. All subsequent Steering Committee meetings are open to the Alliance Partners or by invitation. The Partners attending would be non-voting. There may be a need for executive (closed) sessions. We reserve the option to add new Sectors, Advisors and members at Large.

    - There are no term limits on Steering Committee members, however their performance will be reviewed every two years and re-appointments made. Attendance at Steering Committee meetings will be an important criterion in evaluating that person's commitment to the TSA.

2. **Alliance Partners**: The Partners are individuals and institutions who are participating in the conservation and captive breeding plans for turtle species. All who attended the Fort Worth workshop are automatically invited to become TSA partners. TSA partners would become de facto members of the IUCN/SSC.

- Partners agree to the general mission, goals and code of ethics of the TSA.

- The TSA requires that Partners report if they have ever been ever convicted or pled guilty to a violation regarding wildlife trade (local, state, federal) or any other law regarding animals, and whether they are presently a party to a legal proceeding or know if they are the subject of an ongoing investigation regarding such laws. This does not automatically exclude those with prior convictions from becoming a Partner in the TSA, and each case will be evaluated individually.

- There is no TSA membership fee, but the Steering Committee may make an Annual Appeal for Funds on a voluntary basis with various funding levels and categories.

- We suggest that both individuals and institutions are considered as TSA Partners, and are not referred to as Members.

- The Steering Committee recommends an objective weighted point system to evaluate individuals or organizations wanting to become new TSA partners or members of a Taxon Management Group (TMG). The SC can reject an application from a candidate or remove those not following guidelines.

- TSA Partner applicants should agree to abide by the TSA Code of Ethics and the guidelines for participation and will be judged based on their demonstrated ability to work well with others (be team players) as well as their past experience and commitment to turtle conservation.

- Applicants will be expected to provide reasonable justification for wanting to become a TSA partner and state what they can contribute to the goals and mission of the TSA. These topics should be addressed in the applicant's cover letter that accompanies their application to a Steering Committee member.

3. **Corresponding Associates**. The Associates are those who wish to be included in correspondence generated by TSA activities. Associates are not required to agree in writing to the mission and code of ethics of the TSA, nor would they become members of IUCN/SSC.

Procurement Ethics and Importation Guidelines

The TSA recognizes that, as a sub-group of the IUCN, our practices and actions will be held to a high ethical standard and rigorously scrutinized, and as such we should make every effort to insure that our activities are defendable and consistent with the mission of the IUCN in general.

- Should we take all the turtles in a confiscation? Need to determine on a case-by-case basis. We will work with other organizations such as Turtle Homes (Mike Nesbit), Turtle Homes Asia, California Turtle and Tortoise Club, New York Turtle and Tortoise Society and designate a liaison between TSA and these groups.

- Obtaining animals from the commercial market: We recognize that we might need to buy animals for conservation purposes. A TMG may even recommend collecting animals from the wild if deemed necessary to establish a viable captive breeding population. Clearly, obtaining turtles through confiscations will be the most desirable from an ethical standpoint. However, it must be recognized that for some species of critical importance we will not be able to assume that we will be able to obtain the stock needed through confiscations alone.

- We need to design a proactive conservation strategy, not just one that is reactionary to opportunistic confiscations. Evaluate on a case-by-case basis whether acquiring turtles by methods other than confiscations will have detrimental effects on wild populations.

- TSA will make every effort to avoid stimulating increased commercial trade in turtle species.

- We recognize the need for emergency rescue attempts as a means of saving a species and preventing their extinction. Such plans will be evaluated on a case-by-case basis.

- Evaluate these concerns against the current projected outlook for the species in the wild. In the end, determine if means of acquisition are justified in terms of conservation value.

- The TSA will not engage in activities that are detrimental to species in the wild. A Taxon Management Group (TMG) may propose an acquisition strategy via their proposal. The TSA Steering Committee will need to approve this plan.

- Each TMG should identify the current number of animals already in captivity using various methods (ISIS, Slavens Inventory, Holdings Report from Fort Worth Workshop, contacts with the private sector). These numbers should be assessed prior to recommending the import of additional turtles. Attempts should be made to incorporate these animals into a TSA captive management program before considering obtaining them commercially.

- For USFWS import permits to be applied for by, or on behalf of, TSA for CITES Appendix 1 and ESA-listed species, the demonstrated value of the conservation proposal must exceed that provided for non-listed species. For example, CITES permitting requires that no detriment to wild populations be incurred. For ESA-listed species, an "enhancement" of populations in the wild must be demonstrated in the proposal for a permit to be considered. For CITES Appendix 1 or ESA-listed species, the commercial sale of offspring of confiscated stock may not be permitted.

- All importations and permit applications conducted on behalf of the TSA must be approved by the Steering Committee.

- For the purposes of scientific study and conservation, permits may be applied for to import turtles under the 4-inch carapace length. Proposals that request import of hatchling turtles for conservation purposes should clearly state the needs and benefits.

Structure and Operating Guidelines of Taxon Management Groups

A Taxon Management Group is defined as the core group of individuals that is responsible for developing and implementing a captive management plan for a particular species. Participating individuals will be those with a vested interest (stakeholders) in that species' survival and may include owners, breeders, veterinarians, geneticists, studbook keepers, field biologists, range country program managers and NGO centers. The primary goal for each specific management plan is to insure the long-term survival of that species in captivity and that preserves future options for reintroduction.

- The Taxon Management Groups will be formed for each species for which a captive/conservation management plan is proposed.

- Preliminary lists of TSA Partners who indicated an interest in involvement with every Asian species of turtle were compiled at the Fort Worth meeting and these lists will provide the basis for the initial TMGs. Additional partners will be included in these TMGs as the TSA membership expands.

- The Steering Committee has compiled a list of point persons (Team Leaders) who will be asked to organize TMGs for each of the 17 priority species. Others will follow.

- TSA Partners who are involved with specific TMGs will sign agreements indicating their willingness to subscribe to the goals and guidelines of TSA (stated herein) as well as agree to comply with the specific recommendations of the TMGs of which they participate.

- Individual TMGs will draft proposals for their species of concern. Proposals will be submitted to the Steering Committee for consideration and review. An accompanying document below (Taxon Management Group [TMG] Proposal Outline and Guidelines) outlines general guidelines for each TMG to consider and address in the species proposals that they submit to the Steering Committee of the TSA.

- TSA, through its TMGs, needs to be ready to act when the call comes that a confiscation is available. Hence, the need for proposals in advance.

- To participate in a TMG, the facility(s) involved must be open for inspection and review by a Steering Committee member or designee of the Steering Committee.

- Non-Governmental Organization Partners of TSA have indicated their willingness to help support the implementation of TMG proposals financially once they have received Steering Committee approval.

- A TSA Partner may be given confiscated turtles for which the Partner becomes a Steward of those animals. If the Partner leaves the TSA, those turtles will be turned over to another TSA member.

- Turtles which were property of an individual or institution prior to their partnership with TSA remain the property of those individuals or institutions and are not subject to TSA guidelines. It would be at the discretion of the TSA partner whether any previously owned turtles would participate in whole or in part under TSA guidelines.

- **Partners must contribute offspring to TSA stewardship.** As a general guideline, 50% of progeny from any chelonian(s) which the TSA has caused any import, export, or re-export and caused and placed with a TSA Partner belong to TSA; the remaining 50% are made available for purchase to TSA by right of first refusal at fair market value. However, these general guidelines may modified by individual TMGs to provide more progeny to TSA for conservation purposes; likewise as population goals are reached, they may be modified to provide a smaller percentage of progeny to the TSA and more for the Partner.

The following guidelines will apply to TSA stewardship animals and transactions:

1) Any chelonian(s) which the TSA has caused to be imported, exported, or re-exported and caused to be placed with TSA Partners may not enter any form of commercial trade. Physical transfer, ownership and custody of such chelonians cannot be made without TSA approval, not to be unreasonably withheld. This also pertains to any chelonians, which were donated, loaned, acquired, or granted asylum with TSA connection. Animals not linked to TSA involvement in procurement should not have TSA restrictions unless volunteered by Partners. However, partners should be required to agree, as a condition of TSA participation, that their non-TSA animals will be disposed of under strict compliance with all laws and regulations. Any change of domicile of any chelonian, as previously referred to, directed by or otherwise caused by the TSA Steering Committee or the TMG or its designees, must not enter commercial trade. This will not pertain to situations in which prior agreements have been reached. Permanent placement within the TSA should be stipulated before placement. If placement is temporary that should also be stated. Short term and long term placements should also be specified as known. The TSA will from time to time engage its partners in aspects of rehabilitation and temporary housing. In these events, the TSA shall further direct distribution of chelonians to TSA partners or other facilities.

2) Captive bred progeny which result from parent(s) subject to any aspect of section 1 are subject to, unless otherwise specifically agreed upon, a 50/50 split (with odd numbers going to the TSA partner) between the TSA, or its designees, and the TSA Partner. If there is to be an increase in TSA's share, this must be mutually agreed upon by both the Partner and the TSA TMG. Further, the TSA is to receive a right of first refusal at fair market value of the TSA Partner's share in the event that the Partner chooses to disseminate any specimens from their half of the progeny. The TSA Partner has the right to enter into commercial trade, other legal issues notwithstanding, with their share of the captive bred progeny, in order to recover expenses as deemed by that Partner. The TSA may choose not to exercise its right of first refusal and may also relinquish its rights to its share of the captive - bred progeny in favor of the TSA Partner. TSA Partners are required to promptly notify the TSA, in writing, as to the existence of, and number of, progeny. Disposal of Partner's share of progeny must be in strict compliance with all laws and regulations.

3) The TSA cannot own animals, but will function in a stewardship capacity to assure their responsible management. TSA partners that acquire animals through the TSA hold them in trust for the benefit of the TSA. In the event of a TSA partner's inability to retain ownership of any chelonians, or severance with the TSA, ownership (stewardship) will transfer to the specific TMG designated point person for subsequent transfer to other TMG designated Partners. If a TSA Partner fails to comply with TSA guidelines or code of ethics, or with the recommendations of a TMG, or fails to properly maintain the animals, this shall be reason to justify the transfer of such specimens. Captive bred progeny of such chelonians will be subject to section 2, unless prior agreements have been specifically agreed to.

4) The TSA Steering Committee will make every effort to cover the expenses associated with acquisition, shipping and importation of animals under their direct stewardship. Maintenance costs will be assumed by the TSA partners; however, TMGs can raise funds that can be used to defray such costs.

5) For tracking and monitoring purposes and to follow "ownership" through time, all animals under TSA stewardship must be individually identified with an acceptable method of permanent marking (PIT tags, shell notch, photos, etc.) so that they can be distinguished from other turtles in that collection. The appropriate ID technique will be determined by the TMG for that species. Also, Partners accepting turtles from the TSA will be expected to participate in TMG management plans for those species and to list those specimens in the appropriate Studbooks or Species Registries.

The TSA co-chairs are confident that much of the aforementioned "legalese" type language will not have to be enforced and we submit them as guidelines to be used in the case of a dispute. It is our sincere hope and belief that the TSA will function and operate with an overall spirit of altruism, that the needs of the species for which we are entrusted will remain our foremost concern, and that personal benefit and gain will become secondary in our decision-making process.

Taxon Management Group (TMG) Proposal Outline and Guidelines

Species Scientific and Common Name:

Distribution - Known or Suspected Range:

Habitat:

Protected Status
- Non-listed
- Range Country Protection
- CITES Appendix
- U.S. Endangered Species Act
- Quota, yes or no

Conservation Status
- IUCN—Red List
- Summary of trade and threats

Status in Captivity
- Number in captivity, distinguish both private and public holdings
- Successful husbandry and breeding techniques known?

Identify the Point Person for the TMG

Identify the TSA partners in this TMG and describe their expertise and abilities

Provide signatures of all partners indicating that they agree to TSA Guidelines for participation in the TMG, and that they will comply with the recommendations of that particular TMG.

Describe suitability of facilities participating in this TMG

Describe the ultimate goal of the captive population
- Reintroduction or maintaining a viable population (assurance colony) over time.
- Genetic and Demographic Goals.
- Number of founders and potential founders existing and number needed.
- Origin and location of founders and potential founder specimens.
- Target Population Size, i.e. the number of specimens required to maintain a genetically viable and demographically stable captive population. This number will be based on the reproductive and life history characteristics of the particular species, and may require the input of a biologist with small population management experience.
- Define length of program: long-term management (100 years) vs. short-term (emergency rescue/holding).

Identify the sources for specimens included in this Management Plan

- Refer to Procurement Ethics section above

Are husbandry techniques known?

- If unknown, describe your techniques for husbandry and reproduction
- Has the species reproduced in captivity?
- Does species have a good or poor history in captivity?

Are there genetic issues that need to be resolved with this species?

- Is this a wide-ranging species with many sub-populations where cryptic taxa may exist?
- Do insular sub-populations exist that may differ genetically from mainland population?

Describe the TMG's plan for managing this species:

- Managed as **individual pairs** with each specimen **individually identified** (i.e *Cuora*) or as **groups** (i.e. outdoor pond with 20 *Callagur*)
- Describe how surplus will be managed once target population size is reached
- Describe plan for dispersal of offspring
- Describe the methods you will use to individually identify the turtles in this captive population (i.e. shell notch, PIT tags, photo, etc).

Have Range Country Partners been identified?

- Have linkages with NGOs and range country programs been investigated for collaborative and eventual repatriation/relocation efforts?

Note: TMG Team Leaders will be expected to present annual updates in the form of progress reports to the Steering Committee

TURTLE SURVIVAL ALLIANCE

MEMBERSHIP APPLICATION

Membership category requested: ____Partner
____Corresponding*

Name:_____
Institution/Facility Name:_____
Address:_____

Email: _____ FAX:_____ Phone:_____

**Following information not required for Corresponding Membership Applications*

1) Applicant has read and agrees to abide by the guidelines and ethical standards of the TSA, and to contribute to its mission and goals. _____YES

2) Affiliations (ATC, AZA, OOS/ECS, other)_____

---

3) Reasons for wanting to become a TSA partner. Use additional space if needed.
_____
_____
_____

4) TSA Partnership programs (hereafter referred to as Taxon Management Groups) in which you would like to participate. List species:_____
_____
_____

5) TSA Partnership species which you hold:_____
_____
_____

6) Briefly describe your facilities, husbandry expertise and propagation successes. Use additional space and include photos if needed_____
_____
_____

7) Have you been convicted of, or pled guilty to, any felony or misdemeanor charges (under Federal, State, local or foreign law) related to illegal wildlife activities? _____If yes, please describe and provide dates_____

Attachments Required:
1) Cover letter to TSA Steering Committee
2) Letter of recommendation from TSA Steering Committee or Partner member

_____ _____
Signature Date

In an effort to begin forming TMGs for some of the highest priority species, the TSA Steering Committee identified the following individuals to begin organizing these groups.

Asian Turtle Workshop: Priority Species and Taxon Management Group (TMG) Point Person

Batagur baska
John Behler and Hugh Quinn, TMG co-point persons

- John Behler, WCS: exhibit and breeding group at Bronx Zoo, financial support to *in situ* conservation
- Hugh Quinn: Cleveland Metroparks Zoo – will coordinate importation of new founder stock from Malaysia or elsewhere
- Don Boyer (San Diego Zoo) and Lonnie McCaskill (Disney) are interested in importing new founder stock
- Disney will construct new off exhibit facilities
- Gerald Kuchling: interest
- Peter Paul van Dijk: interest
- 21 living in 4 U.S. zoos; 70 held in 3 Asian zoos; total ISIS holdings worldwide 23.26.42 (91)

Callagur borneoensis
Rick Hudson, TMG point person

- Fort Worth Zoo/Rick Hudson: 2.8 breeding group—successfully bred 3 years; may undertake studbook
- ASIAN TURTLE CONSORTIUM: 18.40.2
- San Diego Zoo/D. Boyer: maintain a group, could devote more space, can house outdoors
- Zoo Atlanta: 0.1.3; St Augustine Alligator Farm 2.2; Birmingham 0.4; Toronto 1.5
- San Antonio Zoo (3.4.7) has reproduced the past two years
- Harald Artner:
- Gerald Kuchling: interest
- Peter Paul van Dijk
- Disney will acquire group and construct new off exhibit facilities
- 57 living in ISIS collections worldwide; 141 total in US and Europe collections

Chelodina mccordi
Harald Artner and Paul vander Schouw, TMG co-point persons

- Paul Vander Schouw:
- Richard Ogust
- OOS/ECS: 3.12.2
- Fred Caporaso has stock from the Bronx Zoo, and has successfully bred
- Denver Zoo has interest

- Harald Artner: 1.2.7 with regular breeding
- Anders Rhodin has interest in *in situ* conservation effort
- Group 1 Holding report lists 550 total in Europe and US
- Frequently misidentified as *C. novaeguineae* in collections

Note: the Australasian region should provide space for this taxa

Chitra chitra
Al Weinberg and Lonnie McCaskill, TMG co-point persons

- Don Boyer: Interested and maintain a pair of *C. indica*
- Gerald Kuchling: interest
- Peter Pritchard
- P.C.H. TNE: tissue and in country efforts
- Peter Paul van Dijk
- Wayne Hill maintains adult pair; species unknown
- St. Louis Zoo has 2 *C. indica*
- Al Weinberg has several sub-adults
- Disney has interest in acquiring breeding stock and will construct off exhibit facilities; wants to support range country conservation efforts for *Chitra*

Cuora aurocapitata
Jim Barzyk, TMG point person

- ASIAN TURTLE CONSORTIUM: 3.3.1; 4.5.11 Meier/Munster Zoo (OOS/ECS studbook animals);
- Richard Ogust;
- successful progeny in 97 and 98 (Jim Barzyk)
- Denver Zoo: interest
- Harald Artner:
- Ron de Bruin:
- Peter Paul van Dijk: interest
- Annabel Ross: AZA studbook
- 105 in private sector but only 30 – 40 available for TSA mgt (Barzyk)
- no specimens listed in ISIS

