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Cover: Tiger in Malaysia's Taman Negara National Park

Photo: University of Florida Malaysia Tiger Project (see page 7)

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Introducing Urs and Christine Breitenmoser



At the same time, the Breitenmosers continued to work with colleagues in the Swiss Lynx Project.

In the early 1990s, fieldwork concentrated on the Jura Mountains, along the border with France, where another lynx population had been restored in the 1970s. In 1995, Urs was mandated by the Swiss Agency of Environment, Forest and Landscape (SAEFL) to co-ordinate carnivore research projects supported by the agency. This gave rise to the programme KORA (Co-ordinated Research Projects for the Conservation and Management of Carnivores in Switzerland), which Urs and Christine direct, together with two colleagues, Simon Capt and Jean-Marc Weber.

KORA is involved in a variety of applied carnivore research and management projects (www.unibe.kora.ch). The main focus is on the large predators – wolf (*Canis lupus*), lynx and, soon, brown bear *Ursus arctos*), which are recolonising the Alps; having been absent for more than 100 years, these predators are causing a lot of controversy among farmers, hunters and conservationists.

KORA currently unites over 20 young scientists working in all fields of carnivore research. In addition to executive functions, Urs is involved mainly in the development of conservation and management concepts and tools (such as translocation and the integration of predation control into wildlife management), while Christine is studying the genetic structure of reintroduced and isolated lynx populations throughout Europe.

Most of the KORA programme deals with carnivores in Switzerland and it is mainly sponsored by the SAEFL, but there



are also other government agencies and several NGOs supporting the projects run by KORA, especially the international projects, such as Status and Conservation of the Alpine Lynx Population (SCALP), the Balkan lynx recovery programme, and the Carnivore Damage Prevention Newsletter. Many of these projects are carried out in the frame of the Large Carnivore Initiative for Europe (www.large-carnivores-lcie.com).

But Urs and Christine have a life apart from carnivores. The Breitenmoser family includes two children, Kaspar and Moritz, aged six and three, who prefer dinosaurs to cats. Nevertheless, they like to attend carnivore conferences, and they might show up occasionally at a cat meeting.

The Breitenmosers live in an old farmhouse in Muri, a town on the outskirts of Bern, close to the KORA office.

The new co-chairs of the Cat Specialist Group, Urs and Christine Breitenmoser, are zoologists from the University of Bern, Switzerland. In 1983, Urs, who is 46, started radio-tracking Eurasian lynx (*Lynx lynx*) in the Bernese Oberland region of the Swiss Alps to study the ecology of the population, which was reintroduced in the 1970s after a century of absence. He was awarded his doctorate in 1986. Christine, now 43, worked in the same area and received her doctorate in 1997 for studies of running-water ecology, focusing on the ecology of the dipper (*Cinclus cinclus*).

After their marriage in 1986, they went to Canada to work for two years as post-docs with Professor Tony Sinclair in a large ecosystem project of the University of British Columbia and other Canadian universities. The project involved a study of the 10-year cycle of high and low numbers of the snowshoe hare (*Lepus americanus*) in the Kluane area in the south-western Yukon; the Breitenmosers joined the team to work on the Canada lynx (*Lynx canadensis*), whose population follows the cycle of the hare, its main prey.

When they returned to Switzerland, Urs joined the Swiss Rabies Centre at the Institute of Veterinary Virology at the University of Bern, which led a successful campaign to eradicate rabies from Switzerland.

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200 Tigers Killed in India Last Year, Says Leading Conservationist

Nearly 200 tigers in the wild were killed in the first year of the new millennium, according to leading tiger conservationist, Valmik Thapar. "The figures are terrible, but the ground realities are worse because a number of deaths still remain unrecorded," he told *The Times of India News Service*. Thapar added that the country had about 3,000 tigers at the start of the year 2000, so today their population could stand anywhere between 2,500 and 3,000.

"All that we can do is to fight as valiantly as we can to save our national animal," added Brijendra Singh, Honorary Wildlife Warden of Corbett National Park and Tiger Reserve.

