Trip Report: South China Tiger Field Methods Workshop, Provincial Tiger Status Updates, and Field Activities

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Executive Summary

The South China tiger, *Panthera tigris amoyensis,* is the rarest of the five living tiger subspecies and the most critically threatened. Over the last 40 years, wild populations have declined from thousands to a scattered few. Officials have seen no wild South China tigers for 25 years, and the last one brought into captivity was nearly 30 years ago. There are 20 or so nature reserves listed by the State Forestry Administration (SFA), People's Republic of China, within the presumed range of the tiger, but they are spatially fragmented, and most are too small to support viable tiger populations. Despite its plight and occasional anecdotal of sightings by local people, no intensive, systematic, scientific field study has been conducted on this tiger subspecies and its habitat. Its precarious status demands that conservation priorities be established and action taken immediately to decide if recovery of the wild population will be possible.

To address this need, the U.S. Fish and Wildlife Service, through its Rhinoceros and Tiger Conservation Fund, and The Tiger Foundation, based in Vancouver, Canada, are supporting a cooperative project with the SFA to train, equip and advise five Chinese survey teams to census wild South China tigers in the provinces of Guangdong, Hunan, Jiangxi, Fujian, and Zhejiang in south-central China. This report summarizes the first training workshop on field census methodology, which included techniques for collecting data on tigers, prey, habitat quality and threat evaluations, use of infrared camera

technology, and developing a GIS map-linked database of all observations. An important objective was to develop the technology to find and photograph wild South China tigers. This would assist the SFA to establish where and how many South China tigers still remain in the wild, their probability of survival, and what needs to be implemented to secure their future

Background

(*Excerpt from Tilson, Traylor-Holzer and Qui Ming Jiang, 1997*)

China is the only tiger range country that has four of the five living tiger subspecies within its borders. One of these subspecies, restricted to the subtropical areas of China, is the South China tiger *P.t. amoyensis*, considered the evolutionary antecedent of all tigers. Formerly the most common subspecies in China, the South China tiger has all but disappeared in the wild due to over hunting and habitat destruction.

The status of wild South China tigers as of 1997 remains vague. In the early 1950s, the South China tiger was reputed to number more than 4,000 when it became the target of many large-scale "anti-pest" government campaigns. Official government statistics documented that an estimated 3,000 tigers were killed during the 1950-70 year period. The effects of uncontrolled hunting were compounded by extensive deforestation and probable reduction in available prey, leading to population fragmentation and increased vulnerability to local extinction due to stochastic events. This resulted in a rapid decline in the wild tiger population, and by 1982 only an estimated 150-200 wild South China tigers remained.

In 1975, the Regulation Regarding the Protection of Wildlife Resources classified the South China tiger as a third category species [protected by controlled hunting]; by 1973 it was upgraded to second category level [a protected and prohibited from hunting species]; and by 1979 it achieved first category status [full protection], but it was ineffective. Hunters neither accepted nor respected the regulation, and wild tiger numbers continued to decline.

Population estimates continued to decline through the 1980s, despite its listing as Category I on China's National Register of Endangered Animals and the creation of three nature reserves for its protection [Chebaling, Guangdong Province (75 km^2); Bamianshan, Hunan Province (200 km^2); and Jingangshan, Jiangxi Province (159 km^2)]. During this period, evidence of wild tigers in central China was spotty and seldom confirmed.

A 1990 survey found a few signs of tigers, and possibly cubs, in 11 protected areas in the remote mountains of Sichuan, Guangdong, Hunan, Jiangxi and Fujian Provinces. No tigers were directly observed; evidence was limited to sightings of tracks, scrapings, and reported sightings by local people. Remnant populations are now believed to occupy montane sub-tropical evergreen forests within protected areas situated along transprovincial boundaries of Guangdong, Fujian, Jiangxi and Hunan Provinces. These sites are spatially separated from each other by agricultural or deforested areas and are, for the most part, too small to maintain viable tiger

populations (14 of 19 are about 100 km^2 or less, the other five range from 180 to 705 km^2).