Cuora galbinifrons
Chris Tabaka and Barb Bonner, TMG co-point persons

- ASIAN TURTLE CONSORTIUM: modest numbers of all races
- Durrell Wildlife Conservation Trust: 3.2 *C. g. galbinifrons*
- Riverbanks Zoo
- Peter Paul van Dijk
- Meier/Munster Zoo: 4.4.2 *C .g. bouretti*; 0.1.3 *C. g. picturata*; 1.3 *C. g. galbinifrons*
- Kadoorie Hong Kong: 0.0.24, subspecies unknown
- Douglas B. Hendrie, TCEP-Vietnam
- Barb Bonner has large numbers of 3 subspecies
- Richard Ogust
- Jim Barzyk
- Rotterdam Zoo: 0.1 *C. g .boureti*
- Tennessee Aquarium, Dave Collins (3.5.1)
- OOS/ECS : 3.8.2
- Chris Tabaka/Memphis Zoo: 0.0.6 and space
- Richard Fife
- Harald Artner
- Al Weinberg: 50 specimens, unknown subspecies
- Annabel Ross: Studbook for AZA
- 14.25.12 in ISIS worldwide

Cuora mccordi
Elmar Meier, TMG point person

- ASIAN TURTLE CONSORTIUM: 2.2.3
- Meier/Munster Zoo: 3.3
- 12.17.16 OOS/ECS studbook animals
- 8.8 Richard Ogust
- Barzyk successful progeny from multiple females in 1997, 98, 99, and 2000
- Harald Artner 2.2.7
- Peter Paul van Dijk
- Group 1 Holdings report lists 145 in Europe and US
- Annabel Ross-studbook keeper
- 5.5.3 in ISIS (2 U.S. zoos)

Cuora pani
Harald Artner, TMG point person

- Fort Worth Zoo/ Rick Hudson: 2.3
- ASIAN TURTLE CONSORTIUM: 5.6.3
- Riverbanks Zoo: 2.2 potential founders
- Elmar Meier/Munster Zoo: 1.1 OOS/ECS studbook animals
- Denver Zoo/Rick Haeffner: (2.2) no breeding
- Richard Ogust: 5.5
- OOS/ECS studbook animals: 21.26.8
- Richard Fife
- Harald Artner: 3.5.7—regular breeding (OOS)
- Peter Paul van Dijk
- Group 1 Holdings report lists 156 in Europe and US
- Annabel Ross—AZA studbook
- 10.11.1 in ISIS worldwide (in 5 U.S. zoos)

Cuora trifasicata
Jim Barzyk and Dave Collins, TMG co-point persons

- Fort Worth Zoo/ Rick Hudson: 2.2 has reproduced in past here
- ASIAN TURTLE CONSORTIUM: 11.12.8
- Elmar Meier/Munster Zoo: 4.6 (OOS/ECS studbook animals)
- Matt Vincent/Melbourne Zoo, Austalia: 0.1
- Kadoorie, Hong Kong: 0.0.13 all adults
- Douglas Hendrie, TCEP-Vietnam
- Jim Barzyk: x.y.z: successful progeny in 95 and 97
- Richard Ogust
- Dwight Lawson
- Rotterdam Zoo: 4.4.3
- OOS/ECS: 23.31.17 studbook animals
- Tennessee Aquarium, Dave Collins: 7.4.7 with recent reproduction
- Denver Zoo has interest
- Baltimore Zoo: 1.1
- Buffalo Zoo has 1.1
- Harald Artner: 4.4.5
- Peter Paul van Dijk
- Group 1 Holdings report lists 189 in Europe and US
- Annabel Ross: AZA Studbook
- 19.14.25 ISIS holdings worldwide

Cuora zhoui
Elmar Meier, TMG point person

- Elmar Meier/Munster Zoo: 5.4.10 (OOS/ECS studbook animals)
- OOS/ECS studbook animals: 10.16.6
- Richard Ogust:
- Peter Paul van Dijk
- Group 1 Holdings report lists 68 in Europe and US
- Annabel Ross: AZA studbook

**A single working group for the four Chinese endemic *Cuora* taxa should be considered, headed up by Elmar Meier and Harald Artner.

Geochelone platynota
John Behler and Bill Zovickian, TMG co-point persons

- John Behler, WCS: captive breeding facility at St. Catherine's Island in cooperation with Bill Zovickian, *in situ* conservation program in Myanmar, collaboration with Myanmar zoos
- 30 – 35 in the U.S.
- ASIAN TURTLE CONSORTIUM (in China): 10-20 with 5 captive bred young
- Riverbanks Zoo: outdoor facilities available
- John Grigus: congener breeding experience
- Charles Innis: medical experience with other *Geochelone*
- Zoo Atlanta: interest and space available
- Baltimore Zoo: interest and space available
- Peter Paul van Dijk: information and interest
- Durrell Wildlife Conservation Trust: interested participant

Heosemys depressa
Jim Barzyk, TMG point person

- John Behler, WCS: surveys of wild populations in Burma, future captive breeding program
- Jim Barzyk: Egg laying recently with 5 yr captive group
- Zoo Atlanta: has space and interest
- Baltimore Zoo: interest and space available
- Barbara Bonner (interest)
- Peter Paul van Dijk
- 15 in two US private collections

Leucocephalon yuwonoi
Charlie Innis, TMG point person

- ASIAN TURTLE CONSORTIUM: 2.2
- Elmar Meier/Munster Zoo: 1.1 OOS/ECS animals
- Dwight Lawson:
- Barb Bonner
- Richard Ogust:
- Richard Innis: captive maintenance, medical data, large captive group
- Jim Barzyk: x.y
- William Espenshade
- San Diego Zoo has group
- Peter Paul van Dijk
- Group 1 Holdings report lists 58 in Europe and US

Mauremys annamensis
Doug Hendrie and Al Weinberg, TMG co-point persons

- Brad Morris
- Dan Badgley, Columbus Zoo: successful breeding group
- ASIAN TURTLE CONSORTIUM: 28.46.13 (includes large group of 21.32.8 at Al Weinberg's)
- Meier/Munster Zoo: 4.1.2
- 20.26.1 OOS/ECS studbook animals
- Kadoorie Hong Kong: 1.1.4
- Douglas B. Hendrie, TCEP-Vietnam
- Richard Ogust 1.1
- Zoo Atlanta (has space for small group)
- Harald Artner: 2.4.6
- Rose Kiester: 0.0.8
- Tortoise Reserve
- Ron de Bruin: 4.4.1
- Peter Paul van Dijk
- Al Weinberg: 20.32.8
- Kurt Buhlmann: 1.0.0
- Rick Hudson to work with Al Weinberg on U.S. Management Plan
- Group 1 Holdings report lists 245 in Europe and US
- 5.1.18 (24) ISIS holdings worldwide

Manouria emys phayrei
Manouria emys emys
Vic Morgan and Dwight Lawson, TMG co-point persons

- John Behler, WCS: captive-breeding program planned at St. Catherine's Island
- Vic Morgan, Jacksonville, FL: breeding group—10 years reproduction
- Zoo Atlanta: 1.1 potential founders
- Dwight Lawson: captive groups of both taxa
- Modest numbers in ASIAN TURTLE CONSORTIUM
- WilliamEspenshade—have bred
- OOS/ECS: 1.1
- Darrell Senneke: *M. emys*
- Harald Artner: 1.1
- Richard Ogust
- Peter Paul van Dijk
- Scott Davis, Mike Forstner and Rick Hudson: captive group in Texas (~18)
- AZA regional studbook maintained by Karla Anderson
- Group 1 Holdings report lists 224 in Europe and US of both subspecies

Manouria impressa
Charlie Innis and Dwight Lawson, TMG co-point persons

- Fort Worth Zoo/Rick Hudson: (2.2) captive hatched specimens plus veterinary experience
- Zoo Atlanta/Dwight Lawson: China connections/acquisition, space and interest; range country program with Chengdu Zoo
- Douglas B. Hendrie, TCEP-Vietnam
- Barb Bonner
- Richard Ogust
- Charles Innis—successful rehab, pathology data
- Barzyk- 4 yr old captive hatched specimens
- *Manouria impressa* Group (MIG) thru Yahoo: William Espenshade
- Chris Tabaka (Memphis Zoo)
- Peter Paul van Dijk
- Group 1 Holdings report lists 16 in Europe and US

NOTE: Though neither *Manouria emys* or *M. impressa* were ranked as CRITICAL by the IUCN Red List, there is sufficient interest in both taxa to warrant cooperative management plans so they are included here. While *M. emys* (both subspecies) is fairly well represented in captive collections and management techniques are generally well understood, this large tortoise should be better managed and captive populations expanded. *M. impressa* is poorly represented in captivity because wild – caught specimens have a dismal history and rarely survive. A pilot husbandry project is ongoing at several facilities based on captive hatched specimens from wild – caught females. Plans to establish breeding stocks of this problematic tortoise in range country zoos are underway.

The following taxa are not maintained in captivity by TSA members and are unlikely candidates for *ex situ* captive programs

Aspideretes nigricans

- P. C. H. Peter Pritchard has first hand knowledge
- Tag Engstron needs tissue samples

Heosemys leytensis

- William Espenshade (interest)
- Richard Ogust (interest)
- Baltimore Zoo (interest)
- Peter Paul van Djik
- This rare Philippine endemic was reportedly "rediscovered" on several islands there and is a good candidate for developing an *in situ* captive breeding and management program. Once this program was successful in the Philippines, stock could be used to start *ex situ* captive populations elsewhere. TSA should consider partnering with the relevant NGOs in the Philippines to initiate this project, and then developing an MOA with the government to expand the program.

Kachuga kachuga

- Al Weinberg feels that this is a good candidate for *ex situ* captive programs and should be elevated to the Active section above. Al has expressed an interest in all large Kachugas.
- Don Boyer (San Diego Zoo) will pursue importation of *Kachuga* species from Nepal.

Rafetus swinhoei

- Gerald Kuchling (interest)
- P. C. H. Peter Pritchard – ongoing field research and status survey
- Douglas B. Hendrie, TCEP-Vietnam
- Tag Engstrom (tissue)
- Peter Paul van Dijk

Implementing Solutions to the Turtle Crisis in Asia

Kurt Buhlmann, Co-chair, Turtle Survival Alliance (TSA), Conservation International, 1919 M Street, Washington DC 20036, k.buhlmann@conservation.org

Rick Hudson, Co-chair, Turtle Survival Alliance (TSA), Fort Worth Zoo, 1989 Colonial Parkway,Fort Worth, Texas 76110, iguanhudso@aol.com

There are few sectors of the conservation and herpetological communities that have not heard of the crisis facing Asian freshwater turtles and tortoises. The documentation of the unsustainable commercial exploitation of chelonians for the food and traditional medicine is convincing and undeniably real. Feelings of hopelessness have at times been nearly overwhelming, as even the combined education and enforcement efforts seem not enough to prevent the extinctions of turtle species in the wild in Asia. However, over the past year, substantial progress has been made towards achieving action on the behalf of beleaguered turtle species. International conservation organizations, zoos and aquariums, private turtle hobbyists, government authorities, and university research scientists have begun to work together on this problem. Fund-raising efforts are beginning to bear fruit. Long-range efforts are being launched on several fronts including support for education programs and law enforcement efforts in the range countries, identification of proposed and "protected" natural areas within range countries, field research and surveys to identify original distributions, habitats, and life histories of Asian turtle species, and the establishment of range country rescue centers.

Of perhaps greatest immediate importance is the progress being made to establish genetically viable populations (Assurance Colonies) of every species of exploited chelonian and to house them in long-term captive or semi-wild conservation programs. The Turtle Survival Alliance (TSA), a new working group of the IUCN, has been formed to facilitate action in this direction. The TSA is a partnership among private turtle hobbyists worldwide, zoos and aquariums, university research scientists, commercial turtle breeders, field-based conservation organizations, veterinarians, and others. The stated mission of the TSA is:

Develop and maintain an inclusive, broad-based global network of collections of living tortoises and freshwater turtles with the primary goal of maintaining Chelonian species over the long term to provide maximum future options for the recovery of wild populations.

Although the initial focus and organizing principal of the TSA was Asian turtle conservation, the TSA is designed to respond to turtle conservation issues worldwide, particularly when captive management becomes a necessary component in a species' overall survival strategy.

Through collaborative efforts with the institutions and individuals mentioned above, many of these "Assurance Colonies" will be established in the United States, Europe, and hopefully in range countries through collaboration with international government authorities. Taxon Management Groups (TMGs) will be formed for each species of conservation concern by interested TSA partners. Each TMG will submit their species management plans to the TSA

Steering Committee (which is representative of the diverse interests comprising the TSA) for approval. The guidelines for becoming a partner in the TSA will be available shortly.

The Assurance Colonies for many species will be stocked primarily through the confiscations of turtles that were destined for food markets in Asia. Confiscated turtles will be made available to TSA partners provided that those turtles become part of Assurance Colonies and are not subsequently sold or traded. Subsequently, some offspring may be sold or traded provided that the conservation goals of the TMG for that species are being met. Assurance Colonies will "keep the pieces" and provide future reintroduction options. For further information about the Turtle Survival Alliance (TSA), please contact the co-chairs.

24 July 2001 – Update from Rick Hudson

This is to update the TSA steering committee on some recent activities and future plans.

1) Division of labor: Kurt and I have divided our duties roughly into two general areas. Kurt has been working internationally to connect the pieces of the network, particularly as it applies to handling confiscations, and has been dialoging extensively with CITES Hong Kong and USFWS at home. He is also working to explain and promote TSA at various levels. I am focusing on getting the Taxon Management Groups up and running, and trying to insure that we have management plans written for at least the top 17 critical species by January 2002.

2) We were both in Detroit recently where Kurt gave a presentation on the Asian turtle crisis and the TSA to the International Herpetological Symposium. I addressed the AZA Chelonian Advisory Group on how to integrate AZA turtle programs to reflect TSA priorities. For instance, one recommendation was to shift zoo collections from the non threatened *Chelodia longicollis* (which take up considerable zoo space) to the critically endangered *C. mccordi*. Both presentations were well received, and due to the extensive networking that both of us did, TSA is now starting to become a well-known name. Just what we need, right? …another conservation acronym?

3) The TSA will be represented at the upcoming International Reptile Breeder's Expo in Daytona Beach, Florida. We have been given table space to promote the TSA and are now scrambling to get material together. I am working to produce a color brochure that will explain and promote our mission in time for the Expo. Maybe t -shirts if the artist can get the image done in time. I would like to include a TSA logo but I doubt we will be able to choose one in time, but maybe. I looked at some mock ups yesterday that have promise. On Friday night at Expo, there is a session of turtle presentations in which Kurt will again promote TSA and its role in the Asian turtle crisis. We should be able to reach literally thousands of people.

4) Some members of the steering committee have expressed concern about the lack of communication. I agree that we need to develop a list serve for the original 80 participants from the Fort Worth workshop plus the new members that have expressed an interest in partnering with TSA. I will get that list to Darrell Senneke this week.

5) The TSA steering committee intends to hold another working meeting one day prior to the International Turtle and Tortoise Symposium in Vienna, Austria, January 17-20, 2002. We will meet on January 16 in an open forum session. I want to use this date as the deadline to have TMG proposals written and ready for review. If you are a point person for one of the TMGs, please contact Rick Hudson to discuss.

6) We have made some progress on TMGs recently but still have a long way to go. Paul van der Schouw has taken on the responsibility of sorting out the U.S. *Chelodina mccordi* population and lining up Partners to participate in a management plan. We have been able to resolve some of the identification problems, and it turns out there are a lot more *mccordi* in zoos than we thought. The highly successful breeding groups of "*C. novaeguineae*" at Toledo and Columbus Zoos are in reality *C. mccordi*. Vic Morgan is starting to pull together information of both taxa of

Manouria emys, and I have just completed a Management Plan for *Callagur,* which can be used as a template for other plans. I hope to post this soon.

7. List Serve established.

Rick Hudson, co-chair
IUCN Turtle Survival Alliance (TSA)
Conservation Biologist
Fort Worth Zoo
1989 Colonial Pkwy.
Ft. Worth, TX 76110

phone: 817-759-7177
fax: 817-759-7501

Example Taxon Management Group (TMG) Proposal

DRAFT

Species: *Callagur borneoensis***,** Painted terrapin

Distribution: Southern Thailand, Malaysia (Peninsula Malaysia, Sarawak, perhaps Sabah) and Indonesia (Sumatra and Kalimantan)

Habitat: Tidal section of large rivers and estuaries; mangrove forests

Protected Status

- CITES II
- Quotas: Indonesia has an export quota of 180 live specimens for 2001; no quota for Malaysia.

Conservation Status

- IUCN Red List - Critically Endangered
- Summary of trade and threats: wholesale collecting for food markets, large scale harvesting of eggs, sand mining of nesting areas, destruction of mangrove forests

Status in Captivity

- 11.24.30 listed worldwide in ISIS; TSA Captive Holdings report list 141 total in private and zoo collections
- *Callagur* has successfully reproduced at least once in four U.S. zoos and two of these (Fort Worth and San Antonio) have had repeat success in recent years (1999 – 2001). Known to have hatched at one private facility (Al Weinberg, SFRE Inc.)

TMG Point Person: Rick Hudson, Conservation Biologist, Fort Worth Zoo, 1989 Colonial Parkway, Fort Worth, TX 76110; phone 817-759-7177; iguanhudso@aol.com

Identify the TSA partners in this TMG and describe their expertise and abilities.