The two tiger specialists made their remarks at a ceremony at which Brijendra Singh received the 2001 Esso award for tiger conservation from the Chief Election Commissioner, M.S. Gill. A new book edited by Thapar, "Saving Wild Tigers", which contains the writings of the champions of tiger conservation in the last 100 years", was also launched at the ceremony (see Book Reviews p. 39).

Gill also presented special awards to Pravin K. Chawdhry, from the Tropical Forest Research Institute in Jabalpur, who has spent six years strengthening the management systems of the Panna Tiger Reserve; R.S. Chundawat, from the Wildlife Institute of India in Dehra Dun, who runs the only radio-tracking study of tigers in India; Rajendra Singh, of the Tarun Bharat Sangh in Alwar, who is regarded nationally as the Water Man of India for his work on water conservation; Praveen Bhargav, of Wildlife First in Bangalore, who works actively to protect tigers in Karnataka; G.S. Rathore, from the Prakratik Society in Ranthambhore, which runs health care and community conservation programmes; and Mrinal Chatterjee of the Institute of Climbers and Nature Lovers in Calcutta, who works deep in the mangrove swamps of the Sunderbans Tiger Reserve.

Project Tiger Director P.K. Sen said tiger numbers were declining because of "ever-growing habitat vandalism, depletion of the tiger's prey base, illicit trade in tiger parts and lack of infrastructure facilities, staff and money" to effectively protect the tiger.

The news service quoted another unnamed tiger conservationist as declaring that coordination between the Central government and various state governments on ti-

ger programmes left a lot to be desired.

"It's high time that the Central and state governments got together to save our natural resources. They must ensure that the money meant for conservation reaches the right quarters and that the 25 to 30 per cent of vacant posts in the Forest Departments are filled up. Otherwise, our wildlife is doomed."

Prime Minister Writes to State Chief Ministers

The Indian Prime Minister, Atul Bihari Vajpayee, has called on State Chief Ministers to remove impediments to conservation of the tiger and other threatened species and step up protection. In a letter dated 29 March 2001 he wrote:

"In recent years, there has been an increase in the number of killing of wild animals like Tiger, Panther, Elephant, Rhino, Musk Deer and other species. Several cases of illegal export of wildlife products derived from various species have been detected from time to time. This is a matter of great concern.

"One of the major reasons for decline in standards of wildlife protection is the large number of vacancies at various levels in the field formations of the Forest Department and need for greater commitment on part of the officials. Certain states have made drastic cuts in the number of sanctioned posts in the department and have also banned filling up of vacant posts. Allocations to the sector have also been grossly inadequate.

"There is also need for upgrading successful prosecution of the offenders. There is also need for upgrading of the skills of the staff both in respect of prevention of wildlife

crime and successful prosecution of the offenders.

"An effective mechanism for intelligence gathering needs to be developed and steps for designating special courts for trying wildlife offences taken. Further, effective infrastructure for communication, adequate mobility and sophisticated weapons have to be made available to the forest staff if we want to protect and conserve our flora and fauna.

"I hope after a review of the situation relating to your State, the issues mentioned above would receive your personal attention so that wildlife protection gets the priority it deserves."

Tiger Enforcement Task Force and Anti-poaching Training

At a meeting in New Delhi in April, 2001, tiger range states agreed to the establishment of a Tiger Enforcement Task Force, including a training course on anti-poaching for range states at India's National Police Academy. This was proposed by the Convention on International Trade in Endangered Species (CITES), in which 152 nations agree on measures to control international trade that threatens wild species.

"The CITES Tiger Enforcement Task Force is a vital initiative for saving the tiger from extinction," said the Convention's Secretary-General, Willem Wijnstekers. "By bringing together tiger and law enforcement experts from around the world, we aim to give tiger protection the technical support it so badly needs."

The training module at the Academy aims at strengthening wildlife crime enforcement and intelligence gathering. Though the wildlife crime enforcement training is being set up by CITES Tiger Enforcement Task Force, it would impact trading in other endangered species as well, said John Sellar, a British police officer who is the Task Force co-ordinator.

The aspects that need to be looked into for effective wildlife crime enforcement are anti-poaching systems, judiciary and prosecution processes, inter-agency, cross-border and international co-operation and liaison with Interpol and the World Customs Organisation.