The SFA made preservation of the South China tiger a priority in its Agenda 21 initiative in 1995. The subsequent five years of research by the SFA resulted in a Draft Action Plan For Saving the South China tiger. After the survey in 1993, the SFA ordered continuous data collection of the all observations and information on wild South China tigers. Over 2,000 pieces of information were collected by May of 2000, including eyewitness sightings, tigers roaring, tracks, scratches, hair and skeletons or parts of their prey. A comprehensive analysis of the possibility and reliability of the above information was made in combination with the continuity of the natural landscape and vegetation. While no direct sightings have taken place, this evidence suggests that South China tigers may still persist in a number of localities but where and how many are not scientifically validated yet. The potential distribution area covers 11 natural geographical units and is about 90,000 km^2, with six of the 11 units covering about 18,000 km^2.

Workshop Report: Before the Workshop

The evening before the workshop began we met our primary counterpart, Mr. Weisheng Wang, Deputy Director, Department of Wild Fauna and Flora Conservation, SFA, Beijing, at the hotel in Longyan City where the workshop was planned. He introduced us to Dr. Hu Defu, Associate Professor at the College of Biology, Beijing University of Forestry, who is designated by the SFA as the Leader of the Central Technical Group for the survey of South China tigers, and another member, Mr. Liu Weishi, an Engineer in the College of Wildlife Resources, Northeast University of Forestry in Harbin City, Heilongjiang Province. We discussed and agreed upon the workshop agenda and were treated to a wonderful banquet by our host, Mr. Yang Hanzhang, Chairman, Forestry Commission of Longyan City.

Workshop: Day One

Plenary Opening Session

Deputy Director Weisheng Wang, who welcomed the distinguished national and international guests, opened the meeting.

Opening of the Longyan Tiger Workshop (L to R, Ronald Tilson, Ruan Yunqui (Fuzhou City), Wang Weisheng (Beijing), Yang Hanzhang (Longyan City), and Hu Defu (Beiging).

Mr. Yang Hanzhang, Chairman, Forestry Commission of Longyan City, Fujian Province, welcomed everyone to this important meeting. He stated his hope that the meeting would move forward the conservation of South China tigers in the province, as well as the South China tiger captive breeding and reintroduction programs. "His administration will do its best to provide good service for this workshop and hoped that all would go smoothly," he said.

Mr. Ruan Yunqiu, Director of the Fujian Administrative Station of Wildlife Protection, and Director, Division of Wild Fauna and Flora Conservation, Forestry Bureau of Fujian Province, Fuzhou City, Fujian Province also welcomed everyone. He expressed "his hope that the workshop will greatly promote South China tiger conservation in Fujian Province, and that we will do our best to support the training workshop and contribute as best we can."

Ronald Tilson, Director of Conservation at the Minnesota Zoo and leader of the US technical advisors to the South China Tiger Protection Program, thanked the hosts for inviting him and introduced the other advisors, Dr. Philip Nyhus from Colby College, Maine and formerly of the Sumatran Tiger Project, and Mr. Jeff Muntifering, graduate of St. John's University, Minnesota with field experience in with Namibian cheetah, Alaskan grizzly bears and Minnesota wolves. He mentioned that the advisory team came to China after receiving an official invitation from the SFA through Deputy Director Weisheng Wang, and through the generous support of the U.S. Fish and Wildlife Service's and The Tiger Foundation. Tilson explained that he visited China in 1995 and 1996 to assist the Chinese Zoo Association (CAUZ) with the captive management of South China tigers in the cities of Shanghai,

Chongqing, Suzhou and Guangzhou. "It is a new millennium and we are now here to help with the protection of the South China tiger in the wild. Our purpose is to serve as technical advisors in tiger field methodology. Our primary objective is to provide scientific evidence that the South China tiger is still alive. The most irrefutable way to do this is to photograph a tiger in the wild. We are here to help you accomplish this. We are honored to be invited and we thank you," said Tilson.

Deputy Director Weisheng led a short discussion of the critical areas of where South China tigers are thought to occur and explained the plans of the SFA and provincial governments on habitat and tiger restoration. Most of this information is documented in the government report, *China Action Plan for Saving South China Tiger*, 1999.