- Rick Hudson, Fort Worth Zoo: large heated outdoor exhibit; 3 successful breedings (2.8.11)
- Alan Kardon, San Antonio Zoo: large outdoor exhibit with well water, 2 successful breedings (3.4.7)
- Lonnie McCaskill, Disney's Animal Kingdom: will construct large outdoor off-exhibit pools
- Al Weinberg, South Florida Reptile Exchange, Inc; has large group in outdoor pond (13.39.2); successful breeding in 2000
- Randy Smith, Birmingham Zoo (0.4 captive hatched adults specimens from Bronx Zoo); indoor facilities
- Dwight Lawson, Zoo Atlanta: large indoor solarium pools (0.1.3)
- Don Boyer, San Diego Zoo (0.0.2); will expand this group in near future
- Bob Johnson, Metro Toronto Zoo (2.5); indoor facilities
- Asian Turtle Consortium:

---Alligator Adventure/Adamm Smith; heated outdoor ponds (5.7)
---St. Augustine Alligator Farm/John Brueggen; warm outdoor pools (2.2)

- Flavio Morrissiey, Gatorland in Orlando: has warm outdoor pools and will take a group of young to raise soon
- Mike Forstner (San Marcos TX) and an Alabama facility have 0.0.12
- Harald Artner has 2.0

Provide signatures of all partners indicating that they agree to TSA Guidelines for participation in the TMG, and that they will comply with the recommendations of that particular TMG.

Describe suitability of facilities participating in this TMG

Most of the outdoor facilities described above have either heated water (Fort Worth Zoo, Alligator Adventure), natural well water with constant temperature year round (San Antonio, St Augustine), or are in southern localities that generally do not receive extended cold periods (SFRE, Inc).

Describe the ultimate goal of the captive population

- Reintroduction or maintaining a viable population (assurance colony) over time

  The goal is to maintain a large (300 specimens) captive population as an assurance colony that is capable of producing large numbers of offspring for reintroduction should this become necessary.

- Genetic and Demographic Goals

  The population will be managed to retain 90% gene diversity over 100 years.

- Number of founders and potential founders existing and number needed

  There are at least 85 wild- caught *potential* founders in the captive population that are available for management within the TSA. At least 11 of these have contributed to the F1 generation (represented as actual founders).

- Origin and location of founders and potential founder specimens

  The actual founders (proven breeders) are held at Fort Worth Zoo (5), San Antonio (4) and South Florida Reptile Exchange, Inc (2).

- Target Population Size, i.e. the number of specimens required to maintain a genetically viable and demographically stable captive population. This number will be based on the reproductive and life history characteristics of the particular species, and may require the input of a biologist with small population management experience.

Since no studbook database exists for this species, population analyses cannot be run. However, given the number of potential founders that exist, developing a genetically diverse and viable captive population will not be problematic providing we have sufficient space. We anticipate managing a captive group of approximately 300 specimens or less in order to leave space for other large riverine forms (*Batagur, Orlitia*) that will demand captive space. Attaining this goal will depend on recruiting additional year round outdoor facilities with adequate space, preferably in southern latitudes.

- Define length of program: long-term management (100 years) vs. short-term (emergency rescue/holding)

  This is a long term program with a 100 year goal.

Identify the sources for specimens included in this Management Plan

- Refer to the TSA Procurement Ethics and Importation Guidelines

Sufficient captive specimens already exist to manage a healthy population, hence no additional specimens from the wild will be needed or sought. Groups of confiscated turtles should, however, be integrated into the captive gene pool.

Are husbandry techniques known?

- If unknown, describe your techniques for husbandry and reproduction

  Breeding techniques generally known. Specimens require time to settle into captive situations and the use of multiple males appears to be an important factor, i.e. all successful breedings have occurred with multiple males.

- Has the species reproduced in captivity?

  Yes, at Fort Worth Zoo, San Antonio Zoo and South Florida Reptile Exchange, Inc.

- Does species have a good or poor history in captivity? Good.

Are there genetic issues that need to be resolved with this species?

- **Is this a wide-ranging species with many sub-populations where cryptic taxa may exist?**

  This is a fairly wide-ranging species with potentially genetically distinct sub-populations on the mainland (peninsula Malaysia) and large Indonesian islands (Borneo, Sumatra).

- **Do insular sub-populations exist that may differ genetically from mainland population?**

  Possibly, though current genetic techniques do not allow genetic resolution at the population level. Markers for other taxa may be useful for *Callagur* which is being investigated by Brad Shaffer's lab at UC Davis. Need to determine geographic source of all captive specimens.

Describe the TMG's plan for managing this species:

- Managed as **individual pairs** with each specimen **individually identified** (i.e *Cuora*) or as **groups** (i.e. outdoor pond with 20 *Callagur*)

  * *Callagur* are best managed in large groups consisting of at least two males with multiple females.

- Describe how surplus will be managed once target population size is reached

  We anticipate managing a captive population of approx. 300 specimens while striving to equalize representation from as many of the wild – caught specimens (potential founders) as possible. As unrepresented specimens contribute to the population, some turtles from over-represented founder lines may need to be surplused to create space. Space will be the primary limiting factor in designating surplus specimens. **TMG Partners will need to develop and agree on a plan to retain a designated number of progeny from each founder breeding in the managed population**.

- Describe plan for dispersal of offspring.

  If surplus stock cannot be placed with other TSA partners, then other non participating private parties will be utilized.

- Describe the methods you will use to individually identify the turtles in this captive population, i.e. shell notch, PIT tags, photo, etc).

  All specimens should be PIT tagged for permanent identification.

Have Range Country Partners been identified?

- Have linkages with NGOs and range country programs been investigated for collaborative and eventual repatriation/relocation efforts?

  A headstarting program that collects eggs from wild nests exists in Malaysia but linking with this program has not been explored. Zoos in Malaysia and Thailand will be encouraged to collaborate with this program.

Range Country Program Statement, 3 April 2001

The first Turtle Survival Alliance meeting succeeded in bringing together a diverse group of stakeholders for the first time to address how captive management might play a valuable role in conservation of Asian chelonians. We have initiated the process of developing a basic framework for action that may secure the future for some of Asia's most threatened species.

However, as voiced at the meeting, I believe that it is imperative that we recognize that these efforts should supplement more determined efforts to conserve Asian chelonians in the wild. Moreover, it must be ensured that as we move forward building captive "assurance" populations, we do not inadvertently compromise ex-situ conservation efforts, particularly as this relates to acquisition of turtles from markets for founder stock.

Subsequently, I would like to address two issues that need to be discussed during the upcoming steering committee meeting:

(1) **Mission statement**: The TSA mission statement needs to state explicitly that TSA recognizes that the best way to secure the future of chelonians is to protect wild populations and their native habitat, and that the establishment of "assurance populations" is a supplemental conservation measure aimed at securing the long-term future of some of Asia's most threatened turtle species.

(2) **Market Acquisitions**: In general, TSA members should not purchase turtles from markets or traders except in rare cases where the turtle species is considered unlikely to survive in nature, and the species' only hope is to assure the genetic preservation through captive breeding and husbandry.

Practical TSA guidelines for market acquisitions need to be established that clearly indicate under what circumstances a turtle species may be considered a "critical priority species" warranting purchase through markets and traders.

Furthermore, TSA members should be strongly encouraged to adhere to TSA guidelines on acquisitions or be required to forfeit membership within the association. It is imperative that the policies and actions of TSA and its members are not perceived to be in conflict with conservation and protection of turtles in the wild.

In addition to there being certain species for which the species conservation action plan may call for acquisition through any means possible (based on the critical status of wild populations), there needs to be a mechanism for acquiring founding stock that will provide TSA members with options other than markets and traders (see recommendations).

Background on Market Acquisition Issue

As a turtle enthusiast myself, it is all too easy to rationalize the procurement of market turtles. They are already in the system, and are undoubtedly all condemned to a violent and brutal death in the hands of their captors. Secured in friendly hands, they are "rescued" from sure demise, and may have the opportunity to live another 20 years, or even secure the genetic future of their race. Some "liberations" may be justified, particularly if the particular species is teetering on the brink of extinction, whereupon one might argue that every turtle counts. However, we must be certain that our "love for turtles" does not compromise broader efforts to secure the future of wild populations, nor indeed facilitate their decline.

Though I am not entirely opposed to market acquisitions, my experience working within a range state and seeing the daily grind, compels me to become concerned when we talk about buying turtles to establish founder assurance colonies.

I find myself thinking about the connection between the friendly businessman in China who supplies turtles on order, and the still-wild colonies of turtles living in the forests of Vietnam.

There is no doubt that Vietnam and other range states are under considerable pressure from swelling human populations exploiting wildlife and other natural resources. While some of the trade is for internal consumption, China is certainly a major destination market for wildlife exports, particularly hard-shelled chelonians. It is also true that natural forests, wetlands, and other natural habitats are being lost to human settlement, agriculture, aquiculture, and other forms of exploitation. Collectively, trade and habitat loss are the perils that threaten the future of the region's turtles (and other wildlife). But the battle is not over yet.

Native populations of turtles still exist in Vietnam. The future of Cambodia's turtles is even more promising based on the abundance of natural habitat (particularly wetlands), and the relatively low human population density. Peter Paul van Dijk discovered *Dogania* "frolicking" in a stream not far from his office in Kuala Lumpur, Malaysia. *Batagur baska* was rediscovered recently in river system in southern Cambodia. There are still turtles out there.

It is no secret that enforcement in many range states is extremely lacking, offering little protection for turtles in the wild. Wildlife protection officers tend to be poorly trained, and lack the knowledge and skills to carry out their jobs effectively. Additionally, economic conditions and low living standards in range states provide significant incentives for local people to collect and sell turtles into the trade. The profits of the wildlife trade reach well beyond the realm of hunters and traders, supporting an extended food chain that includes a phalanx of officials, rangers, border guards, and others along the way.

However, there is a transformation in process. Public awareness and interest in protecting the country's threatened wildlife is growing, increasing the pressure upon traders and those responsible for safeguarding the future of Vietnam's biodiversity. More importantly, stars are emerging from within the ranks of key agencies and institutions, demonstrating commitment and assuming active roles in protecting wildlife. Enforcement is slowly improving. Rangers are putting their lives on the line to protect wildlife and wildlife habitat. In fact, there has been a

serious increase in the number of incidents involving attacks on wildlife protection officers as they seek to enforce forest and wildlife protection laws.

Enter the trader. Buying turtles from local collectors and hunters, and shipping them to transit points where they are loaded onto trucks, trains, boats, and planes and sent north to Hanoi and China. The Vietnamese traders sell to Chinese traders, often at the border, who then sell the turtles in the markets of Guangzhou and elsewhere.

Enter the international turtle enthusiast. While there is no doubt that the purchase of less fortunate turtles found in markets constitutes a "rescue" of sorts, I would submit that such "liberations" involving exchanges in money not only bolster the further exploitation of turtles from the wild, but in fact, finance the very people who are stabbing, beating, blowing up, cutting, and killing a small contingent of wildlife protection officers and police that are making an effort to protect turtles in the wild and control the wildlife trade. Ultimately, the dollar paid to the Chinese broker reaches the Vietnamese trader, and based upon price differences between turtles sold to foreigners and those sold to Chinese buyers in the market, one might go so far as to say that foreign buyers put the "L" in "lucrative profits".

This connection is intuitive, and one might argue that foreign buyers have little effect on harvests that will occur anyway and ultimately be purchased by local buyers if not sold to others. However, the real question is how we integrate our conservation aims of establishing assurance populations with our obligation not to support the very people who are systematically exterminating turtles from the wild?

I believe this issue needs to be discussed fully and openly by TSA at the onset of our efforts. I also think that there are ways that we can address these concerns without compromising the integrity of our efforts, nor the future of wild populations.

My recommendations follow:
There should be a general ban on TSA market acquisition in that TSA members should not be bankrolling the hunters, collectors, and traders responsible for the Asian turtle crisis (TSA determined critical acquisition species excluded).

Efforts should be made to develop cooperation with range state enforcement units (e.g. Fisheries Department and Wildlife protection Office in Cambodia, National Forest Protection Department in Vietnam, Chinese CITES Authority, etc.) under which range state rescue centers are established for confiscated animals. The international community (through TSA) will provide the local government with support to help train protection authorities, increase awareness, carry out trade monitoring and enforcement activities, and other inputs that will support the ability of the range state government to stop the trade and protect turtles in the wild. In exchange, the range state authorities will help assist TSA in its efforts to establish international assurance populations for Asian species.

By obtaining turtles from confiscations only, there are no financial benefits extended to the traders (seizures constitute financial losses to traders!). Range state government agencies are encouraged to increase their efforts through active support for their enforcement efforts.

Furthermore, range state authorities are likely to support TSA aims if it is clear that there is an investment in helping authorities protect their wildlife, and includes efforts to maintain a representative "assurance population" initiative within the range state. Export of confiscated animals will also help resolve difficulties presently experienced in some range states with large numbers of animals confiscated outside their native range, and for which there is little hope of repatriation.

Conclusion

Without question, the easiest way to acquire our founder stock is through the market. This involves a simple transaction of funds and a little export paperwork. I would argue that although this approach serves our purposes well, it does not necessarily serve the interests of turtles, nor the interests of range state governments and people, many of which would welcome our help protecting the future of their wildlife.

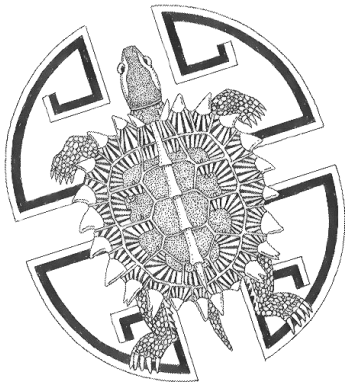
This issue is not about scooping up funds for range state conservation, but rather about choosing a more difficult and less certain path because it is the right thing for turtles.

I would welcome any feedback on this argument. I hope that the TSA steering committee can find a way to address this sensitive issue productively, and achieve our collective goals of establishing assurance populations.

Kind regards,

Douglas Hendrie
Turtle Conservation and Ecology Project- Indochina
Hanoi, Vietnam

IUCN Asian Turtle Workshop: Developing Conservation Strategies Through Captive Management



FINAL REPORT

Fort Worth, Texas, United States
26-28 January 2001

Section 4:
Organizational Reports

Organizational Problems and Needs

The following concerns were voiced on the morning of Day 3 and helped set the tone for the remainder of the workshop

- Recognized level playing field among all constituencies that wish to work together.
- Formal or ad hoc representation of all sectors (government, AZA, NGOs, private, etc.) with everyone having equal votes.
- 'Flow chart' minimizes private sector contributions. (treat flow chart as working document).
- Need to decide how to organize the group – perhaps create the Chelonian Captive Management Alliance with a well-respected Steering Committee, with representation from each of the constituencies, including US and international, public/private, commercial breeders including those producing for the Asian food market, academic community, NGOs, AZA, EAZA, regulatory (CITES, Asian government agencies) etc. Need to work out a strategy to facilitate cooperation among all these groups.
- How to bring private community into zoo community efforts.
- Formulation of species or appropriate taxonomic working groups – including a cross section of the public and private sectors – including a studbook keeper and species manager (which could come from either sector).
- Nominate species of focus then define which individuals want to be part of management groups for particular species/taxa identified.
- Need a higher public profile and internal and external communication to let people know what others are doing.
- In-country side of issue needs to be tackled – for example, we haven't discussed repatriation. If there are individual species management plan, need to consider developing individual species repatriation plans if this is not in place already.
- Need for linkage of captive programs with field programs.
- Both public and private sector work under certain constraints. Develop a mechanism for programs to work given those constraints.
- Membership organization or society that people not at this conference could become involved with.
- Offer of training across sectors for skills and competencies.
- Central organization serving as 'steward' for confiscated animals and designate them for breeding facilities that do not assume ownership. Ownership retained by the organization.
- Looking at captive breeding outside of range areas – is there a place for commercial distribution of surplus animals outside of the conservation organization or group?
- Good relationships at local levels between private individuals and zoos – can these successful partnerships be used as a model to frame future partnerships?
- Developing a code of shared ethics.
- We can generate priority lists based on CITES, genetics, availability in trade, legal hurdles, etc. Is this conference going to end with a list of species we can protect in some sort of priority order?
- Many people have the 'What's in it for me? perspective – don't see benefit of interaction. Useful to elucidate this.

- What can be taken back to the USFWS to help improve trust and improve working relationships?
- Prioritize a small group of species (e.g., CR species first) and write up 'fast track' species management plans with identification of which groups with expertise that should have input into those plans. Also provides a tangible result that can be taken back to USFWS.
- Need a mechanism to avoid exclusion of people involved in commerce from these programs.
- Need to identify mechanism to transfer funds, in some cases, to private people that participate in these programs.
- Nomenclature (species survival vs. species management plans).
- Generate a list of individuals interested in contributing materials from their collections for genetic analyses.
- Need agreed communication routes for this workshop group.

Organization Working Group Report

Participants: Kurt Buhlmann (NGOs), Al Weinberg (commercial breeders), Hugh Quinn (AZA), Richard Gibson (EAZA/European community), Anders Rhodin (IUCN/SSC), Leslie Levine (legal), Reingold (regulatory), James Barzyk (private breeder), Doug Hendrie (range countries), Harald Artner (European private breeders), Barbara Bonner (veterinarians), John Iverson (academics), Wan Ming (China), Lonnie McCaskill (public/private), Susie Ellis (CBSG, facilitator), Tarren Wagener (recorder)

Organization Working Group Goal

Develop an over-riding organization/Steering Committee/alliance that communicates, facilitates (etc.) all the issues and actions discussed at this meeting.