Tigers and many other species threatened by international trade are listed on Appendix I of CITES, which bans commercial trade in them.

Tiger Poaching Gangs Busted

Officers of India's Central Bureau of Investigation (CBI) made two spectacular seizures of tiger and other wildlife parts near Nagpur, Maharashtra, in central India on 21 March 2001. Two inter-state gangs were busted and six people arrested. The seized items included five tiger skeletons, one tiger skin, four leopard skins, tigers' claws and teeth, and antlers.

The tiger skin, which was only a few weeks old and had not been properly tanned, came from a tiger that had either been poisoned or electrocuted. The leopard skins all had bullet marks and were well tanned. A vehicle used by one of the gangs was also seized.

It was the first seizure of tiger parts carried out by the CBI since the Central Government issued a notification on 23 January this year, granting the CBI full powers to deal with wildlife smuggling.

A Special Task Force (STF) of Uttar Pradesh police busted an international gang of poachers on 24 February, arresting four persons and recovering one tiger skin, seven tiger heads, 41 kg of bones of different protected animals and equipment used in poaching.

A spokesman told reporters that the gang had been operating in and around Dudhwa National Park, near the Indo-Nepal border, for the past six years and had so far killed 600 protected animals, including tigers, deer and birds.

The arrests were made following the interrogation of two persons arrested last month near Lakhimpur Kheri from whose possession a leopard skin was seized. They acted as "carriers" for an international gang of poachers and supplied animal skins and other body parts, he said.

On 23 April, the special task force carried out raids in Kanpur and Lucknow towns and seized 24 leopard skins, Rupees 500,000 (\$10,650) and a pistol from a group of five, including two Nepalis, who were arrested.

The Uttar Pradesh government earlier denied that poachers were active in the forests of the state despite the spurt in tiger deaths, saying that out of four cases of tiger deaths only one was a clear case of poaching.

With the discovery of the carcass of an adult tiger in a canal Forest Department officials expressed apprehension that the tiger had been poisoned by Bangladeshi refugees who have settled in the region.

The Forest Department has lodged a re-

port naming six people, including the head of a poaching gang, but independent sources said the death was shrouded in mystery, since preliminary investigations had revealed bullet-like marks on the body.

An honorary wildlife warden said the tiger was spotted near human inhabitation some weeks back. It was said to have killed a labourer sometime earlier. Accompanied by a semi-adult male cub, the tiger had become a source of terror amongst the local people and hence chances of poisoning were high.

Delhi police ambushed a van carrying five tiger and six leopard skins on 24 April. Following a tip-off, the police had been shadowing the suspects and obtained details about plans to pick up the skins and the route to be followed. Three men in the van were arrested.

Police said the biggest tiger skin measured over 11 feet, while the biggest panther skin was over eight feet long. Five of the skins also had the heads mounted.

The accused reportedly told the police that the skins were to be sold to their contacts for around Rupees 2.5 million (US\$50,000). Investigations are also being conducted to identify the persons who were supposed to buy the skins.

However, according to Ashok Kumar of the Wildlife Trust of India, all of the skins were very old trophies from pre-ban days. The present owner of these skins was a 70 year old widow of a senior forest officer (deceased). An authorisation to possess these skins (ownership certificate) had been issued in 1973.

At present, the Wildlife (Protection) Act of 1972 permits owners of wildlife articles covered by ownership certificates to sell or give them away. The Wildlife Trust of India is pursuing a change in the law so that ownership of such trophies (including shahtoosh shawls) can be transferred only by inheritance. This was expected to be im-

plemented in a few months, Kumar said.

In the southern coastal state of Andhra Pradesh poachers trapped a tigress in Srisailem Tiger Sanctuary early in February, slit its throat and made off with three of its legs, police said. The three-year-old tiger's carcass was found by people from nearby.

Three more tigers were reported killed by poachers in Tadoba and Pench Tiger Reserves in Maharashtra in 20 days in February-March. One was skinned, another poisoned, and a third electrocuted.

A spokesman confirmed two tiger deaths near Tadoba Tiger Reserve. In one case, a steel trap was used to catch the tiger, after which it was skinned and its paws chopped off.