Beginning in 1993, the Ministry of Forestry (now the SFA) ordered the continuous collection of all information on wild South China tigers. Over 2,000 pieces of information were collected by May of 2000, including eyewitness sightings, tiger roars, tracks, scratches, hair and prey skeletons or parts. A comprehensive analysis of the reliability of the information was made in combination with analysis of the natural landscape and vegetation. The analysis confirmed the likelihood wild South China tigers still exist in China. The potential distribution area covers 11 natural geographical units and is about 90,000 square kilometers in extent. For the present, the SFA has decided to focus on three primary projects in areas of south central China where they believe the probability of finding wild South China tigers is the greatest. These projects are briefly described below.

Expansion of Yihuang Nature Reserve in Jiangxi: The reserve covers an area of 230 square kilometers and some evidence of South China tigers has been confirmed. This project will expand the reserve to an area of 583 square kilometers by rehabilitating about 3,000 hectares of farmland and relocating approximately 400 families. The reserve will then connect naturally with surrounding hills of some 5,000 square kilometers to form an integrated protected area covering a total of 5,800 square kilometers with the reserve as its core. If possible, they hope to trap four to six isolated tigers in other areas and transfer them to Yihuang for improvement of the resident population's genetic structure. Their plan also carries the provision to add 10 more protection monitoring stations in Yihuang to patrol for poachers and monitor the population.

Expansion of Fengyangshan-Baishanzu Nature Reserve in Zhejiang: This reserve combines the former Fengyangshan and Baishanzu nature reserves and now covers 109 square kilometers. The plan is to expand this reserve to 400 square kilometers by rehabilitating about 3,000 hectares of farmland and relocate some 800 families around it. A protected area of about 1,000 square kilometers will be available for the wild population of tigers. Translocations of tigers and additional protection and monitoring stations are also planned.

Habitat Rehabilitation of Luoxiao Mountain: This area covers 6,000 square kilometers including five nature reserves: Mangshan, Taoyuandong, and Guidong-Bamianshan nature reserves of Hunan Province; Jinggangshan nature reserve of Jiangxi Province; and Jiulianshan nature reserve of Guangdong Province. Because farmlands and villages separate isolated tigers, two steps are proposed to connect these populations:

- Rehabilitate about 11,000 hectares of farmland, relocate approximately 2,700 families, and introduce sufficient prey to the rehabilitated areas;
- Build eight to 10 new protection and monitoring stations.

In summary, the SFA plans to restore 15,800 hectares of farmland back to natural tiger habitat and to relocate approximately 3,900 families. This will establish three integrated, biologically diverse habitats of 5,800, 6,000, and 1,000 square kilometers. The number of protection and monitoring stations will be increased by 20 to 30 to form a more effective protection network.

Workshop Session Two: Provincial Forestry Reports

Director Ruan Yunqiu, Fuzhou City, Fujian Province

The potentially important areas in Fujian Province were determined to be near Sanming City and Lungyuan City. The most important evidence we have obtained to date is from Sanming City, Qing Liu County. Mr. Muntifering has been there to visit. There are also many reports of local informants who have found scrapes, possibly made by tigers. Most of the evidence to date is scrapes and the survey teams are checking to see if tigers made the scrapes. Mr. Luo Ming-Xi and Mr. Chieu will provide the details.

Mr. Luo Mingxi, General Secretary of Meihuashan Nature Reserve, and leader of the Lung Yan Administration's survey of wild South China tigers

Meihuashan Nature Reserve was established specifically to protect the South China tiger. According to historical evidence, we divided the area into five regions where we suppose tigers still exist. From the evidence, we think it is very possible for the tiger to live in the Meihuashan. There are many ways for tigers in this reserve to contact tigers in surrounding areas. In 1998 we obtained 20 types of secondary evidence, including footprints and scrapes and a report of a tiger roaring. This evidence received considerable attention from the city government. In the field survey of 1990-1992, a cooperative project between the SFA and WWF China (see report by Gary Koehler, WWF 1992) we found many traces (Editor's note*: the word trace generally refers to any kind of physical sign—tracks, ground scrapes, tree scratches, feces, or hair*) of wild tigers.