Individual Stakeholder Factions Needs and Constraints

Legal: Need to know what others need in terms of: a structure that will provide ability to take advantage of incentives, confidentiality, compliance with laws, appropriate guardianship for animals (keeping animals safe), shielding people from liability-- functions in the interest of other stakeholders. Constraints: confidentiality and compliance with law.

Public/private: Needs to become a partner and resource because we have resources at Disney for contributions. Constraints: Linkage with for profit organization limits access to grant monies, and ability to compete for grants. Limits pool of resources that can be used.

International Specialist Group: Need to represent how captive breeding fits in broader picture with habitat preservation and conservation *in situ.* Constraints: Conservation Breeding Specialist Group cannot own animals, appointed on a 4-year basis for chair (group has long term consistency and longevity).

European Zoo Community: Needs clear goals, targets to drive European zoo community to motivate European zoos to allocate resources. Also needs good information for involvement internationally and in the private/public sector. Needs also to link to range country programs. Needs help facilitating paperwork for international transactions. Constraints: resources (space, time, money).

Range states: Need support for regional conservation programs (especially pertinent to captive care/mgmt. in range states--desires to link/holistic program). There needs to be regional ownership for program development and capacity building. Constraints: Political, economic capacity level issues that make working *in situ* difficult.

AZA: Needs to participate in conservation programs that are well defined, legitimate and organized because it is part of our mission. Constraints: Working within our regulatory framework (which is extremely varied between institutions) regarding disposition of animals and quality of care.

NGO: needs viable populations of the spp. that can someday form basis for reintroduction into areas identified as critical to protect. Once players identified, species prioritized, and facilities are identified and field research needs are identified, we can facilitate funding to this group for maintenance of captive collections. Constraints: needs organization with clearly specified goals to make funding available.

Academics: need to strengthen interaction between scientific community and everyone else here so that available information can be best utilized to answer questions. Constraints: time and money (mostly volunteer time and $).

European private sector: Needs to be taken seriously. Constraints: how to maximize resources (animals) for maximum contribution.

Commercial breeders: need to see that there are commercial facil/breeders that are interested in conservation and willing to contribute. Need understanding that funds raised can benefit conservation. Constraints: lack of availability of people who want to breed them. Economic constraints overcome only by selling progeny they produce.

USFWS: Needs to know that activities that the agency permits are not detrimental to the species and that they help the species and that they are legal. Needs to see that this is an organized network, that is legitimate and that will have positive effects on conservation in order for the agency to get behind effort. Constraints: resources, legal constraints, political milieu.

China: Need to relate achievements of this workshop to consumer countries and range areas to take advantage of conservation of Chelonians. Government needs to pay attention to this issue, to adopt/enforce laws to address issues. Encourage support related to organizations, zoos, breeding centers and farms in range states to be involved in breeding Chelonians. Needs information to conduct public education and awareness through media etc. Needs to persuade countries to stop using wild-caught Chelonians (import and export--both sides are needed). Constraints: money, enforcement of existing laws.

Vet. Community: Needs support system to connect vet community to the animals and each other to increase survivability, vigor and reproductive capacity of involved species. Constraints: space, money and time.

Private: Needs are founder animals, capital and expense, an outlet for progeny with respect to the goals of this conference and in consideration of investment recovery—share goals of repatriation and genetic diversity. Potential needs to be taken seriously, with mutual respect and reciprocity. Constraints: regulatory (municipal level) and CITES (pre-act holdings, etc.), lack of space and time relative to skills and potential.

Organization Committee

Potential Name: Chelonian Captive Survival Alliance (CCSA)

- Broad-based alliance
  -Interdisciplinary, inter-sector
- Core coordinating body (Steering Committee or Executive Committee)
- Perhaps component of existing Specialist Group (SSC/IUCN)
- Committee to include at least these constituencies: international specialist group, private breeders, private commercial, zoos, NGOs, academics, Range countries (e.g. China, Vietnam), vets

Potential advisory groups to TSA Executive Committee/Steering Committee:
-Government Agencies
-legal
-Animal welfare agencies (Humane Society)?
-Open to input from other organizations

Mission of TSA:

Develop and maintain an inclusive, broad-based global network of collections of living tortoises and freshwater turtles with the primary goal of maintaining Chelonian species over the long term to provide maximum future options for the recovery of wild populations.

Structure and Roles of the TSA:

Focus on taxonomic groups to pull together plans

- Coordinate groups
- Prioritize groups
- Facilitate efforts to fund raise
- Information sharing and communication
- Development of standards for participation in groups
  (e.g. marking animals, sharing info, etc.)
- Develop guidelines for taxon-based groups for action plans

Suggestions for Taxon-based Group Structure

Groups with expertise in each species develop criteria for participation facilities]

1. Best to include all interested parties (there are many groups worldwide)
2. Collate all information needed to make decisions (perhaps based on CAMP-type process or other species-directed process)
3. Groups will decide identity of point person for the group

Comments:

- Differentiate btw. *in situ* and *ex situ* (incl. in range countries) efforts.
- Begin assigning SC members at this meeting. Define time scale and resources needed.

Slate of Nominees:
Private Sector: James Barzyk, Harald Artner
Commercial: Al Weinberg
International Specialist Group: Anders Rhodin, Rick Hudson
Zoos: Matt Vincent (ARAZPA), Richard Gibson (EAZA), Hugh Quinn (AZA)

NGOs: Kurt Buhlmann (CI), John Behler (WCS)
Regional Breeding Centers: David Lee, Doug Hendrie
Academics: John Iverson
Veterinary: Barb Bonner
Field/Range Country: Peter Paul van Dijk, Wan Zi Ming (China)

Kurt Buhlman or Rick Hudson to serve as Chair/Coordinator of TSA or both serve as Co-Chairs

Advisory Members: Leslie Levine (legal), Bruce Weissgold (USFWS), others as needed

Tasks of the Steering Committee:

1. Organize meeting in one year to discuss progress from this meeting. (identify sponsors, local organizer, etc.)
-Steering Committee to meet 1-1.5 days before this meeting

2. Put word out about TSA.
-Sector representative on Steering Committee will identify potential participants
-centralized web site "hub" (Ross Keister?—cost approx. $60, 000 U.S.; timeframe=1 year)
-listserv for steering committee member communication – perhaps link appropriate info. to web site
-Ross Keister will develop this listserv for the Steering Committee

3. Steering Committee will instruct taxon-based working groups to develop and implement a plan as soon as possible to be based on group 2's recommendations—contact person in group 2 is Dave Collins
-fast track several that have a high probability of success

4. Develop a shared code of ethics

General Considerations for Taxon-based Working Groups (to supplement Group 2's recommendations) [Time requirements for proposals from TWGs by 1 June 2001 to Rick Hudson/Kurt Buhlmann]

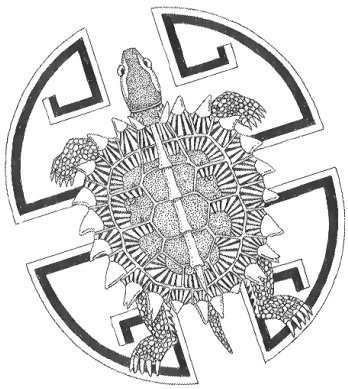
1. Follow acquisition guidelines
2. Determine level of management as well as numbers/types of facilities (e.g. several pairs of individuals in private hands, semi-captive population at certain zoo facility?) [See Group 5 report]
3. Determine location of managed population (based on climate or other species' needs, see Group 5 report)
4. Establish standardardized husbandry protocols, including levels of individual animal management (see Problem 3 Goal, Group 2 and Group 4 report)
5. As much as possible, consider repatriation links and conservation of species in the wild including identifying in-country facilities in which to build capacity with collaboration with conservation organizations.
6. Conduct/promote/consider information from field natural history studies for adaptive management of captive populations

7. Determine current resources and identify potential funding sources
8. Identify potential costs of program and relate to Steering Committee
9. Identify communication needs and best means to meet them
10. Establish a protocol for dealing with placement/utilization of progeny and recuperation of economic investment
11. Identify studbook keeper and species manager
12. Identify and follow veterinary protocols and triage needs (see Group 4)
13. If there are regulatory needs, coordinate with appropriate agencies
14. Develop a shared code of ethics
15. Generate a list of people interested in contributing biomaterials for various analyses (genetics, reproduction, etc.)
16. Collaborate with researchers to use captive populations to learn about basic biology of the species.

Modes of Communication for Steering Committee

1. Web site
2. Steering Committee list serve
   -Ross Keister to set up and moderate
   -timeline 28 Feb. 2001
3. Issue of openness/protection of part of site for Administration

IUCN Asian Turtle Workshop: Developing Conservation Strategies Through Captive Management



FINAL REPORT

Fort Worth, Texas, United States
26-28 January 2001

Section 5:
Working Group Reports

Population Management Plan Design Working Group

Participants: Dave Collins, Brett Stearns, William Espenshade, John Iverson, Hugh Quinn, Elmar Meier, Henk Zwartepoorte, and Dennis Herman

Problem 1: The purpose of *ex situ* management of Asian turtles is not defined.

Goal 1: Determine the purpose of each taxon/population specific management program (i.e. repatriation, reintroduction, or captive population holding).

Action 1: Establish a taxon working group made up of a broad base of representatives and establish responsibilities for members.

Timeline: Today, identify potential members for taxon management groups for all Asian species but prioritizing formation of groups for the 8 most critical species.
March 1, establish working groups for the remaining 10 critical species (from Cambodia Workshop). Note: Formation of these groups will follow resolution of organizational details by CCSA steering Committee (meeting 2-3 April)
January 2002, working groups established for all remaining taxa.

Action 2: Determine the current status of each taxon (e.g. numbers, locations/origins, genetic diversity, wild status, legal, husbandry, etc.)

Action 3: Determine the resources needed for proper captive management of each taxon (e.g. minimum number needed, number of founders needed, number of locations/populations needed, where the program is best managed, funding, number of personnel, size of facilities etc.).

Problem 2: How is the taxon-specific management program implemented?

Goal 1: Develop a taxon-specific management plan.

Action 1: Determine the level of individual animal management (e.g. individual's ID, blood vouchers, genealogies, etc.).

Action 2: Determine the level of program management (e.g. studbook, PMP, SSP, herd vs. pairs,).

Action 3: Determine the scope of programs (national or international).

Action 4: Determine plan for surplusing overstock of turtles.

Action 5: Determine plan for dealing with confiscations.

Action 6: Develop a mechanism for regular assessment (e.g. updates on wild status, status of captive population, political environment, etc.).

Action 7: Develop a mechanism to ensure the continuity of captive turtle collections and the taxon-specific management programs.

Action 8: Identify the costs of the program.

Action 9: Identify funding sources.

Action 10: Develop the means for fund management.
Action 11: Develop a mechanism for the transfer of information. (e.g. between members of the working group, between group and steering committee)
Action 12: Develop a mechanism for coordinating the management of populations across private and public sectors.

Goal 2: Implement the taxon-specific management plan.

Action 1: Develop timeline for plan
Action 2: Assign areas of responsibility to each working member.
Action 3: Acquire the resources needed to implement the plan.
Action 4: Implement the management plan.

Systematics Working Group

Participants: H. Bradley Shaffer, Mike Forstener, H. D. Philippen, Patrick J. Baker and Phillip Q. Spinks

Problem 1: Identification of species and higher (genus) taxonomic levels. (Inadequate recognition characters at all levels)

Goal 1: Maximum: photographic checklist/atlas in conjunction with morphological and genetic characters used in taxonomic recognition. Ideally we would like to see such an atlas for all species, subspecies, and higher genera.
Minimum: Red List atlas of taxa –
Timeline min is 1 year (minimum)

Action 1: Photographic atlas
Time line: IUCN Red List taxa- begin immediately
Time required: IUCN Red List taxa-1 year, all Asian species- 2-5 years.
Resources needed: Funds possibly needed for publishing the document, copyright acquisition, cameras and other misc. expenses.
Measurable outcome: Atlas of Asian turtles, both hard copy and website access. Description of each species should include carapace, plastron and head photos of males, females and juveniles with emphasis on diagnostic characters.
Responsible: Patrick Baker (USA) and H.D. Philippen (Europe)
(Note: the Tortoise Reserve has been assembling photos of the world's turtles for conservation and educational use.)

Goal 2: Complete phylogenetic analyses for geoemydid, trionychid and testudinid taxa
Maximum: Assemble mitochondrial DNA, nuclear DNA and morphological characters and trees for all species.
Minimum: Complete mitochondrial DNA for all species
Timeline: For minimum, 1 year
For maximum—probably several years.

Action 1: Assemble tissues for all species
Time line:
Time required: Conditional on studbook development and network (see below) development
Resources needed: Funds for travel expenses, shipping, chemicals and curation.
Measurable outcome: Tissue collection with vouchered specimens located in 1 or 2 accessible depositories. Arrange network with veterinarians and private breeders for disposition of tissue samples to responsible parties

Responsible: Brad Shaffer, Phil Spinks, H.D. Philippen, Patrick Baker, Tag Engstrom

Action 2: Assemble morphological data
Time line:
Time required:
Resources needed: NA
Measurable outcome: Preserved and skeletal specimens of Asian species with as much geographic representation as possible deposited in aknowledged accessible collections.
Responsible: No single individual, however, Peter Pritchard would be a good first contact person. Also, include veterinary community.

Action 3: Develop molecular markers for nuclear genes and population-level analyses.
Time line: 1 year
Time required:
Resources needed: Modest funds for primer development and for sequencing costs
Measurable outcome: Develop primers for 2 nuclear genes
Responsible: Brad Shaffer's lab, Mike Forstener's lab, Fred Janzen's lab

Action 4: Completing phylogenetic analyses
Time line:
Time required: Dependent on acquisition of tissue (see above)
Resources needed: Funds needed for molecular work
Measurable outcome: Phylogenies published in journals
Responsible: The labs previously mentioned are responsible for molecular work while John Iverson, Peter Meylan and Peter Pritchard may be appropriate responsible parties for morphological work

Problem 2: Vouchering; Some form of identification is necessary to link tissue samples to individual turtles. Currently there is a well-established vouchering procedure for museum specimens, but none for living specimens. Since much of the molecular work will be based on living specimens, and some of the confusion over species may stem from identification issues, this is essential.

Goal 1: Develop strategy that will enable data used in scientific study to be unequivocally linked to individual specimens

Action 1: Develop an identification protocol for linking samples to individuals using either scute notches, photographs, implantable chips or other long-term marking techniques
Time line:
Time required: 1 year
Resources needed: probably none
Measurable outcome: Short protocol
Responsible: H.D. Philippen

Action 2: Photographs of key specimens used in research should be available for public viewing or research
Time line:
Time required: Refer to information working group
Resources needed: See information working group
Measurable outcome: Website
Responsible: Ross Kiester (?) responsible developing and maintaining website

Problem 3: Inadequate sampling of most species. Much of our current systematics is based on one or a very few specimens, often of unknown localty of origin. We need to understand variation within species in order to correctly deliniate species boundaries.

Max Goal: Species sampling which has representative rangewide geographic sampling with known locality data suitable for both molecular and morphological work. Samples should be eventually deposited in museum collections (see vouchering above).
Minimum Goal: Assess current state of materials in hand for which we have appropriate data.

Action 1: Organize collection of new material from existing collections identified at the Ft. Worth meetings (for deposition of material, see vouchering above 1)
Time line:
Time required: Immediately; continuing for 2-3 years
Resources needed: Modest funds
Measurable outcome: The compilation, organization and deposition of material
Responsible: At ATC workshop-John Iverson. Shaffer lab ultimately responsible

Problem 4: Getting the maximum information from specimens. Specimens exist, and are often bled for other purposes, without that blood getting to museums, systematists, etc. Also, when samples are taken, they are not vouchered. When animals die, there is no route to get them into museums.

Maximum Goal: All physical and genetic data possible are obtained from individuals collected or maintained as vouchers.
Minimum Goal: Red list taxa and/or their captive founders have genetic and physical data deposited. (see vouchering).

Action 1: Make sure to interface with other working groups for acquisition of specimens. This includes the veterinarian working group, the studbook working group, and information acquisition.

Problem 5: Hybridization. As a community, we may be directing conservation efforts toward named entities which represent hybrid (artificial) species. Hybrids may be either very recent, and created by humans, or natural and relatively ancient. Our presumption is that identifying hybrid "species" created by humans is important in setting them as low priority.

Maximum Goal: Identify and assess putative hybrid origin taxa
Minimum Goal: Make conservation entities and programs aware of this problem

Action 1: Acquire tissue/blood samples from a minimum of 10 individuals, from diverse sources if possible, of each putative hybrid species, as well as a minimum of 10 individuals from each putative parental species. Ideally the parental material would cover the geographic distribution of the parental species. Note: John Iverson's handout of potential hybrid species already exists.
Time line: 1-2 years, after material is acquired.
Time required: 6-12 months of full time work
Resources needed: Funding to conduct molecular analysis. This would probably be on the order of $50,000.00 US.
Measurable outcome: Determination of hybrid status of each putative species.
Responsible: Shaffer/Iverson labs for conducting work. Our collective group for acquiring the material

Action 2: Acquire tissue/blood samples from hybrids that have been knowingly produced in captivity to use as benchmark hybrid individuals. This is a potentially important set of data that will help interpret hybrids of unknown origin.

Problem 6: Prioritization. Choosing which named entities and at what emphasis each will be conserved.

Maximum Goal: Accurately assign conservation values to each named entity using phylogenetic inference for eventual compilation alongside other criteria, which should take into account putative hybrids.
Minimum Goal: Provide immediate weight assignment based on trees from currently held or available mtDNA datasets.