"We have booked three suspects", the spokesman said, adding that another tiger death had been reported poisoned close to Pench.

A regional forest office said a male tiger had been electrocuted about 50 kms from Pench and the body found.

The spokesman said the staff could not be blamed. "We are desperately outnumbered and just do not have enough staff to combat the poachers," he said. The shortfall in the forest staff in Maharashtra is estimated to be about 40 per cent.

The Press Trust of India reported from Coimbatore on 29 March that an unclaimed parcel at Tirupur railway station was found to contain the skins of two tigers and 29 leopards. The report said the parcel reached Tirupur by Kovai Express from Chennai (Madras) about four months earlier. It was said to have been sent from Rajasthan to Chennai."

In Bangalore, police arrested two men on 26 April trying to sell tiger and deer skins in a central park in the city. The men said they had bought the skins from a man in Andhra Pradesh.

(Compiled from Indian press reports)

The Deadly Toll

A Ministry of Environment and Forests' database on seizures shows that 123 tiger skins and bodies, and 370 leopard skins and bodies were seized from poachers or illegal traders between January 1998 and July 2001.

Seizures are, of course, the tip of the iceberg, as police and customs authorities recognize, so that the figures could indicate, conservatively, that at least 1,850 leopards and 615 tigers were killed, maybe up to twice as many, in the two and a half years.

In addition, there were seizures of skulls, teeth, claws and penises, which are not included in the calculation as they could have come from the skinned bodies.

Sell Tigers on the Web, Says Thai Breeder

A provincial zoo owner in Thailand wants to help save tigers by selling them over the Internet.

According to the Bangkok Post (22 Oct. 2000) Chuvit Pitakpornpallop admits the law would have to be changed first, but insists commercial breeding and trade could help save the species from extinction and wipe out the black market trade.

Mr Chuvit floated the idea at a seminar organised by the Thai Rak Thai party at the Queen Sirikit National Convention Centre. He said the law should be amended to allow commercial breeding and trade, in the same way as crocodiles and deer can be sold openly.

Chuvit, a Thai Rak Thai election candidate, said he began raising a pair of cubs in 1992. Today he has 30 tigers and believes this will grow to 100 in 2003 and 200 by 2005.

He said a tiger cub sells for 50,000 to 100,000 baht (about US\$1,100-2,200) on the black market. About 1,000 cubs, worth 50-100 million baht, were traded annually.

"If we can amend the law, about 20,000 tigers could be raised domestically over the next 5-10 years," he said.

Tiger Research in Taman Negara National Park, Malaysia

by Kae Kawanishi¹, Melvin Sunquist¹, and Sahir Othman²

Introduction

Peninsular Malaysia occupies the southern end of the distribution of the Indo-Chinese tiger (*Panthera tigris corbetti*). Although little is known of the conservation status of tigers in most Southeast Asian countries, Malaysia supports substantial populations of the subspecies. Malaysia is divided into two regions: Peninsular (West) Malaysia, covering 131,700 km² of the Malay Peninsula, south of Thailand; and East Malaysia, occupying 198,300 km² of northern Borneo where tigers are not found. In the past century or so, Malaysia lost about half of its forest cover. Most of the remaining forests are now found primarily in isolated mountainous regions with little agricultural value.

Since independence in 1957, large areas of productive lowland forests in Malaysia have been converted into oil palm and rubber plantations through government agricultural development schemes. In addition to this habitat loss and fragmentation, increased demands on wild meat and high-priced body parts of some wild animals brought population declines of many large mammals, including elephant (*Elephas maximus*), sambar deer (*Cervus unicornis*), seladang (*Bos frontalis*), tapir (*Tapirus indicus*), Sumatran rhinoceros (*Dicerorhinus sumatrensis*), and tiger (*Panthera tigris*). The Javan rhinoceros (*Rhinoceros sondaicus*) and banteng (*Bos javanicus*) are now believed to be extinct in

Peninsular Malaysia. The human impacts on the populations of smaller endangered mammals, such as various cat species, civets, and dhole (wild dogs) are unknown. Nonetheless, most of these species are totally protected in Malaysia.