The most interesting field evidence that we have obtained was in July 2000, when we found scrapes in the area and many local people reported to us that they heard tigers roar during July and August. Since then we have received no new evidence.

Abstract of Koehler's Report*: Koehler's (1991) field survey found evidence of tiger activity, even reproductive evidence, in 11 protected areas in the three provinces of Guangdong, Hunan, and Fujian. However promising, his observations, along with all other South China tiger data confirmed by officials in the previous 25 years, yielded no visual sightings. Koehler also found frequent sign of possible tiger prey species, including Sambar deer (Cervus unicolor), serow (Capricornis sumatraensis), wild pig (Sus scrofa), several other deer species, rodents and lagomorphs. Other predators sharing the surveyed area were leopard, clouded leopard, leopard cat and golden cat. With only tracks documented, it was not possible to estimate population size of tigers, prey or other predators.*

Mr. Zheng Jinpo, Deputy Chief of Wildlife Management, Forestry Committee of Sanming City, Fujian

In our area we have three important sites: Qingliu County, Jiangle County, and Yong'an County. In September 2000 we heard that 15 sheep and one calf was lost. We found the skull and skin of a tiger. Local people reportedly still have the skull. From September to October there were five reports of a tiger roaring, and a local

villager reported seeing a tiger in the mountains in November. Our investigation team went to the area and found samples of hair, which we are sending to the SFA Wildlife Detecting Center in Harbin. Mr. Muntifering just visited this site. We also found a footprint and made a plaster mold of it (about 8 cm wide). At the same place we found four scratches on a large tree (about 1.5 m high, and another four scratches at 1.4 m), and we found ground scrapes (about 40 cm long by 15 cm wide). Additional scrapes were found at higher elevations. In the survey, we found tracks of many other animals, such as wild pig and deer. This year we found five more tiger scrapes and villagers reported they saw some also. The historical evidence totals 26 direct sightings by 54 people since 1990. Leopards were observed four times and clouded leopard 26 times. The area available for tigers is 220 km^2 and the less important areas measure about 300 km^2.

Mr. Tu Xiaobing, Chief of Wildlife Management Division, Bureau of Wild Fauna and Flora Conservation Forestry Department of Jiangxi Province, Nanchang City, Jiangxi Province

Last year we held a joint SFA-Wildlife Conservation Society training course, which about 50 people attended (see Endi Zhang 2000 report). After the course, the potential range of tigers was prioritized into two levels of importance. From the less important area we required the local officials to collect evidence from local people. In the more important area we organized special investigation teams for surveying, and most attention focused on Yihuang County Nature Reserve. In this province we collected 80 traces of tigers and even talked to an old hunter who had seen a tiger that weighed about 180 kg. The best evidence was from February 2001, when a 200 kg cow was killed and eaten. We found the skeleton and believe it was killed by a tiger (photograph shown) and in 1999, at the same site, another cow was eaten (photograph shown).

Mr. Peng Xianwen, Chief of Wildlife Protection Division, Forestry Bureau of Yihuang County, Yihuang County, Fuu'zhou City, Jiangxi Province

We obtained a tiger trace from an old man who had hunted tigers 20 years before. He says he knows which trace is tiger and which is leopard. The latest evidence was found this month. We found scrapes on the ground (one was 30cm long and 21cm wide) in the core area of Yihuang Nature Reserve. We found three traces in an area where it looked like a tiger had laid down to sleep. The old hunter estimated that the tiger was about 100 kg and maybe was at the site about two weeks ago. In March, we found a print on a fallen, rotten tree (about 9cm wide), but the hunter said this was a leopard that weighed about 50 kg and passed the site about 10 days ago. Two villagers reportedly saw the tiger directly and when shown pictures of leopards and tigers, they correctly identified the tiger. A villager found tracks (13 cm width), another heard a roar, and in March of this year a worker identified a scratch.