Action 1: Complete the phylogenetic prioritization for all Asian species
Time line:
Time required: This meeting for geoemydids and trionychids. Tortoises = 1 year
Resources needed: NA
Measurable outcome: List of prioritized species
Responsible: Shaffer lab. Note, this was completed at the meeting

Problem 7: Ethics of taxonomy. There is an uncommonly large amount of systematic chaos involving Asian turtles, and some of this may be due to use of inappropriate materials or rushing to publication.

Maximum Goal: Quality presentation and ethical systematic efforts focused on the science, not individual career goals and ambitions.
Minimum Goal: Create informed sensitivity that systematic papers include relevant vouchers both physically and genetically by informal agreement.

Action 1: Publish letter of understanding regarding vouchering, tissue collection and methodology pertinent to the study of Asian turtles. In particular, this document should emphasize the importance of careful and correct taxonomy, rather than rushing to publication.
Time line:
Time required:
Resources needed: NA
Measurable outcome: Letter of unnderstanding published in CCB
Responsible: Systematics working group. Anders Rhodin will be contacted for possible publication in CCB.

Explanation of priority weighting

We used our current trees, based on molecular (geoemydids) or molecular/morphological combined (trionychids) to calculate "phylogenetic prioritizations". The strategy that we used is a very simple modification of Vane-Wright's original scheme (Vane-Wright, R. I., C. J. Humphries, and P. H. Williams. 1991. What to protect- systematics and the agony of choice. Biological Conservation 55:235-254) as proposed by May (May, R. 1990. Taxonomy as destiny. Nature 347:129-130).

To read the scores, look at the Percent Contribution column. This takes the total amount of phylogenetic "information", and assigns it to each taxon **in that dataset**, out of a total of 1.00 These numbers are only meaningful as comparisons to each other within a dataset, not between datasets. For example, in the softshell dataset, *Carettochelys* has a score of 0.20, but *T. truinguis* has a score of 0.05 This implies that *Carettochelys* has a "value", by this prioritization scheme of about four times that of triunguis. All such comparisons are valid among the softshells, but they are **not** valid between softshells and geoemydids.

It is important to emphasize that this is only one way of prioritization, and it is one based on phylogenetic uniqueness and on our current state of understanding of phylogeny. As the trees become better resolved, these scores will change to some extent. Obviously, these scores do not capture all of the relevant information that we need to think about for prioritizing our conservation efforts. For example, this analysis would place an equal weight, more or less, on *Rafetus swinhoei* and *Apalone spinifera*, which completely ignores the extreme rarity of *swinhoei*. However, it also emphasizes that the large softshells vary to some extent on their phylogenetic importance, and this might be useful in trying to decide which of these large, expensive taxa would be best targeted for breeding programs.

This was produced by Brad Shaffer, Tag Engstrom and Phil Spinks

taxon	node count	info quotient	Stan. Weight	Percent Cont.
Carettochelys	2	149	10.5	0.20425457
Trionyx triunguis	8	37.25	2.625	0.05106364
Cyclanorbis senegalensis	8	37.25	2.625	0.05106364
Lissemys scutata	8	37.25	2.625	0.05106364
L. punctata	8	37.25	2.625	0.05106364
Cycloderma frenatum	10	29.8	2.1	0.04085091
C. aubryi	10	29.8	2.1	0.04085091
A. ferox	11	27.0909091	1.90909091	0.03713719
A. mutica	11	27.0909091	1.90909091	0.03713719
A. spinifera	11	27.0909091	1.90909091	0.03713719
Pelodiscus sinensis	12	24.8333333	1.75	0.03404243
Rafetus swinhoei	12	24.8333333	1.75	0.03404243
R. euphraticus	12	24.8333333	1.75	0.03404243
Pelochelys bibroni	12	24.8333333	1.75	0.03404243
P. cantorii	12	24.8333333	1.75	0.03404243
Chitra indica	12	24.8333333	1.75	0.03404243
Palea steindachneri	14	21.2857143	1.5	0.02917922
C. chitra	14	21.2857143	1.5	0.02917922
C. myanmar	14	21.2857143	1.5	0.02917922
Dogania subplana	16	18.625	1.3125	0.02553182
Amyda cartilaginea	18	16.5555556	1.16666667	0.02269495
Nilssonia formosa	21	14.1904762	1	0.01945282
Aspideretes hurum	21	14.1904762	1	0.01945282
A. gangeticus	21	14.1904762	1	0.01945282
total	298	729.481854	51.4064394	1

taxon	node count	info quotient	Stan. Weight	Percent Cont.
Batagur baska	14	55.8571429	1.50000384	0.02138585
Callagur borneoensis	16	48.875	1.31250336	0.01871262
Chinemys reevsii	17	46	1.23529728	0.01761188
Cuora amboinensis	15	52.1333333	1.40000358	0.01996013
Cuora amboinensis lineata	15	52.1333333	1.40000358	0.01996013
Cuora aurocapitata	21	37.2380952	1.00000256	0.01425724
Cuora flavimarginata evelynae	19	41.1578947	1.10526598	0.015758
Cuora flavomarginata sinensis	19	41.1578947	1.10526598	0.015758
Cuora galibinifrons	18	43.4444444	1.16666965	0.01663344
Cuora mccordi	17	46	1.23529728	0.01761188
Cuora pani	21	37.2380952	1.00000256	0.01425724
Cuora trifasciata	17	46	1.23529728	0.01761188
Cuora zhoui	19	41.1578947	1.10526598	0.015758
Cyclemys atripons	16	48.875	1.31250336	0.01871262
Cyclemys dentata	16	48.875	1.31250336	0.01871262
Cyclemys java	19	41.1578947	1.10526598	0.015758
Cyclemys ovata	19	41.1578947	1.10526598	0.015758
Cyclemys tcheponensis	16	48.875	1.31250336	0.01871262
Cyclemys yunnan	19	41.1578947	1.10526598	0.015758
Geoclemys hamiltoni	9	86.8888889	2.3333393	0.03326688
Geoemyda depressa	14	55.8571429	1.50000384	0.02138585
Geoemyda japonica	11	71.0909091	1.90909579	0.02721836
Geoemyda spengleri	11	71.0909091	1.90909579	0.02721836
Hardella thurjii	14	55.8571429	1.50000384	0.02138585
Heosemys grandis	14	55.8571429	1.50000384	0.02138585
Heosemys spinosa	12	65.1666667	1.75000448	0.02495016
Hieremys annandalii	12	65.1666667	1.75000448	0.02495016
achuga dhongoka	16	48.875	1.31250336	0.01871262
huga flaviventer	20	39.1	1.05000269	0.0149701
uga smithi smithi	18	43.4444444	1.16666965	0.01663344
achuga tecta	16	48.875	1.31250336	0.01871262
Kachuga tentoria circumdata	20	39.1	1.05000269	0.0149701
Leucocephalon	14	55.8571429	1.50000384	0.02138585
Malaemys subtriuja	12	65.1666667	1.75000448	0.02495016
M. annamensis	16	48.875	1.31250336	0.01871262
M. caspica	16	48.875	1.31250336	0.01871262
Mauremys japonica	17	46	1.23529728	0.01761188
M. leprosa	15	52.1333333	1.40000358	0.01996013
M. m. kami	18	43.4444444	1.16666965	0.01663344
M. mutica	18	43.4444444	1.16666965	0.01663344
M. rivulata	16	48.875	1.31250336	0.01871262
Melanochelys trijuga	9	86.8888889	2.3333393	0.03326688
Morenia ocellata	14	55.8571429	1.50000384	0.02138585
Notochelys	14	55.8571429	1.50000384	0.02138585
Ocadia sinesis	17	46	1.23529728	0.01761188
Orlitia borniensis	12	65.1666667	1.75000448	0.02495016
Pyxidea mouhoti	17	46	1.23529728	0.01761188
Sacalia beali	14	55.8571429	1.50000384	0.02138585
Sacalia quadraocellata	14	55.8571429	1.50000384	0.02138585
Siebenrockiella crassicolis	9	86.8888889	2.3333393	0.03326688
	782		70.1408715	1.00001243

Veterinary and Husbandry Issues Working Group

Participants: Bonnie Raphael, Anthony Wisnieski, Kirsten Krantz, Jim Krantz, Barbara Bonner, Chris Tabaka, Don Boyer, Charles Innis, Joe Flanagan, Sheryal Bielby

GOAL SETTING

Actual Vet Care

1. **Triage:**
   Definition: optimize resources and survival of individuals
   Determine species ID and significance based on holdings and genetic importance
   ID animals for which efforts may be most successful.
   Develop different levels of triage which can be applied in different settings

   Action:
   Establish triage guidelines for:
   - Range Country
   - Confiscation point
   - Vets
   - Private keepers/dealers

   July 2001
   Bonnie Raphael/Paul Calle

2. **Actual vet care:**
   ID Capable and competent veterinarians (w/o regard to facilities)

   Action:
   Survey and collate appropriate veterinary community into a list of individuals who can provide assistance
   July 2001
   Charles Tabaka, Charles Innis, Nancy Lung

   Action:
   Develop minimal and recommended diagnostic, medical husbandry, and therapeutic protocols for species.
   July 2001
   Barbara Bonner, Nancy Lung

   Action:
   Identify commonly seen medical problems by taxon group, general guidelines, specific exceptions.
   Sept 2001
   Chris Tabaka, Barbara Bonner, Charles Innis

Action:
Develop Euthanasia guidelines (Decision Tree, method)
July 2001
Chris Tabaka

Necropsy/histopathology/ anatomy information recovery

Action:
Write protocol for gross necropsy and tissue preservation
Sept 2001
Charles Innis/ Joe Flanagan (Jacobson)

3. **Facilities:**
   ID facility capability (Public and private facilities capable of supplying care)
   (Short Term, long term, acute)

   Action:
   Survey and collate appropriate community into a list of individuals and organizations who can provide care.
   July 2001
   Charles Tabaka, Charles Innis, Nancy Lung

4. **Funding:**
   Identify needs (cost of housing, husbandry, transportation, lab testing, equipment, drugs, utilities, travel costs, professional services)

   Action:
   Create a list and expected cost range of specific, cost-incurring activities associated with care, assessment, and treatment of chelonians.
   July 2001
   Barbara Bonner

   Action:
   Clarify federal reimbursement procedures for costs incurred in animal care
   July 2001
   Anthony Wisnieski

Disease Factors

1. **Quarantine:**
   - Develop recommended quarantine protocol for various steps of process (confiscation site, transport, hospital), short term, long term.

     Action:
     Within 1 year develop written protocols for quarantining animals
     Confiscation site
     In country
     In transit
     In Hospital
     At holding/breeding site
     Jan 2002
     Joe Flanagan, Bonnie Raphael

2. **Disease introduction (Introduction to non-native habitats) (now includes wastewater and exotic diseases)**
   - Identify potential disease risk (to herps, fish, mammals, humans)
   - Develop protocols to minimize environmental impact and potential transmission of zoonotic, exotic, and "non-range" disease risks.

     Action:
     Adopt and make species specific modifications to recommendations of Disease Risk Assessment Group document.
     Jan 2002
     Joe Flanagan, Bonnie Raphael

     Action:
     Provide consultation to crisis managers during interim time period.
     Immediate
     Bonnie Raphael, Joe Flanagan

3. **Screening (prerelease)**
   - Develop and disseminate recommended physical/lab parameters to be met.

     Action:
     Adopt and make species specific modifications to recommendations of Disease Risk Assessment Group document.
     Jan 2002
     Joe Flanagan, Bonnie Raphael

Husbandry

Develop husbandry guidelines for various taxa (in the format of AZA taxon management accounts (TMAs))

- Establishment
- Maintenance
- Breeding
- Nutrition

Action:
Offer expertise to the CCSA in the development of TMA's on recommended species
Bielby, Wisnieski, Kranz, Boyer, Bielby

Records

- Develop minimum recommended specimen identification methods and data to be recorded
  For example: date received, source, unique identifier
  - Temperatures
  - Feeding
  - Breeding behavior
  - Animal source

Action:
Develop recommended minimum database for species management
Don Boyer
July 2001

Dissemination of Information and Biological Samples (DIBS)

1. Identify sources for dissemination
   - Web sites
   - Journals
   - Newsletters
   - Meetings
   - List serves
2. Encourage dissemination
   - Husbandry
   - Pathology
   - Medical successes
3. Encourage full use of tissues, parasites, and bodies (Parasite ID, necropsy, genetics, museum specimens, feeding studies)
   - Develop protocols for keepers, vets, geneticists, etc.

Action:
Prepare a flowchart of a progression of samples from gross necropsy, histopath, genetics, and museum preservation of specimens.
Charles Innis
November 2001

External Exam

1. **Neurologic exam** (simple version) to evaluate response to stimuli and coordination. Refer to Chrisman, S et al. JAVMA for details.

2. **Integument:** Skin, flippers and shell evaluated for trauma (punctures of carapace, bites, fishhooks, bullet wounds, fishing line), color, quality of integument, epibiota (algae, barnacles, leeches, leech eggs, bivalves), tumors, bites, missing parts (defects), foreign bodies, sloughing of tissues, oil and tar, tags, ID marks, concavity of plastron, percussion of scutes. Please note lesions on diagram of turtle.

   Equipment-scale, digital camera. Small hammer

3. **Musculoskeletal** (e.g., sinking of plastron) evaluated for evidence of chronic disease or malnutrition, muscle atrophy, joint swelling, strangulations, fractures, propeller cuts, shark bites.

   Equipment-digital camera

4. **Eyes** evaluated presence/absence, discharge, sinking in the orbits (feature of dehydration), corneal lesions, cataracts, lumps and bumps on conjunctiva, quality of the pupil. A light should be shined into eyes to look for evidence of exudate or hemorrhage into the anterior chamber. Visual assessment via menace response (hard to assess negative)

   Equipment-Flashlight, digital camera.

5. **Nares** examined for discharges, exudates, blockage, ulceration, other lesions and patency.

6. **GI TRACT-Oral cavity** Note ease at which mouth can be opened. Examined for foreign bodies, tumors, leeches, leech eggs, patency of choanae, ulcerations, erosions, inflammatory lesions, and color of mucous membranes, tar, oil, presence of sea grass.

   Equipment-Haups speculum (non-traumatic so as not to crack beak).

   GI TRACT CLOACA-Masses, prolapse, ulceration, foreign body, see integument.

7. **Cardiovascular** and ancillary tests- Doppler is most practical to assess circulation and heart rate.

   Equipment-Doppler

8. **Reproductive system**-use ultrasound for assessing reproductive status and presence of internall masses. Use rigid fiberoptic scopes.

   Equipment-Fiberoptic scope, Ultrasound

9. **Photograph whole body including head, carapace, plastron, flippers and any lesions.** At some point, it will be necessary to determine if a turtle should be presented to a rehabilitation facility for further diagnostic work-up and treatment.

Biomedical Samples

Divide these into non-invasive, minimally invasive and invasive tests.

RELATIVELY NON-INVASIVE OR MINIMALLY INVASIVE

Blood sampling

1. **Hematologic evaluations:** blood collected into lithium heparin tube.
    a. See Jacobson, Session II, Health Assessment Workshop, Part I.
    b. Blood film made and then blood placed in lithium heparin

2. **Biochemical evaluations:**
    a. See Jacobson, Session II, Health Assessment Workshop, Part I.
    b. Published reference values are available for bilirubin, calcium, carbon dioxide, chloride, cholesterol, creatinine, glucose, iron, phosphorus, potassium, sodium, total protein, triglycerides, urea nitrogen, uric acid, alkaline phosphatase, alanine aminotransferase, aspartate aminotransferase, and lactate dehydrogenase, hormone profiles.

3. **Osmolality** (a measure of hydration and certain particles in the blood).

4. **Mineral and vitamin analyses** (a measure of nutritional status)
    a. Includes iron, copper, zinc, selenium, vitamin A and vitamin E.

5. **Infectious disease testing:**
    - Serology (measures antibody titer to certain pathogens). Tests for herpesviruses are in development.
    - Microbiological testing (virology, bacteriology, mycology, parasites) Need swabs, media, vials, slides (see Elliott's list), fecal flotation.
    - Molecular-PCR
    - Microscopy (light, EM, scanning)

6. **Immune function:**
    a. Test in development (some crude tests exists for humoral and cell mediated response).

7. **Toxicant profiles:**
    a. Toxic metals
    b. Develop biomarkers for exposure to organohalogens, organics, and metals.

    Need scute, blood, tissue matrix of some sort.

8. **Genetic profiling** (skin biopsy or blood samples and how preserved)

INVASIVE PROCEDURES
Best performed under sterile conditions.
Always use sterile instruments!

Biopsies as needed for special projects
Fat, bone marrow, muscle, liver, urine, etc.

Ranking of Diagnostic:

1. Blood (need to bank red cells and plasma)
    a) CBC and chemistry
    b) Plasma banking (toxicants, serology, reproductive hormones)
    c) Baseline microbial (bacterial/viruses/etc)
    d) Immune function
    e) Genetics
    f) Vitamin/minerals

For animal with visible lesion:

1. Biopsy (formalin and frozen and/or special media or special fluids/cytology) and then Blood.

2. Swabs, cultures, biopsies, blood cultures (microbiology) dictated by behavioral and physical exam.

3. Fecals (parasitology)

4. Urine (for toxicologic, hormonal, other assays)

5. Cerebrospinal Fluid (for infectious disease, cytology)

6. Doppler, ultrasound, Xrays

Facilities Working Group

Participants: John Behler, Kurt Buhlmann, Ron de Bruin, Gerald Kuchling, Lonnie McCaskill, William McCord, Brad Morris, Richard Oogust, and Tom Probst

Problem 1: Facilities designated for the maintenance and breeding of the giant softshells.

Goal: Define basic guidelines for facilities for giant softshells such as *Chitra* and *Pelochelys*.