With the opening of the forests for agricultural development and the raising of livestock, the natural habitats and prey most preferred by tigers became depleted and, at the same time, tigers were exposed to domesticated animals. Consequently, tigers are frequently reported to prey on livestock outside the protected area system. Protection of human life, livestock, and crops from wildlife is the responsibility of the Department of Wildlife and National Parks Peninsular Malaysia (PERHILITAN). Any animals posing threats are killed occasionally by locals, but if possible, captured and relocated by PERHILITAN. Animals are sacrificed by PERHILITAN as the last resort.

In 1976 the tiger became a totally protected species under the Protection of Wildlife Act of 1972. In the same year, PERHILITAN established Tiger Management Units in four states with large tiger populations. Primary task of TMUs is to reduce the conflict between tigers and men by attending to villagers' complaints and reports on livestock depredation; capturing problem tigers if necessary; and monitoring tiger movements near villages and plantations. No compensation is paid for the loss of livestock. As a result, the offi-

cial persecution of tigers in most parts of Malaysia stopped, and 'problem' tigers captured if possible and transferred to the Melaka Zoo, where PERHILITAN has maintained a breeding center for tigers since 1982. Anyone found guilty of killing a tiger is liable to a penalty of up to RM.15,000 (US\$4,000) and/or up to five years imprisonment. To date, no one has received the maximum penalty.

The estimated number of tigers in Malaysia declined from 3,000 in the early 1950s (Locke 1954) to 250 in the early 1980s (Khan et al. 1983). Although both these estimates were not derived from sampling-based statistics, they are nonetheless indicative of a rapid population decline. A recent official estimate of 500 tigers (Topani 1990), based on years of depredation reports and surveys done by PERHILITAN staff, suggested a population comeback. Asserting that the Topani's estimate was conservative, PERHILITAN later adjusted the number to 600-650 (Samsudin and Elagupillay 1996), which serves as the most up-to-date estimate of the nation's tiger population today.

The existing protected area system in Peninsular Malaysia relies heavily on its only national park, Taman Negara. Established in 1938, and largely due to its inaccessibility, the park has remained intact and undisturbed for the most part. It encompasses 4,343 km², accounting for 59% of the total protected area in Peninsular Ma-

Malaysia. It is not only the largest park among 13 national parks in the nation (12 other parks are in East Malaysia), but also one of the largest in Southeast Asia.

Taman Negara is part of a large contiguous tract of forest that stretches to southern Thailand. Encompassing a total of 27,469 km², this large forest tract includes 7,135 km² in five protected areas (Dinerstein et al. 1997), offering the best chance for long-term persistence of the tiger population in Malaysia. Under the Constitution of Malaysia, land is a state matter and the State Executive Committee of each state, not the Federal Government, is the highest decision-making body concerning land-use policy. In addition to the geographical significance, Taman Negara thus represents the only piece of land in Peninsular Malaysia that comes under direct jurisdiction of the Federal Government. Therefore, Taman Negara is a stronghold for many of the endangered species in Malaysia.

Yet even in this most critical conservation area, ecological data on many endangered species, including tiger-prey communities, are lacking. Thus, this joint project between University of Florida and PERHILITAN aims to provide the baseline ecological information on tigers and prey from Taman Negara, using sampling-based population estimation techniques. More specific objectives are: 1) to develop and refine the sampling techniques necessary to estimate the density of tigers and abundance of prey species, 2) to estimate population size of the tiger and prey biomass, 3) to investigate tiger ecology in relation to habitat integrity, and 4) to improve local capacity in application of sampling techniques so that the monitoring of the tiger population in the country can be continued.

International Collaboration

The conservation of the wild landscape that supports top predators and their prey species has become a global concern. With almost half of the land still forested, a tiger conservation effort based on sound knowledge of its ecology is not too late in Malaysia. In developing countries, government organizations, especially those concerned with natural resources, are often understaffed and chronically lacking in funds for research, and sometimes expertise. PERHILITAN recognizes that the attainable goal requires international cooperation.