Professor Deng Xuejian, Associate Professor, Department of Biology, Hunan Normal University, Changsha City, Hunan Province

In January 2000 we obtained footprints and heard reports of direct sightings of the tiger. In subsequent months we found evidence in five different sites. Three goats were reported killed. When we investigated, we found footprints and obtained a very clear mold, noting six hairs attached to the mold. We also heard reports from local

people that 20 goats were lost. When we went to the area we found many footprints and made molds. In August we went up to the mountain with two dogs, and when we were walking, the dogs barked at something. Because of the heavy forest it was hard to see. We heard some noises going down the mountain, but I didn't see the animal, but did find many footprints of wild pigs. For a moment we heard another voice like loud blowing in a microphone, but when we went to the site we found no trace.

Mr. Yuan Xicai, Research Professor, Southern Research Institute of Endangered Wildlife, Guangzhou City, Guangdong Province

Since the Nanchang workshop we wanted to determine where the important areas for tigers are located, so we organized a local information center. Because of other business our team has not gone up to the mountain, but from local informants we learned that there were tracks in someone's food garden that measured 10 cm wide. We were unable to get a trace of the track. After this workshop our team will go to the mountains to search for the new traces.

Mr. Yao Fengping, Deputy Chief, Management Office, Baishanzu Nature Reserve, Zhejiang Province

Our team included old hunters, local officials and researchers. Our first investigation was from October to December 2000. We found 21 big tracks, 16 traces, and the skeleton of a water buffalo, mostly from the core area of the reserve, that we photographed. We left 15 goats where the buffalo was lost, and three are now missing, but we have not been able to find their skeletons. After our workshop we will release more goats to try to attract the tiger so we can take a picture of it from a tree blind.

Mr. Wang Wei, Engineer, Division of Wild Fauna & Flora Conservation, Forestry Bureau of Chongqing City, Chongqing

After the report of the tiger survey on CCTV (television), our bureau received many reports of tigers from local people living on the boundary between Chongqing and Guizhou province. Most reports were from three general areas, all along the boundary between Chongqing, Guizhou and Hunan provinces. A team was sent to area and in one village almost everyone said they had heard tigers roar, and they were afraid. The team found tracks in the area that were very different from other animals and reported these observations to the SFA. Because the report received no official answer no other surveys were performed. After this meeting we will continue our work in this area.

Mr. Ran Jingcheng, Deputy Chief, Management Office, Maolan Nature Reserve of Guizhou, Guizhou Province, and Mr. Wang Liqiang, Deputy Chief, Management Office, Xishui Nature Reserve, Guizhou Province

In 1995 local people saw tigers, and in 1996 they found some tracks. We did not first believe the reports, but because they persisted, we went to the area to investigate. In July 2000 we found seven footprints (about 13cm long and 16cm wide), some hair samples, and reports from three people who reported they had seen tigers at a distance of 20 meters. In September more footprints were found, as well as skeletons of an antelope and wild pigs. Wildlife resources in the area area are rich, and because

human activity in the area is rare, the area is suitable for tigers. Xishui Nature Reserve is about 460 km^2, which could be expanded to 2000 km^2

Workshop Afternoon Session: Demonstrations of GPS and Remote Cameras

Ronald Tilson, Philip Nyhus and Jeff Muntifering

The continued support of international donors most likely will be linked to the acquisition of photographs of wild South China tigers. This must be a field priority. Although DNA analysis of hair and scat samples can confirm the presence of tigers, the impact will be much less than that of photographs. Secondly, there are conservation organizations that will soon develop their ability to attract funds for continued tiger fieldwork in China--Save China's Tigers-- for one, and probably other larger organizations if sufficient field data are obtained. Therefore we perceive this component of the project as a pilot project in desperate need of field confirmation of wild tigers. If that occurs, the probability of attracting additional funds from international donors and from the Chinese private and public sector will be much greater.

Additional support to help develop a GIS map of tiger ranges has already begun, and once the priority sites for South China tigers have been identified, the maps can be refined. Working with Dr. Philip Nyhus we believe we can establish a GIS/Arc View map of priority tiger habitats within China and combine these analyses with other components important to long range conservation planning.

We presented an overview of the Garmin Global Positioning Units (GPS) and mapping with UTM coordinates and demonstrated how to incorporate GIS with mapping data. We described the Sumatran Tiger Project in Indonesia and how we generated our field data on tigers. We illustrated this with a short slide show. The pictures and stories were of great help in explaining the process. We followed with a short demonstration of the camera system.