1. Based on availability of space, the climate, finance, and aim of the facilities, a choice has to be made whether to keep the animals in outdoor or indoor enclosures. With aquatic softshells, you need to know where your animals are. It is difficult to see them in outdoor ponds. They can be kept indoors in tubs.
2. They need warm water in the 70s.
3. The bottom of the enclosure needs to be covered with sand or mud substrates
4. Egg laying facilities have to be available if breeding is a goal.
5. They must be fed live food (fish).
6. *Chitra* and *Pelochelys* will get along in crowded conditions, if a sand bottom where they can hide is present.
7. In an appropiate climate (Florida) they may be kept in specifically designed outdoor ponds- like the CI-funded ponds in Madagascar.

Best facilities for softshells:

The optimal facilities are in range states. Outside range countries, turtles should be kept in a region where the climate is similar to that in the country of origin

Outdoor ponds should be artificially-lined. If ground water can be used, geothermal-heated wells, above 70 F are preferred.

A greenhouse should let in UV-light

It is at present unknown if these large riverine species will do OK in ponds

Minimum acceptable breeding facilities for *Chitra and Pelochelys* (giant softshells):

A bathtub, 4 to 5 times the size of the turtle with space to bury in non-abrasive sand will do.

Temperatures should be kept in low 70's F.

Action: Identify or create defined facilities.

Problem 2: Facilities designed for the maintenance and breeding of large softshells.

Goal: Facilities with the following basic guidelines.

Best case scenarios for other softshells- Nile softshells, *Trionyx, Nilsonia*

Since they are aggressive, they should preferably be kept single.

If not kept in isolation, they need room to avoid each other, and to get visibly away from each other. For instance, *Dogania* can kill a bigger softshell by picking at it.
There may need to be separate setups for maintenance and breeding. The best scenario may be a sandy outdoor enclosure with a sandy bottom. If this is not possible, a greenhouse that lets in UV light could be used. Anyway, climatic control is a must. The climatic parameters for each species should be defined.

Action: Identify or create the defined facility.
Perhaps collaborate with existing facilities such as U.S. Fish Hatcheries, private/commercial Turtle Farms, large institutions (i.e., Disney)

Problem 3: Facility design for large river turtles.

Goal: Create facilities with the following basic guidelines.

- Large Riverine Turtles like *Kachuga, Orlitia, Callagur, Batagur, Carrettochelys*, and perhaps *Hardell*a
  Minimum depth 1 m deep, max 4 m deep
  Ideally, in greenhouses with UV
  Can keep in high densities
  Natural nesting areas
  Carrettochelys like clear water, in the high 80s-95 F
  Need terraced ponds, very shallow to heat up, then deeper
- Basking sites

Breeding Groups
15 male to 30 females 15.30
Callagur males are more delicate than females
10 x 15 m pond, 0-3 m deep
Natural nesting beach

Maintenance

- Substrate not as importance
- *Orlitia* males may fight
- Basking sites
- For *Callagur* add salt
- Water temperature for *Callagur* is the mid 70s to 80s
- Basic structure:
  Need 5x the body size for living space
  Carrettochelys can be kept in indoor facilities - A charismatic animal- good for aquariums

Action: Identify or create the defined facility.

Problem 4: Facilities design for breeding and maintenance of semi-aquatic species.

Goal: Facilities with the following basic guidelines.
Shallow water and land interface needed. Nesting areas and substrate with available hide spots in both water and on land. Basking area with thermoregulation available. UV light availability. Minimum holding can be very sparse in a small tank for maintenance.

Action: Identify or create the defined facility.

Problem 5: Facilities design of maintence and breeding for terrestrial species

Goal: Facilities with the following basic guidelines.
Need a much larger space made available to forage, hide, bask, and sleep. In breeding situations animals should be housed in larger pens with visual barriers. UV light availability is a plus.

Action: Identify or create the defined facility.

Problem 6: Facilities designated for small to medium aquatic species

Goal: Facilities with the following basic guidelines.
Max. Enclosure design – large aquatic enclosure (Stock tanks, aquaria. Etc.) 3.5 animals would be preferred. Tapered from shallow to deeper water (0-.5m). Provide planks, land bridges, with access to basking sights and shallow water areas. Aeration or filtration is required. Identify minimum suitable-sized aquarium/tank.

Action: Identify or create the defined facility.

Problem 7: Facilities for Confiscated Turtles

Goal: A centralized quarantine facility for confiscated turtles.

Goal: Funding for said facility

Action: Identify possible existing facilities that could manage or be expanded to exist as such a facility.
Action: Approach the steering committee for funding for such a facility.

Problem 8: Veterinary care for turtle species.

Goal: To create a program were all parties involved in the Asian turtle program have veterinary care made available to them.

Action: Identify hub facilities (zoos, universities) that can act as conduits for veterinary care

Problem 9: Security of these endangered animals from theft.

Goal: To prevent the loss of valuable specimens from the consortium

Action: To make certain that all location information on specific species in the program is kept secure.

Action: All members holding animals must maintain reasonable security protocols for the safety of their animals.

Problem 10: Availability of facilities.

Goal: Produce an inventory of all available facilities.

Action: Produce a survey and contact all parties with possible facilities to house all species designated to work with by the working group.

Problem 11: Comprehensive facility design.

Goal: Listing of all the necessary areas that are needed for a complete breeding and maintenance facility.
This facility would encompass the following design criteria. It would consist of small and large holding areas both indoors or outdoors with access to outdoor light or artificial UV light. Provide separation areas for more aggressive species. Breeding tanks, a nursery area, incubation and quarantine area, isolation area for sick or injured animals. Provide access to veterinary care. Live food availability either thru bait tanks, invertebrates in house or delivery of those items. Need food preparation area, deposition area for dead animals, and treatment area.

Action: Encourage new facilities to follow these design parameters.
For Example:

Confiscations

↓ USFW

Vet health facility → zoos
(described by Group 4) Private sector
Designated species recipient:
Minimums:
Maintenance
Breeding

Problem 12: When to use Outdoor vs. Indoor Facilities

Outdoor keeping:

Pros are: animals may be kept in more natural settings with natural egg laying sites, basking opportunities, the presence of UV light, more spacious, deeper water. This may result in less aggression and better condition of the animals, which may be reflected in better breeding results.

The cons are: animals should be able to cope with, or be protected against bad weather. It is more difficult to monitor them, and loss of control of animals is possible. There should be sufficient protection against theft, predation by alligators, raccoons, fire ants, etc.

Outdoor facilities can be natural, or man-made ponds

Either flow-through or dump and fill system

Need climate similar to country of origin

Indoor keeping:

Pros are: more control over the animals which results in better monitoring of health

Cons are: higher cost, cleaning, feeding

Problems and Obstacles that may be encountered when establishing Facilities

1. Funding
2. Space
3. Local Laws/ zoning
4. Climate
5. People (i.e., Labor)
6. Security
7. Scale/Size
8. Utilities
9. Water quality- what the well produces, amount of water, put in a good well, water restrictions, frightfully expensive if city metered
10. Species chosen
11. Waster Disposal
12. Food and food storage
13. Veterinary availability
14. Enclosure design
15. Pathology, Quarantine facilities
16. Health Assessments
17. Nursery facilities
18. Incubation facilities

19. Back up / standby power and water, temperature concerns
20. Need meaningful action plans
21. Someone has to take responsibility for doing it.

To identify the best/minimum facilities, a flowchart process should be used:
1. Identify the focus of the facility: aquatics, semi-aquatic, terrestrial
2. Identify best places: in range states, in climate similar to wild. This will vary with species and political stability
3. Identify best ways: in situ, in natural outdoor ponds, in outdoor-lined man-made ponds, using groundwater, in inside tubs, greenhouses—again will vary with species
4. Identify best/minimum facilities—for each defined group of species
5. Identify maintenance / breeding groups
6. Facilities that are "maximum" might be outdoor facilities that can maintain viable populations of a given species. In contrast, a minimum facility might only hold individual turtles or small groups, and not have all of the support sectors needed for a complete plan.
7. Overall formula for maintaining an assurance colony of any of the species
8. Ask all participants at this meeting what facilities they have. Are they a maximum facility, a minimum facility or something in between. Do they see themselves working with river turtles, semi-aquatics, or tortoises. Are they a maintenance facility or a breeding facility. What can they hold. How many?

These items below are representative of all maximum-type facilities whether for river turtles, semi-aquatics, or tortoises:

Large holding areas out-door ponds
Separation AREAS
Breeding tanks
Head start area
Quarantine area
Isolation area for sick
Deposition dead (freezer)
Food prep area
Treatment area
Bait tanks (fish, insects etc.)
Overall formula for maintaining an assurance colony of any of the species

The need for general natural history information:

1. Mimic natural seasonal habitat changes
2. aestivation
3. hibernation

Types of facilities for tortoises:

Need:
cool – humid
dry –hot
hot – humid

Locations of facilities for tortoises:

- Desert Tortoise Center, Las Vegas
- Ashton's, Florida
- Minimum facilities in private sector, Bioreserve, California

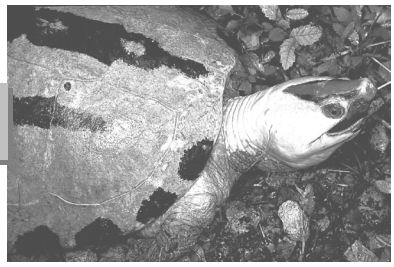
Types of facilities for semi-aquatics

- marshes
- water/land interface
- nesting areas
- hiding areas, substrate
- environment, plantings
- aestivation/hibernation protocol and site if needed

Locations of facilities for semi-aquatics

- The Tortoise Reserve
- Private hobbyists
- Fish Hatchery ponds
- Zoos and Aquariums

Regulatory Constraints Working Group



Participants: Joe Ventura, U.S. Fish and Wildlife Service/Law Enforcement; Bruce Weissgold, U.S. Fish and Wildlife Service/Division of Management Authority; Wan Zi Ming, China CITES Management Authority; Richard Fife, Riparian Farms; Richard Gibson, Durrell Wildlife Conservation Trust; Craig Hoover, TRAFFIC North America.

Problem 1: It is unclear how existing international, national and local regulatory regimes may constrain the movement of animals for conservation purposes.

Goal 1: A comprehensive assessment of existing regimes is needed.

Action 1: Document existing regulations on a species by species and country by country basis.
Timeline: 9 months
Time requirement: 80 hours
Product/outcome: Report
Responsibility: TRAFFIC
Resources needed: $2,500 to $5,000

Problem 2: A lack of knowledge/information in government, public and private sectors leads to increased regulatory constraints and administrative burdens, as well as frustration.

Goal 1: Increased knowledge, information sharing and training regarding regulations, administrative procedures and enforcement.

Action 1: Identify and assess existing species ID material
Time: 1 year
Time requirement: 40 hours
Product/ Outcome: Report with sample materials
Responsibility: TRAFFIC (CITES Animals Committee working group)
Resource needs: None

Action 2: Document & make available existing regulations & administrative burdens
Time: 1 year
Time requirement: 40 hours
Product/outcome: Available on Website and fact sheets
Responsibility: USFWS (for US regulations and procedures)
Resource needs: None

Problem 3: Existing and future regulatory constraints may jeopardize conservation efforts.

Goal 1: Constraint Alleviation

Action 1: Identify/engage governments, institutions interested in collaboration
Time: 1 year
Time requirement: 80 hours
Product/outcome: Increased collaboration
Responsibility: Institutions should contact USFWS and other governments to discuss alleviating existing constraints and shape potential future constraints when possible.
Resources needed: None

Goal 2: Ensure that the conservation benefits of proposed/future regulation outweigh the conservation costs.

Action 1: Assess, on case-by-case basis, the conservation costs/benefits of proposed/future regulations (ie, CITES, domestic legislation)
Time: 2 to 3 years
Time requirement: 40 to 200 hours
Product/outcome: CITES analyses/recommendations
Comment on draft regulations
More effective regulations
Responsibility: TRAFFIC
Resources needed: Consultant/intern; $5-15,000

Information Acquisition and Disposition Working Group

Participants: Anders Rhodin, Leslie Levin, Stan Mays, Karla Anderson, Annabel Ross, Ross Kiester, Dan Badgeley, and Tag Engstrom

Discussion

After some discussion, this group decided that our efforts would concentrate on the critical species as determined by this meeting; these would be our primary focal point for the short term (1-2 years). Requested reports from several other groups.

Decided to remove Goal C (validating and valuation of information) under acquiring information, since it is part of goal A.

Should an action involve sending a survey as a form of acquiring information? Information gathered and used by private organizations does not follow a standardized format. Format will be standardized by informal studbook keepers.

It was decided that coordinating information efforts is too much to be done on a voluntary basis, and should be part of the job description of the full-time position that needs to be funded.

We discussed whether 'encourage and facilitate participation' needed to be a goal under Problem 2 Managing information. We decided to change wording of the goal.

Do we need to create a multi-lingual newsletter for the participants of this workshop to document progress, or should we use publications that are already in existence and reach a wider audience.

We decided to use publications already in existence, but we would bring the idea up to the group as a whole.

Several goals were changed to actions as a result of our discussion.

Problem 1: Acquiring information.

Goal: Identify information required.

> **Action:** Gather studbook data for critical species determined by this meeting; link with species management groups; maintain informal studbooks for species.
> Resources: Annabel Ross, Karla Anderson, others as delegated.
> Time line: One year, and ongoing.
>
> **Action:** validate and value studbook information.
> Resources: Informal studbook keepers.
> Time line: One year, and ongoing.

Action: gather natural history data, locality data (when available), husbandry, medical, regulatory data, current/past/future research or other projects, holding spaces, interested participants, and additional information as needed or provided.

Goal: Identify sources of information.

Action: Identify target contributors. Sources: IUCN Asian turtle workshop participants, traditional literature, private organizations, websites, professional journals, and others as found.
Timeline: One year.

Goal: Organize and standardize format and content.

1. Format appropriate to provide:
a. accessibility
b. utility

Action: Prepare and distribute protocol for individual animal identification.

Goal: Encourage and facilitate participation.

Action: Prepare and distribute letter to all IUCN Asian Turtle Workshop attendees encouraging participation, and requesting contacts with non-participants.
Resources: Annabel Ross and Tag Engstrom, follow-up letters by Stan Mays.
Time line: Two weeks.

Action: Follow up and maintain contacts.
Time line: Ongoing.
Resources: Group members as required.

Action: Develop procedure for protection of confidential information.
Resource: Asian Turtle Consortium.

Problem 2: Managing information.

Goal: Coordinate efforts internationally
Between groups (public/private/government/non-government)
Within species
Between ex-situ and in-situ efforts

Action: Select full-time coordinator/manager or use TSA. Job duties should include:
Receive/edit/update materials at appropriate intervals.
Guide allocation of resources according to priorities.
Time line: As soon as possible.

Goal: Establish electronic communication medium for Asian Turtle Workshop Group.
Website

List serves.
Time line: six months.
Resources: Asian turtle crisis list serve, AZA list serve, European zoo list serve, etc.

Problem 3: Disseminating information.

Goal: Identify all people that need access to information.

Action: Assemble list at TSA workshop to include:
Comercial Breeders, private breeders, Zoos, Vet community, Academic community, Legal Community, Range State Gov't, and Field enforcement agents, NGOs, Non-Range Regulatory groups, General Public USA/EU, General public in range states, Is there any one left out?

Goal: Provide clearinghouse of information in a format that is accessible to previously identified target audiences

Action: Develop and Administer Web Site
Resources: Determined by TSA organization Committee

Goal: Raise international consciousness of Global Turtle Crisis, generally following the recommendations of John Behler and Russ Mittermeier.

Action: Facilitate the contribution of appropriate materials to already established publications
Time line: on-going.
Resources: all members that have access to or contribute to publications.

Action: Bring News Media into all Meetings and events

Action: Develop canned slide show
Resources: Photo Collections of Dave Collins, Dave Lee
Constraints: Copyright and permission or photographers
Time Line: 6 months

Action: Develop Citizen Action Suggestions
Eg. Letter writing campaign to CITES, financial support to CI, WCS, IUCN/TSA, Tennessee Aquarium, Cuc Phong, Kodoorie Farms etc.
Time line: 6 months

Action: Develop Poster for National Sale and International Free Distribution
Resources: Existing Photo Collections of Dave Collins, Dave Lee Constraints: Copyright and permission or photographers
Time Line: 1 year

Action: Build Relationship with Existing PR resources

e.g. Zoo PR departments, Video productions, Zoo websites, graphics
Time Line: Ongoing

Went over working group report; what all groups represented at this meeting needed, and any constraints that may be in place.

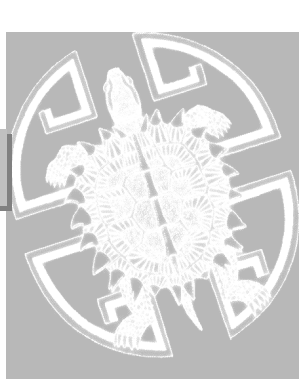
Organization Working Group Report

Overall goal: develop an over-riding organizational/Steering Committee that communicates facilitates, etc., all issues and actions discussed at this meeting.

Broad based alliance-Chelonian Captive Survival Alliance (now Turtle Survival Alliance)-broad based, multi-disciplinary, inter-sector.

Mission and job duties outline, group structures examined.

Linkages and Programs within Asia Working Group



Participants: Bosco Chan, Paul Crow, Indraneil Das, Peter Paul van Dijk, Doug Hendrie, James Juvik, Noriko Oshima, Peter Pritchard and Matt Vincent.

MISSION STATEMENT: To emphasize the financial and political preference of range country conservation by encouraging international support of in-country captive breeding efforts as insurance and repatriation for tortoises and turtles.