This is the first intensive ecological

study on tigers in Malaysia and the first long-term research conducted by any foreign institution in Taman Negara. From the onset of the project, the project has received tremendous support from the Director General and former Director General of PERHILITAN, and all aspects of the fieldwork are supported and assisted by various PERHILITAN personnel. At the beginning of the project in 1998, an officer and a senior ranger were assigned to the project as a project counterpart and permanent field assistant, respectively. The field team, headed by Kawanishi (a PhD candidate at University of Florida), consists of 8-10 persons, including PERHILITAN rangers, local research assistants, aborigines, and, occasionally, villagers. We exchange field notes with PERHILITAN's Rhino Protection Unit, which surveys for rhino tracks in large areas of Taman Negara. We are also working closely with the Research Division to standardize the data management system for all camera-trapping studies in Malaysia. The Management Information System Division (MIS) provided the project with past records of tiger tracks in Taman Negara and a base map for a Geographic Information System (GIS). All the spatial information collected in this study will eventually be added to the PERHILITAN database. In cooperation with MIS, we will be building a wildlife database for Taman Negara using GIS, which will serve as a prototype for the rest of the protected area system in Malaysia.

Tiger experts anticipate that this project will generate one of the most reliable estimates of tiger density from primary rainforests. By filling a major gap in our current understanding of tiger ecology, the result will have major implications for global tiger conservation. With this ambitious goal, the project has received generous financial support from the Save the Tiger Fund (54%), a special project of the National Fish and Wildlife Foundation created in partnership with ExxonMobil Corporation, the World Wide Fund for Nature (WWF)-Japan (18%), WWF-UK (8%), the Disney Wildlife Conservation Fund (8%), University of Florida (8%), WWF-Netherlands (4%), and personal donations (<1%). Other partners for the conservation efforts of Malaysian tigers include the New York based Wildlife Conservation Society and WWF-Malaysia, both of which are conducting tiger-related research programs in other parts of Malaysia. Within the next few years, outputs of all the collaborative re-

search will be put together, and the results will enable us to understand the conservation needs for the species, and to devise an ecosystem- and landscape-scale conservation strategy for tigers in Malaysia.

Methodology

Chances of observing tigers in a densely vegetated rainforest are extremely rare. The project thus uses both active and passive infrared camera-trapping systems, electrically triggered by animals passing in front of the camera, to capture the image of tigers. Then, based on the photographs, individual tigers are identified based on their unique stripe patterns. The capture history data will be analyzed using program CAPTURE software (Otis et al. 1978, White et al. 1982, Rexstad and Burnham 1991). Application of this population model to estimate a tiger population using photographic data has been refined by Karanth and Nichols (1998) and successfully applied to tiger populations in India. In order to estimate the population size of tigers in this large relatively undisturbed primary rainforest, we needed to sample multiple sites. Then, to photographically capture and recapture multiple individuals, the size of each sampling area must be large enough to encompass the home ranges of several tigers. Based on available information and financial as well as logistical resources, three sites of 200 km² each were selected as study sites in Taman Negara.

Up to 45 camera traps are placed at strategic points to maximize the opportunities to capture tigers. The site selection is based on preliminary surveys and information gathered from aborigines and PERHILITAN staff. Cameras are attended to every month and left in the same location throughout the trapping period unless trapping performance is too poor at specific localities. Most of the field time is spent maintaining these camera traps in the road-less study areas. On average a team can attend 1.5 cameras/day.

In addition to the camera trapping, scats of tigers and leopards are being collected for a dietary analysis, and line-transect and track-count sampling are being conducted to estimate the abundance of prey species, while signs of human/natural disturbance in the park are being systematically compiled to assess the habitat integrity for tigers and prey. All the above information will be incorporated into a spatial model of the predator-prey communities using GIS.

Progress

Overall project period, January 1998 – August 2002, is divided into the three main phases as follows:

1. Phase I (January-November 1998): Preparation
2. Phase II (November 1998-July 2001): Data collection
 - April 1999-May 2000: First sampling site
 - March 2000-January 2001: Second sampling site
 - November 2000-July 2001: Third sampling site
3. Phase III (August 2001-August 2002): Data analysis and dissemination.