We emphasized that the workshop was not the right venue for actually learning how to use the various equipment that was to be used in the field. Our intention was to give each field census team a GPS unit and compass for orientation, access to a number of Trailmaster camera systems for photographing tigers, and to provide hands on training for each team on how to use these tools when we visited their respective provinces. We shared our objectives for the next four to five months.

Field Objectives

- Train Chinese Field Biologists: Upon arrival in China a four-day training workshop for SFA staff will be held. We will familiarize staff in the use of Garmin GPS units for field data collection, orientation with forestry maps, and use of GIS-linked field data. We will present additional methodologies for community-level surveys. These methods will include village meetings and appropriate quantitative and qualitative rapid survey instruments and data gathering forms. Other components will include the collection of tiger scats and hair samples for analysis of diet (see below) and possibly DNA analysis. We will explain how to census for tigers as well as prey. All field surveys and remote camera monitoring will be conducted with side-by-side cooperation between international and field census teams with emphasis on learning and

understanding basic and advanced field methods and techniques. Five teams of five Chinese members will survey four provinces.

- Extensive Ground Surveys: Daily ground surveys will be conducted by walking mountain trails at different altitudes and in different habitat types as well as checking previously determined tiger sign locations. Team members will record wildlife signs including prints, scrapes and chance encounters. All scats and hair will be recorded and collected for analysis. All locations will be pinpointed with a GPS unit and recorded including coordinates, habitat, time and date. These data will be collected in a master database than can be linked to a spatial map of the conservation area for further analysis and to guide further research, management, and conservation decisions.

- Survey Data Collection: We will demonstrate how to use Trailmaster brand camera-trap units (35 mm, auto focus, rangefinder type) tripped by active infra-red trail monitors, and how to download camera-trap data into GIS databases, what is the most effective use and placement of camera units in the field, and how to keep the units operational. A database to file all survey recordings including photos of tigers, herbivores, and other predators will be created. These photos can then be organized for storage and easily accessible when analysis is underway.

- Diet Analysis: Scats will be collected when found and analyzed to provide data on prey occurrence in the tiger's diet. An identification guide from known prey species' hair will be completed before analysis is undertaken for more accurate results. This ongoing database will be kept in place for further investigation to increase sample size and for more accurate results.

We concluded the demonstrations with a lengthy session of questions and answers.

Workshop: Day Two

Field Trip to Meihuashan South China Tiger Breeding and Research Center

In the morning everyone traveled to Meihuashan (Plum Blossom Mountain), about 70 km northwest of Longyan, to observe the South China Tiger Breeding and Research Center. The Meihuashan tiger facilities owe their existence to two very energetic and passionate officials of Longyan City, ex-mayor Mr. Luo Mingxi and party secretary Mr. Zhang. Since 1998 the municipality of Longyan has invested nearly US$2 million in the Save the South China Tiger project. In July 1998 the SFA approved the establishment of the Meihuashan South China Tiger Breeding and Research Center, and on August 1, 2000, it was officially opened.

The project includes the protection and rehabilitation of the habitat of nearby Meihuashan Nature Reserve, and the development of the 470 ha South China Tiger Park, which consists of three components; a breeding center for tiger prey, a breeding center for captive South China tigers, and a tiger rebarbarization (*editor's note: refers to the process of preparing the tiger for release into the wild*) area, where captive tigers will be prepared for reintroduction to not only Meihuashan, but other priority tiger areas as well. This last area, to be free from any human contact, will be built on top of a neighboring mountain.

The Save the South China Tiger project has three stages, costing 120 million yuan (US$ 15 million) and aims to result in 100 tigers at Meihuashan through captive breeding and "semi-wild and wild breeding", eventually returning them to their natural, wild state. The long-range plan is to move

approximately 10,000 people from a much larger area around the reserve in the next five years. Adjacent to the breeding facility there is a fenced-off area of several km^2 where tiger prey (sika, tufted and barking deer, and wild pig) will be raised. These animals will be fed to the tigers, and used in repopulating areas where tigers are to be released.