Assumption *– within the lifetime of today's turtles we may see massive changes in Asia. Wild collection and trade issues will be resolved eventually as politics and society permit, and there will be a move towards mass-production of farmed specimens to supply demand, allowing eventual protection, repatriation and reintroduction of tortoises and turtles in Asia.*

1. Overview

The effort to conserve tortoises and freshwater turtles threatened by trade in Asia is a huge task. Although there is a desperate need to establish co-ordinated holding spaces for captive maintenance and reproduction outside of Asia, this may be limited by several factors:

- availability of holding spaces for difficult to maintain species,
- lack of availability of rare species,
- legislative constraints,
- climatic conditions,
- high transport mortality and
- limited funding.

It has been demonstrated many times that captive reproduction efforts can be highly effective within, or close to, the natural range of any given species. Although not difficult to quantify resources available in the US, Europe and Australasia, this is not true of the Asian region. Even so, it is known that many collections within Asia do, and have the potential to, hold vast numbers of tortoises and turtles. Exchange of both information and animals with these range country facilities may prove to be a critical step in managing captive populations. Furthermore, range country facilities, with appropriate resources, have the ability to influence local law enforcement officials, change local political and community attitudes and participate in *in situ* conservation programs. Two facilities within Asia, Kadoorie Farm & Botanic Garden (KFBG) and Cuc Phuong Turtle Conservation and Ecology Project (TCEP) have already achieved some of these goals and other organisations are yet to be identified. It is therefore necessary to establish a network of captive facilities working co-operatively within Asia and at an international level to maximize resources and avoid costly and time-consuming replication of programs.

The IUCN Draft Policy on the Management of *ex situ* populations for Conservation states " … *ex situ* conservation should never be considered as an alternative to *in situ* conservation, and effective integration between *in situ* and *ex situ* approaches should be sought wherever possible". Range country programs can provide middle ground between the two extremes, while

recognizing that the priority of conservation efforts should remain focused on protecting turtles in their native habitat.

2. The relevance of programs in range countries to captive conservation efforts

Ex situ captive management should be considered as complimenting, not replacing, range country programs. These programs offer a variety of advantages over maintaining specimens in countries outside of Asia. These include:

2.1Conservation Breeding – existing and potential captive holding and breeding programs in range countries and beyond are in a unique position to obtain founder stock through confiscations, wild collection and/ or purchase of specimens, and provide local ecological, captive husbandry and breeding data. They often have the ability to hold large quantities of stock.

2.2 Commercial Operations – existing traders and farmers may prove valuable in providing known provenance stock or obtaining exceptionally rare species and provision of ecological, captive husbandry and breeding data. Some farms may be willing to participate in conservation breeding efforts. Crocodile farms have existing captive holding and breeding facilities that could be further utilised for turtles. Fish farms may also offer the potential to provide space for holding/ breeding turtles.

2.3 Research – market and field surveys may provide sound trade, ecology and natural history data that are critical to identifying priority species and, in turn, necessary for the appropriate allocation of resources.

2.4 Education & public awareness – local facilities have the ability to reach local communities through media campaigns, the display of educational material and participation in educational programs. They often have the ability to influence local government.

2.5 Capacity building – by their very nature, many range country programs endorsed by NGO's are working towards establishing infrastructure to manage conservation issues on a local level.

2.6 Protection, Regulation, Legislation & Enforcement (including CITES) – local knowledge and expertise can be utilized to influence these issues that, in turn, influence prioritization of species for *ex situ* programs.

2.7 Repatriation linkages – in-country programs allow for far easier repatriation, acclimatization and reintroduction of specimens.

2.8 Community-based farming/ breeding – the opportunity exists for small-scale farming and/ or breeding of turtles by local villages and communities, including in conjunction with larger commercial operations. These have the potential, if appropriately managed, to engender greater support for turtle populations by local people.

3. Known programs in range countries.

3.1 Local/ regional facilities:

- Madras Crocodile Bank – has 16 species of Indian turtles and tortoises, including *Geochelone elegans*, *Indotestudo travancorica*, *Melanochelys trijuga*, *Lissemys punctata* and *Aspideretes gangeticus* at present. In the past, this facility has bred *Kachuga tentoria.*
- Turtle Conservation and Ecology Project, Cuc Phuong Conservation Project (TCEP) – See 3.2
- Kadooorie Farm and Botanic Garden (KFBG), Hong Kong – See 3.3.
- Samut Prakarn Crocodile Farm and Zoo – holds many species of Thai turtles and dedicated to breeding *Chitra chitra*, *Pelochelys cantorii*, *Manouria emys*, *Heosemys spinosa* and others.
- Other crocodile farms – data deficient, yet enormous potential for reallocation of resources. The Crocodile Specialist Group is one avenue for determining the potential of crocodile farms to participate.
- Local and national zoos – zoos in virtually every Asian country maintain local species of tortoises and freshwater turtles and some reproduction occurs – no specific holding data are available. The South East Asian Zoo Association (SEAZA) could assist with data on current and potential holdings.
- Temples - in virtually every country in Asia, temples maintain local species of tortoises and freshwater turtles and some reproduction occurs – no specific holding data available.
- Fisheries, Forestry and Wildlife departments of Asian countries – regulatory authorities on species-specific conservation, exploitation management and protected areas management – insufficient data available.
- Japan Natural History and Research Network - taxonomy research undertaken and captive collections exist, some moving towards captive breeding.

3.2 Example of a range country facility participating in captive conservation: Cuc Phuong Turtle Conservation & Ecology Project (TCEP), Vietnam

Established in 1998 under the umbrella of the Cuc Phuong Conservation Project, administered by Fauna and Flora International (FFI), the TCEP is focused on the conservation and protection of Vietnam's 23 native tortoises and freshwater turtles, and is comprised of seven principal project initiatives, all of which are presently in progress:

(1) Public awareness and education

(2) Training and institutional capacity building of national protection authorities

(3) Research on captive ecology and reproduction.

(4) Rescue, rehabilitation, and translocation of turtles back into protected areas and habitat

(5) Field research on the natural distribution and status of Vietnam's turtles

(6) Research and monitoring of the wildlife trade

(7) Building interest and expertise in turtles within the national scientific community

Cuc Phuong Facilities and Captive Breeding Outlook:

Facilities
Approximately 2,800 square meters of enclosures, and a 30,000 square meter fenced forested hill. Enclosures include aquatic, semi-aquatic, and terrestrial environments, suited to the specific needs of each species. Approximately 800 turtles that were confiscated from wildlife traders are being maintained at the centre, including 19 of Vietnam's 23 species.

Breeding Programs
Year 2001 will be the first year that the TCEP attempts formally to breed some of its resident species. The priority is on *Mauremys annamensis,* though efforts will also focus on other species as well.

Placement of Confiscated Animals
The TCEP maintains that the best solution for Vietnam's threatened turtles is to provide greater protection for wild populations. Subsequently, the major focus of TCEP efforts is on conservation initiatives (public awareness, training, education) that further this goal. While translocation and head-start programs are also under way, as well as development of a permanent sanctuary for confiscated turtles in Vietnam, TCEP shares the view that ex-situ insurance colonies should be established for turtles of some species in order to ensure their survival. Recognizing such, in 2001 the TCEP plans to develop a legal means to export turtles to recognized conservation-focused programs abroad, as deemed appropriate by the project steering committee.

3.3 Example of potential to expand a range country facility to increase participation in captive conservation

Kadoorie Farm & Botanic Garden (KFBG), Hong Kong

Facilities
Currently have capacity for approximately 200-400 turtles confiscated from trade. It would be preferable to dedicate a proportion of these facilities to captive breeding of species that occur in Hong Kong. Potential to expand old pig holding pens that would increase holding/breeding capacity by 2-3 fold.

Breeding Programs
Currently no breeding programs are underway. Potential to start breeding *Cuora trifasciata, Chinemys reevesii* and *Sacalia bealei* within the near future. All three species have good potential to be returned to the wild in Hong Kong if protected areas are made secure in the near future. It is possible that local stock from the wild in Hong Kong can be identified for these projects.

In situ ecological research to assist captive breeding priorities. A number of research projects are already underway, such as rapid biodiversity surveys. There is enormous potential to undertake projects on specific species that require further investigation as decided by the Turtle Survival

Alliance or staff at KFBG. There are also known populations of several endangered species close to KFBG. These will assist in prioritization of captive breeding programs.

Placement of Confiscated Stock for Captive Breeding
The strategic location of KFBG has potential to process turtles from South China for placement in other institutions participating in captive breeding efforts. This may include export to other countries.

3.3 Species-Specific Programs

- **River Terrapin** *Batagur baska*
  Malaysian Fisheries Department – head-starting of wild-collected eggs – many hatchlings and head-started juveniles released into habitat, but adult population in continuing decline.
  Fisheries Department of Thailand - captive breeding within facility locatedin natural range, proportion of hatchlings and juveniles released into habitat. Species no longer reproducing in the wild in Thailand.
  West Bengal Forest Department - had a head-starting facility in the Sunderbans, India, till the late 1990s.

- **Painted Terrapin** *Callagur borneoensis*
  Malaysian Fisheries Department – head-starting of wild-collected eggs – many hatchlings and head-started juveniles released into habitat, but adult population in continuing decline.
  Fisheries Department of Thailand - captive breeding within facility located in natural range, proportion of hatchlings and juveniles released into habitat. Species no longer reproducing in the wild in Thailand .

- **Red-crowned Roofed Turtle** *Kachuga kachuga*
  Uttar Pradesh Forest Department - has a head-starting facility at Kukrail, India.
  Madhya Pradesh Forest Department – has head-starting facilities in Morena, India.

- **Three-striped Roofed Turtle** *Kachuga dhongoka*
  Uttar Pradesh Forest Department - has a head-starting facility at Kukrail, India.

- **Indian Softshell Turtle** *Aspideretes gangeticus*
  Madras Crocodile Bank – captive breeding since the 1980s.
  Uttar Pradesh Forest Department – head-starting programme at Kukrail, India.
  Madhya Pradesh Forest Department – head-starting programme at Morena, India.

- **Indian Peacock Softshell Turtle** *Aspideretes hurum*
  Uttar Pradesh Forest Department - has a head-start facility at Kukrail, India.

- **Black Sofshell Turtle** *Aspideretes nigricans*
  Protected and reproducing at a single site; possibly an isolated population of *A. hurum.*

- **Giant Softshell Turtle** *Chitra chitra*
  Fisheries Department of Thailand - captive breeding within facility located in natural range. No captive reproduction succeeded yet, but significant captive mortality.

- **Softshell Turtle** *Chitra indica*
  Uttar Pradesh Forest Department - has a head-starting facility at Kukrail, India.

- **Chinese Softshell Turtle** *Pelodiscus sinensis*
  Numerous commercial farms throughout East and Southeast Asia, producing 1000's of metric tonnes of market-size animals per year. Founder stock generally from Taiwan, but genetic purity undetermined.

- **Asiatic Softshell Turtle** *Amyda cartilaginea*
  Some commercial farming attempted by private sector in Thailand and Malaysia but abandoned in favour of *P. sinensis* culture.

- **Chinese Three-striped Box Turtle** *Cuora trifasciata*
  Secretive but presumed substantial commercial breeding in southern China.
  Origin of founder stock and genetic purity of produced offspring uncertain. KFBG have a number of specimens to work with, including some provenanced stock.

- **Chinese Stripe-necked Turtle** *Ocadia sinensis*
  Large commercial farms exist in Taiwan, together producing hundreds of thousands of hatchlings annually. All founder stock apparently from local Taiwanese population. Hatchlings mostly sold domestically for religious release into temple ponds and other waters, and an increasing number exported for the pet trade in East and Southeast Asia and beyond.

- **Asian Batagurids** (*Mauremys*, *Cuora*, *Pyxidea*, *Ocadia*, *Sacalia* spp.. etc.)
  Farms exist in southern China and Vietnam, at least, but few data on quantity and genetic purity of output.

4. Priority Issues

1. Inadequate information & communication between range country captive facilities.

Goal: create linkages between range country captive facilities to ensure adequate flows of information.

Action:
1. Formalize regional specialist group steering committee (Asian Chelonian Conservation Committee, ACCC) to identify participant organizations and open formal lines of communication to ensure a cooperative and regional approach to local conservation efforts.
2. Nominate a convenor to oversee the committee.
3. Ensure country coordinators link to a central/ regional convenor.
4. Seek funding for a full-time convenor (location immaterial).
Responsibility: Peter Paul van Dijk to compile list of stakeholders; Doug Hendrie & Bosco Chan to identify potential committee members; and Matt Vincent to discuss potential of funding with TSA for convenor position.
Time frame: 3-6 months.

2. Inadequate information & communication between range country captive facilities and ex situ international conservation breeding efforts.

Goal: Create flow of information on an international level.

Action:
1. Create linkages between proposed ACCC, zoo organisations in Asia (initially SEAZA), North American (American Zoo Association, AZA), Australasia (Australasian Regional Association of Zoological Parks & Aquaria, ARAZPA), European (European Association of Zoos & Aquaria, EAZA) and Turtle Survival Alliance.
2. Utilize comprehensive website and web-links to many stakeholders outside Asia and ensure that this is regularly updated.
3. Build in feed-back mechanisms that are easy to operate.
Responsibility: ACCC & nominated committee members of the TSA.
Time frame: 6-12 months.

3. Funding for range country conservation activities.

Goal: secure funding for range country conservation activities.

Actions:
1. Co-ordinated campaign to seek short and long-term funding for rescue centres and conservation activities through full-time regional co-ordinator (if activities are going to be implemented).
Responsibility: ACCC and nominated convenor. Time frame: 9-12 months

4. Wastage / loss of stock confiscated and placed in existing rescue centers

Goal: create pathways to relocate rescued target species into appropriate captive breeding programs both within and outside Asia.

Action required:

1. Communicate with local, regional and international government agencies and policy makers to investigate placement options.
2. Designate approved regional and international holding facilities.
3. Establish protocols to address husbandry and veterinary issues.

Responsibility: ACCC & TSA.
Time frame: implement As Soon As Possible.

5. Shortage of in-country expertise & lack of turtle biologists

Goal: link local and international expertise with range country *ex situ* and *in situ* conservation programs. Identify up and coming biologists and provide opportunity.

Action required:

1. Identify in-country training requirements.
2. Identify potential biologists, ecologists, managers and other individuals who could support in-country conservation of turtles.
3. Establish list of overseas institutions/ facilities/ individuals that could provide the necessary expertise/ resources to train and educate local staff. This could involve a suite of mentoring and partnership programs.

Responsibility: CAAA.
Time frame: Ongoing.

6. Lack of connection between captive breeding and safeguarding repatriation habitat

Goal: integration of *in situ* conservation and *ex situ* strategies. In particular, captive breeding activities must have a meaningful link with *in situ* turtle conservation, including habitat protection.

Action required:

1. Identify potential repatriation sites and formalize links between stakeholders.

Responsibility: CAAA.
Time frame: ongoing.

7. Reduce targeting of wild populations due to high trade prices.

Goal: to assess the risk of increased demand for the pet trade leading to increased exploitation of wild populations, and address the economics of the international trade (i.e. inflated pet prices leading to increased exploitation of wild populations).

Action required:

1. Encourage trade for pet stock from no profit or captive-bred sources and reduce profit to traders.
2. Support this initiative with a global marketing/ education campaign.

Responsibility: CAAA & TSA.
Time frame: 12 months.

Founder Acquisition Working Group

Participants: Dwight Lawson, Kamuran Tepedelen, Rick Haeffner, Scott Pfaff, Quentin Bloxam, and Shi Haitao

Potential Acquisition and Need for Founders: Critically Endangered Species List

Overview

In the face of continued unsustainable commercial trade, the need to establish *ex-situ* assurance colonies of endangered Asian chelonians has gained widespread acceptance among those interested in this rapidly vanishing group of animals. Establishing and managing such colonies for ninety species over the long-term is a monumental task. An initial hurdle in this task is the availability of founder specimens. Based on the Captive Holdings Report (Group 1), we generate recommendations for founder stock importation. Recommendations are based on general genetic demographics for maintaining genetic diversity for approximately 100 years. Actual importation must take the sex ratio of existing captive populations (if known) into consideration, and make every effort to balance the male/female ratio. Decision on numbers of founders needed is made in a vacuum of adequate life history information (e.g., fecundity, age of first reproduction, lifespan). Similarly, captive husbandry (and the immediate expectation of reproductive success) has not been perfected for many species under consideration. In most cases 20 founders may be sufficient to establish a viable reproducing captive population. However, we arbitrarily increase this total to 30 (15.15) to account for deaths, non-breeding specimens and skewed sex ratios. Recommended acquisitions are separated based on US and European needs. Finally, the group is conscious that several captive populations are contained within only one or two collections, and recommend that these populations be dispersed.

Definitions

Founder is used to represent unrelated wild specimens. In reality, as the term is applied here, specimens represent potential founders.

Critically Endangered Species List: Recommended Acquisitons/Importations

- *C. yunnanensis* – NA, importation not possible; species possibly extinct
- *Aspideretes nigricans* – importation very unlikely, limited range (exists in one protected temple pond), no specimens in captivity
- *Batagur baska* – importation possible because of wide range in multiple countries; potential exists to acquire permits. Potential founders needed.

  Goal North America: Import 20 founders.

  Goal Europe: Import 25 founders.
  Achievement: Maximum 5-10, minimum 1-2 years.

Actions: Acquire founders.
Time: immediate
Time required: permits 2 years, acquire animals 2 years
Resources needed: money, USFWS assistance
Responsibility: CCSA to organize distribution of imported specimens, and facilitate permits acquisition.
Note: if permits for *Chitra chitra* are pursued, group recommends possibly trying to combine permit acquisition with this species.