Mr. Huang Muqing from Suzhou Zoo is Meihuashan technical adviser, and has trained the staff of four. He started work on South China tiger research and conservation in 1984, and is well known in China for his efforts. Mr. Huang believes that even if the tigers do survive in the wild, reviving their numbers is a distant and difficult prospect.

The South China tiger reintroduction program, based at Meihuashan, will be implemented in stages. By the year 2007 they hope to have at least 10 captive-bred South China tiger, and by 2010 they hope to have rehabilitated an area of over 600 km2 into suitable tiger habitat in anticipation of releasing tigers. To accomplish this they need to relocate some 300 resident families and convert hundreds of hectares of farmland into forest. If technically feasible, they hope to obtain genetic material from wild South China tigers in other areas to increase the genetic diversity of the current captive population. Barbarization of individual tigers since birth will hopefully lead to individual tigers capable of surviving on their own after being released.

History of the Captive South China Tiger Population

To put the South China tiger captive program in perspective, the authors of this report provide some history of events that have occurred in China. Because of the fragility of the wild populations, captive South China tigers may play a role in the recovery of the wild population. This choice is fraught with problems. The decline of the tiger in China prompted a symposium on the conservation of the South China tiger in Chongqing in October 1984 by the Zoological Society of Sichuan and the Wildlife Conservation Association of Sichuan. At this meeting, a South China Tiger Conservation Coordination Group was formed to manage the captive population, but this group accomplished little more than recommending the development of a central breeding facility. In the same year, the Chinese Ministry of Urban and Rural Construction and Environmental Protection (MURCEP) approved the construction of a South China tiger research and breeding center at Chongqing Zoological Garden, but no funds were available for the project. .

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Until 1995, the precise status of captive South China tigers was unclear. At that time the International Tiger Studbook listed 36 living South China tigers, all held in Chinese zoos. Completeness of the data was suspect, as no births and little other information had been reported since 1985. Studbook pedigrees indicated that the captive population was derived from either six or eight wild-caught founders (it was uncertain whether or not two founders had reproduced after 1985). No new founders had been brought into captivity since 1970. There was no official studbook keeper in China, and reports to the International Tiger Studbook were irregular and incomplete, making analysis of the population impossible. .

The Chinese Association of Zoological Gardens (CAZG) and the IUCN/SSC Conservation Breeding Specialist Group (CBSG) initiated the first steps by updating the CAZG South China Tiger Studbook. Based upon demographic and genetic analyses of the revised studbook, the CAZG set specific five- and 10-year goals to retain 90% of the current genetic diversity in the captive population (which had already lost 22% of its gene diversity). Using this information, they drafted a preliminary South China Tiger

Masterplan, which outlined recommendations for tiger identification and record keeping, medical and management procedures, reproductive evaluation and genome banking, and training needs. This Masterplan and the accompanying CAZG South China Tiger Ex Situ Conservation Strategy recommended effective captive management of the South China tiger through institutional cooperation and renovation of existing facilities rather than by development of a central breeding facility. .

The captive population, though numbering more than 60, struggles with extreme loss of genetic diversity. As of June 2000, 62 South China tigers were held captive, all in Chinese zoos. The same father probably sired most of these tigers. An official studbook keeper was only recently appointed causing skepticism regarding the accuracy of older records and no records being added since 1985.

Workshop Afternoon Session: Reintroduction Discussion

Deputy Director Weisheng outlined two possibilities for protecting South China tigers. The first would be to find and protect wild south China tigers that still exist by establishing larger nature reserves and by banning the hunting of tigers and their prey in core ecological areas. The second would be to reintroduce tigers and their prey from captive facilities, which he elaborated on in this session.

The captive South China tiger breeding and reintroduction program was established in 1998. Some of the issues discussed concerned how to rehabilitate the habitat so that it is suitable to both tigers and their prey, what combinations of forest, grasslands and wetlands would be ideal, what combinations of prey species and size would be ideal, what kinds and sizes of buffer zones are needed to minimize or prevent tiger-human conflict, how to raise tigers so that they are suitable for release, what issues of genetics and disease do they need to address, and how to monitor the tigers after they are released. The discussion ended with the recommendation that various authorities, both within China and internationally, should be consulted for their advice on how to refine the intended South China tiger reintroduction program.