- *Callagur borneoensis* – Potential founders not needed
- *Chelodina mccordi* – Potential founders not needed
- *Chitra chitra* – Importation possible. Protected in most of range states except possibly Bangladesh. Potential founders needed

Goal North America: Import 20 founders

Goal Europe: Import 30 founders
Achievement: Max time 5-10 years, Min 1-2 years

Action: Acquire founders.
Time: immediate
Time required: 2-5 years.
Resources needed: Stateside consortium to facilitate Indonesian permits, and a designated institution to act as importing agent.
Responsibility: CCSA to organize distribution of imported specimens, and facilitate permits acquisition.

- *Cuora aurocapitata* – Potential founders needed;
- *Cuora galbinifrons* ssp.–. Potential founders not needed
- *Cuora mccordi* –Potential founders not needed
- *Cuora trifasciata* – Potential founders needed
- *Cuora pani* – Potential founders needed
- *Cuora zhoui* – Potential founders needed,
- *Geochelone platynota* – importation possible but regulation issues in range states. Potential founders needed

Goal North America: Import 0 (not needed, 30 in US collections)

Goal Europe: Import 28 founders
Achievement: Maximum 10 years, min 1-2 years.

Actions: Acquire founders.
Time: immediate
Time required: 5 years
Resources needed: supporting institutions

Responsibility: Wildlife Conservation Society (New York) working on acquisition and in country captive population

- *Heosemys depressa* – Potential founders needed

  Goal North America: Import 26 founders

  Goal Europe: Import 30 founders
  Achievement: Max time 10 years, Min 1-2 years

  Action: Acquire founders.
  Time: immediate
  Time required:5 years
  Resources needed: supporting institutions/privates
  Responsibility: Wildlife Conservation Society (New York) working on acquisition and in country captive population

- *Heosemys leytensis* – Potential founders needed, but possibly extirpated
- *Leucocephalar yuwonoi* – Potential founders needed

  Goal North America: Import 0 (not needed; 47 in US collections)

  Goal Europe: Import 15 founders
  Achievement: Max time 5-10 years, Min 1-2 years

  Action: Acquire founders.
  Time: immediate
  Time required: insignificant, importation eminently expected
  Resources needed: money to acquire specimens.
  Responsibility: CCSA to organize distribution of imported specimens to appropriate facilities/private holdings.

- *Kachuga kachuga* – Potential founders needed

  Goal North America: Import 30

  Goal Europe: Import 30

  TSA must investigate possibilities for importation.

- *Mauremys annamensis* – Potential founders not needed

Conclusions

It is apparent from the above exercise that many species requiring captive management attention are not currently considered critically endangered. Based on current holdings and presumed extant wild populations, we recommend additional acquisitions for only 6 of 18 critically endangered species. The TSA should generate acquisition recommendations for species listed under the other IUCN categories as part of each species' management plan.

Captive Holdings Working Group

Participants: Harald Artner, Jim Barzyk , Rick Van Dyke, David Lee, Vic Morgan, Mike Nesbit, Paul Vander Schouw, Darrell Senneke, Al Weinberg

This group was charged with creating an inventory of Asian turtles in the private and public sector which are possibly available for captive breeding / conservation efforts in an *ex-situ* program. It is recognized that not all of these animals may be made available by their current owner (s) due to the lack of desire to be part of such a program. Only animals being held in collections where it was known that the owner would not cooperate where excluded.

Resources:

- Personal knowledge of captive (private sector collections in USA)
- Personal knowledge of captive (private sector collections in Europe)
- ISIS abstracts (Zoo holdings)
- Asian Turtle Consortium (ATC) listings
- Known European holdings

The following animals were NOT included:

- Japanese holdings (while we realize that there are a great many animals in Japanese hands. The total numbers are not available to this committee)
- In-range collections in private hands
- Collections where we believe the owner will not participate in conservation programs

Animal populations compiled:

Our greatest concentration was upon those species declared critically endangered and endangered by the IUCN/SSC Tortoise and Freshwater Turtle Specialist Group and Asian Turtle Trade Working Group (2000). To this was added all tortoises and *Cuora serrata* at the group's discretion. European numbers for the species in Table 1 are considered accurate and are included in the totals for this reason. In most cases, where known, these animals are lacking from collections of in-range zoos, or are maintained in very small numbers. Where available, the in-range zoo data are included.

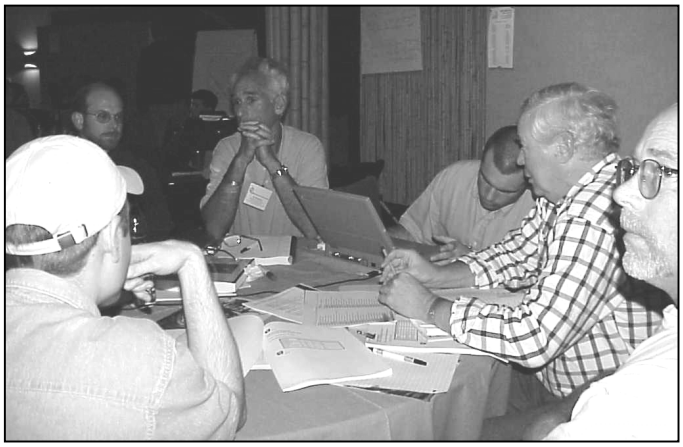


TABLE 1 - Critically Endangered and Endangered Species

TABLE 1

Species	Total Private U.S. and Europe Combined	No. in Zoos Out-range	No. in Zoos In-Range	Known captive breeding beyond imported gravid females	Notes
CRITICALLY ENDANGERED OR ENDANGERED					
Testudinidae					
Geochelone elegans	>690	110	0	Yes	
Geochelone platynota	141	3	0	Yes	The majority of these are in legally isolated colonies (Hong Kong Taiwan etc.) Possibly 15 in U.S or Europe
Indotestudo elongata	>425	71	22	Yes	3 breeding groups in the U.S.
Indotestudo forstenii	173	13	0	Yes	No regular breeding
Indotestudo travancorica	Unk	Unk	0	Yes	3 animals in US – bred in past – not presently
Manouria emys					Established studbook
Manouria emys emys	109	50	1	Yes	
Manouria emys phayrei	114	18	6	Yes	
Manouria impressa	16	4	1	No	Almost all living captive U.S. specimens hatched from gravid imported females
Bataguridae					
Batagur baska	27	19	72	No	

Species	Total Private U.S. and Europe Combined	No. in Zoos Out-range	No. in Zoos In-Range	Known captive breeding beyond imported gravid females	Notes
CRITICALLY ENDANGERED OR ENDANGERED					
Callagur borneoensis	141	43	5	No	
Chinemys megalocophala	160	Not Listed	Not Listed	?	No zoo listing – possible miss-identification of this species
Chinemys nigricans	240	6	0	Yes	
Chinemys reevesii	>1000	38	5	Yes	
Cuora aurocapitata	105	Not Listed	Not Listed	Yes	No zoo listings
Cuora flavomarginata					No known representative of first two subspecies
Cuora f. flavomarginata	Unk	Unk			
Cuora f. evelyni	Unk	unk			
Cuora f. sinensis	>1000	31	4	Yes	
Cuora galbinifrons	18	56	4	Rarely	No large scale breeding groups – very high mortality of imports
Cuora g. galbinifrons	800	Unk		Rarely	
Cuora g. bouretti	306	Unk		Rarely	
Cuora g. picturata	278	unk		Rarely	

Species	Total Private U.S. and Europe Combined	No. in Zoos Out-range	No. in Zoos In-Range	Known captive breeding beyond imported gravid females	Notes
CRITICALLY ENDANGERED OR ENDANGERED					
Cuora mccordi	145	13	0	Yes	
Cuora pani	156	22	0	Yes	
Cuora serrata	67	Not Listed	Not Listed	Yes	
Cuora trifasciata	189	51	8	Yes	Possible large scale "farming" In range countries
Cuora yunnanensis Extinct	N/a	0	1	No	One listed in Hong Kong – miss-identified
Cuora zhoui	68	Not Listed	Not Listed	Yes	
Geoemyda japonica	27	Not Listed	Not Listed	No	
Geoemyda spengleri	>1000	77	0	Yes	
Heosemys depressa	14	Not Listed	Not Listed	See note	Very recent Success - eggs
Heosemys spinosa	244	52	3	Yes	
Heosemys yuwonoi	58	4	0	No	
Hieremys annandalii	77	7	1	No	
Kachuga dhongoka	3	Not Listed	Not Listed	No	

Species	Total Private U.S. and Europe Combined	No. in Zoos Out-range	No. in Zoos In-Range	Known captive breeding beyond imported gravid females	Notes
CRITICALLY ENDANGERED OR ENDANGERED					
Mauremys annamensis	245	Not Listed	Not Listed	Yes	
Mauremys mutica	>1000	0	11	Yes	
Ocadia sinensis	57	19	11	Yes	Possible large scale "farming" In range countries
Orlitia borneensis	35	20	15	No	
Pyxidea mouhotii	36	11	3	Yes	
Sacalia bealei	60	16	1	Yes	
Sacalia quadriocellata	30	8	0	Yes	
Platysternidae					
Platysternon megacephalum	18	23	0	No	
Platysternon m. megacephalum	12	7	0	No	
Platysternon m. shiui	6	14	0	No	
Trionychidae					

Species	Total Private U.S. and Europe Combined	No. in Zoos Out-range	No. in Zoos In-Range	Known captive breeding beyond imported gravid females	Notes
CRITICALLY ENDANGERED OR ENDANGERED					
Aspideretes nigricans	0	Not Listed	Not Listed	No	
Chitra chitra	8	Not Listed	Not Listed	No	
Chitra indica	3	4	4	No	
Nilssonia formosa	3	Not Listed	Not Listed	No	
Palea steindachneri	18	1	0	No	
Pelochelys cantorii	12	0	0	No	
Rafetus swinhoei	0	Not Listed	Not Listed	No	
Chelidae					
Chelodina mccordi	550	1	0	No	
Chelodina pritchardi	15	Not Listed	Not Listed	No	Not listed in ISIS

TABLE 2 - Vulnerable / Lower Risk - Near Threatened / Lower risk – Least Concern / Data Deficient Species

With these species we attempted to determine the approximate number of animals in captivity. Numbers given are for US – Private Sector, Europe – Private Sector and Zoos - Worldwide. The European list is far from complete. A number of studbook keepers could not be reached or could not reach their participants. European breeding results are also incomplete for the same reason. For these reasons the European private holdings are listed separately .

Resources:

- Personal knowledge of captive (private sector collections in USA)
- Personal knowledge of captive (private sector collections in Europe)
- ISIS abstracts (Zoo holdings)
- Asian Turtle Consortium (ATC) listings
- Known European holdings

The following animals were NOT included:

- Japanese holdings (while we realize that there are a great many animals in Japanese hands. The total numbers are not available to this committee)
- In-range collections in private hands
- Collections where we believe the owner will not participate in conservation programs

Table 2

Species	U.S. Private Holdings	Eur. Private Holdings	Zoos Holdings Worldwide	Known Breeding Success	Notes
VULNERABLE					
Amyda cartilaginea	14	0	11	No	
Aspideretes gangeticus	0	1	Not Listed	No	
Aspideretes hurum	0	1	Not Listed	No	
Aspideretes leithi	0	0	Not Listed	No	
					Most scattered in "trophy" settings

Carettochelys insculpta	76	0	53	Yes	"trophy" settings – only one viable U.S. breeding group
Chelodina parkeri	309	0	29	Yes	
Cuora amboinensis	<2000	54	124	Yes	Almost all scattered in singles or very small groups - 4 known U.S. breeding groups Holdings for C.a. lineata or less than 20 , C. a. amboinensis est. 100. Remainder are C. a. kamorama and C. a. cuora
Elseya branderhorstii	20	0	Not Listed	No	
Geoclemys hamiltonii	60	55	129	Yes	
Hardella thurji	0	0	1	No	
Heosemys grandis	164	0	46	Yes	
Malayemys subtrijuga	21	0	Not Listed	No	
Melanochelys tricarinata	25	15	Not Listed	No	Very high captive mortality rate
Morenia ocellata	0	0	1	No	
Morenia petersi	0	0	4	No	
Notochelys platynota	21	0	Not Listed	No	
Pelochelys bibroni	6	0	10	No	
		0	17	No	

Pelodiscus sinensis	24				
Siebenrockiella crassicollis	100	23	28	No	
LOWER RISK - NEAR THREATENED					
Chelodina reimanni	24	0	24	Yes	
Chelodina siebenrocki	134	0	40	Yes	
Cyclemys dentata	366	0	56	Yes	Subspecies combined for total
Kachuga smithi	6	0	9	No	
Mauremys japonica	65	0	24	Yes	
Melanochelys trijuga	100	0	200	No	Subspecies combined for total
LOWER RISK – LEAST CONCERN					
Chelodina novaeguineaee	24	0	77	Yes	
Dogania subplana	24	0	Not Listed	No	
Elseya novaeguineaee	10	0	154	No	
Emydura subglobosa	579	0	142	Yes	
Elseya species					Not defined
		0	40	No	

Kachuga tecta	5				
Kachuga tentoria	4	1	5	No	
Lissemys punctata	6	0	35	No	Subspecies combined for total
DATA DEFICIENT					
Mauremys iversoni	12	0	Not Listed	No	
Mauremys pritchardi	6	0	Not Listed	No	
Ocadia glyphistoma	6	0	Not Listed	No	
Ocadia philippeni	6	0	Not Listed	No	
Sacalia pseudocellata	3	0	Not Listed	No	
Lissemys scutata	26	0	Not Listed	No	

Ongoing:

- As a committee we are committed to further developing this list as a current working total of non-range numbers. It is firmly believed that species presently of lesser concern will attain higher levels of concern over time.

Conclusions:

- As a group we are impressed at the current level of holdings for many of the above taxa as the basis for long-range conservation efforts. An effort should be made at ascertain with certainty the present owner (s) cooperation in ongoing species preservation efforts on a species by species basis. In the event that this cooperation cannot be assured known locale founder stock should be obtained.

- Highlighting the need for cooperative efforts between the private and public sector is the finding that for most of these Taxa the majority of the present captive animals are currently in private hands.

Funding Subgroup

Participants: Russ Mittermeier, Anders Rhodin, Brett Sterns, John Behler, Dave Lee, Bruce Weissgold, and Rick Hudson

- Russ opened the meeting by suggesting that the group link their funding strategy to a media and marketing strategy. This is a system that has worked well for Conservation International over the years and serves to gain greater exposure (=funding opportunities) through increased public appeal. This marketing strategy should try and strike an emotional cord with the public in a manner similar to the bushmeat crisis, and Russ suggested that we develop a package similar to Bushmeat Crisis Task Force in conjunction with AZA and others.

- We should bombard the media with an ongoing rollout of information, keep up the pressure, and invite the media to every event that we hold. In addition we should use the high profile aspect of this issue as a platform to approach the Chinese. We should write letters to relevant authorities in China such that it is seen as an important issue that is of global concern, and hence potentially damaging to their image.

- We should use the IUCN organizational structure to write letters and solicit funds. The IUCN is a recognized international entity and has greater name recognition than our individual institutions. Russ suggested that we need to upgrade and broaden the IUCN Tortoise and Freshwater Turtle Action Plan that will provide a detailed and updated blueprint for turtle conservation. This should include individual project descriptions with budgets.

- A second document should be produced that graphically illustrates the Chinese market problem that immediately grabs the reader's attention. This would serve as fund raising tool as well to help promote the issue. This is envisioned as an attractive, glossy, colorful booklet (not a throwaway pamphlet) that goes on the library shelf. The document would not only define the problem but also include text, photos and descriptions of actions that are being taken to address the problem. In other words, we should describe how we are proposing to address the Asian turtle crisis. The role of captive breeding facilities, regional conservation centers, breeding consortiums and other partnerships should be emphasized. Kurt Buhlmann (Conservation International) is currently working on such a document and has a rough draft available.

- Russ advises against hiring a full time fundraiser, preferring to use a Program Officer that knows the issues to be more effective. It was decided that this group would need a funded program officer to keep the agenda moving after this workshop. We need to create a multi-institutional turtle conservation action fund to help launch priority projects. This fund could be administered through Anders and CRF.

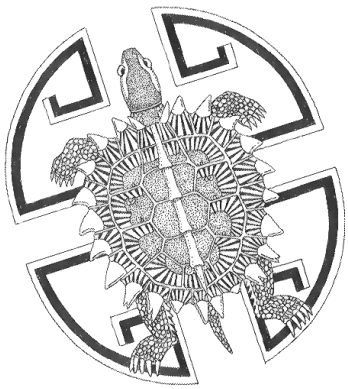
- We need to be able to answer the frequently asked question by the media "Why save turtles?" Suggestions include "Because it's the right thing to do" and "Because they are cool." The response "Because they are integral components of their ecosystems" usually falls on deaf ears.

- Russ said that it was important to be ready for funding opportunities when they arrive. Much of this involves luck. We should look for endowments and target private foundations and individuals. The following web site has a list of those that accept environmental grants: www.environmentalgrants.org

- It was noted that Conservation International has generated about $70,000 for a variety of captive programs in only seven months.

- We need to designate a flagship species that is readily identifiable to serve our cause. The golden-coin box turtle (*Cuora trifasciata*) was suggested as the "poster child" for the Asian turtle crisis. Others felt that one of the giant Asian softshells would be more appropriate due to their spectacular size and appearance, and the fact they are rarely seen by the public.

IUCN Asian Turtle Workshop: Developing Conservation Strategies Through Captive Management



FINAL REPORT

Fort Worth, Texas, United States
26-28 January 2001

Section 6:
Appendix