That evening at the banquet we met Ms. Quan Li, founder of Save China's Tigers charity, who flew in from London via Beijing.

Workshop: Day Three

Internal Discussions and Field Activity Plans

The morning session was devoted to discussions by provincial forestry officials on what needs to be accomplished in the coming months so that all of the tiger priority areas will be censused. It also included where the US advisory team would go to begin the process of training individual teams in field censusing methods, and where the remote camera system could be best utilized. We all decided that Yihuang County Nature Reserve was the most appropriate place.

Post Workshop Activities

After the workshop two of us loaded our field gear into a police escort car, which took us to the city bus station, where we reloaded our gear into a rickety old bus and began a long, bumpy journey to Yihuang County in central Jiangxi Province. We stayed overnight in Rening City and arrived in Yihuang County the next afternoon.
The following day we met Mr. Zhang Li Wang, Director of the Yihuang South China Tiger Reserve and were presented once again with a list of recently found secondary evidence for tigers. None of the photos had any scale, so it was difficult to even guess at measurements. The mysterious death of a snake hunter in July 1999 was suggestive of a tiger attack. The video and pictures showed a man with the entire right side of his face mauled, two semicircular lacerations on top of the head, a shattered cheek and jaw, and a tooth and bone fragments found nearby. His hunting partner described seeing three tiger cubs near where the attack occurred. A tiger may have been responsible, or possibly a leopard. No tracks were found nor any other evidence, except perhaps some hair samples, which were collected and are being analyzed (see also Endi Zheng, WCS report, 2000). The afternoon was spent discussing plans to make a preliminary reconnaissance of the reserve's core area. Fortunately, the office had military maps that used UTM coordinates, which allowed us to determine a suitable place to enter the forest based on topographic features.

We departed early for Sheng Gong village, located in the experimental zone of the reserve, on the southern boundary of Yihuang County. The road was poor; the 45 km journey took almost three hours. With the reserve shaped like a horseshoe and the largest core area located on the eastern most branch, we decided to climb in from Sheng Gong, which is located close to this core area. There seems to be one continuous village running the entire length of the valley, many more than the 400 families scheduled to be relocated, and both sides of the valley slopes are terraced for planting crops.

The human exploitation is everywhere and extreme. The path is extremely well used. Apparently once a year local villagers enter the forest and cut and dry bamboo, which dominates the upper mountain slopes (above 600 m). The artificial spruce is continuously planted and cut on the lower mountain slopes. There was no trace of any wildlife. On the ride back to the village there were scores of timber stacks along side the road. We observed numerous wandering cattle and pigs, yet there has been no tiger depredation for years, except for a few exceptions as noted above.

On the second day we headed to a more southerly access point, passing ancient bridges and buildings. While climbing we worked on more staff training, stopping every 100 m and going over some GPS skills such as understanding the system of satellites, and how to mark a waypoint and save it. We also begin taking the UTM coordinates from the GPS unit and plotting the locations on the map. After a few lessons and with Mr. Hu translating for a more thorough understanding, the team members caught on. We also demonstrated how to set up the Trailmaster camera system.

The next days were spent planning with the field team. We worked hard on explaining why it was important to work out of a base camp located near the core area, mostly to conserve time and to get away from village encroachment and distractions. Our list of supplies, outside of our personal camping gear, included: 1 large gas tank, 2 burners with tube connections, 2 teapots, 1 large kettle and necessary cookware, 6 pails for washing and water, 1 large frying pan, 5 food boxes and water bottles, 2 water thermoses, 2 2x10 m bamboo ground flooring, 2 2x10 m thick roofing material, 4x50 m plastic roofing, 200 m of rope, 5 airtight containers for cameras, 2 folding tables, 7 plastic stools, alcohol, Q-tips and a camera cleaning kit, toilet paper, mosquito coils, flashlights and batteries, a box of candles, 4 lighters, a shovel, 2 tweezers, 4 lighters and some miscellanous items.

I rode a minibus to Nanchang with Dr. Hu and caught a flight to Xiamen that evening, the next day another flight to Hong Kong, with a following day connection to Japan and the US. Jeff stayed behind and moved back to the field (see" Notes from China").

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