We are in the middle of sampling at the last site. So far we have collected about 3,000 wildlife photographs of 45 vertebrate species during some 9,000 trap nights (one camera set out for one 24-hr period = one trap night). Photographs of tigers constitute 1% of the total wildlife photographs. Besides tigers, the photographs provide incontestable evidence of the existence of rare species in Taman Negara, such as dhole (*Cuon alpinus*) and Storm's stork (*Ciconia stormii*). The only medium to large mammal known to occur in Taman Negara that has not been captured on film is the Sumatran rhinoceros. We have track records of this extremely endangered species from several locations in the study sites, but so far the animals have eluded the cameras. In addition, a total of 72 scat samples of *Panthera* species await a dietary analysis. We are currently soliciting additional funding for a molecular analysis of these scats.

With financial support from international funding agencies, it has been the cooperation between American institutions and the Malaysian government that made this difficult project possible. We would also like to thank those on the ground, who spend most of their time moving from one trap site to another, carrying heavy equipment, camping gear, rice, sugar, and cans of sardines on their backs. They have kept going, despite the rigors of trying to move about in the undulating terrain, crossing flooded rivers, living in always-wet clothes and shoes, under the constant attack of ground leeches, all to ensure that cameras are functioning properly in the humid environment. Because of their dedication, interest, diligence, and sense of humor, the project has survived many difficult situations. Thanks are due to Malek Sahak, Ahmad Zaharudin, Kamarizuan Kamaruzzaman, Song Horng Neo-Liang, Abraham Mathew, Abu Zahrim Ismail, and Hairul Azhar B. Harun. Only humanity will save the tigers.

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Counting Tigers in the Russian Far East: “How many are there?” versus “Is there a change?”

by Dale Miquelle*

Perhaps the most commonly asked question about tigers by journalists, the public, and even conservationists is, “How many are there?” Unfortunately, accurately determining the population size of a wild animal as rare and elusive as the tiger is exceedingly difficult. The problem is especially complex in Russia, where, even in good conditions, tigers exist at densities as low or lower than anywhere else in the world. Good answers to this question could have important conservation implications. However, in initiating a tiger-monitoring program in the Russian Far East, we argue that the question is misdirected, usually unanswerable, and is inherently the wrong question. Instead of asking “How many are there?” we

should be asking “Is there a change in tiger numbers?” In other words, key management/conservation decisions are based on knowing something about tiger population trends – are tiger numbers stable, increasing, or decreasing? An understanding of how and why tigers are counted in Russia and elsewhere around the world helps explain this change in philosophy and change in emphasis.

Tigers are so rarely seen in the wild that it is usually necessary to rely on indirect means to assess numbers. In India, a traditional methodology relied on the ability of trained rangers to distinguish individual tigers based on the unique characteristics of their tracks, or “pugmarks”. Although this methodology has been successfully

employed by well-trained trackers when applied to small, discrete units of land, Wildlife Conservation Society biologist Ullas Karanth has demonstrated that there exist huge errors in this methodology when it is implemented by large numbers of people and applied to large tracts of land. In many of the other tropical countries of Asia where tigers occur, tracks, scat or other indirect signs of tigers quickly disappear, making it virtually impossible to assess numbers. However, throughout much of Asia today, a new methodology has been developed to count tigers using "camera traps" – a remote camera is set in the forest with a triggering mechanism that allows a picture to be taken anytime an animal passes by. Because each tiger has a unique pattern of striping, each tiger can be individually identified, and because not all tigers will be photographed, a type of mark-recapture statistical model is employed to estimate the true number of tigers in an area based on the number of times individual tigers were photographed more than once. This process provides a relatively high level of statistical confidence in estimating tigers in any given area, but it is time intensive, and requires a large number of camera stations to be effective.

A different methodology has evolved in the Russian Far East, based largely on the fact that the Amur tiger is the only subspecies for which snow, an excellent tracking medium, is present for a number of months throughout the winter. Russian biologists have long taken advantage of this fact, and beginning with Kaplanov's seminal studies in Sikhote-Alin Zapovednik in the 1930s and 1940s, tigers have been counted in the Russian Far East based on the relative size, distribution, and age of tracks. Tracks in close proximity to each other can be distinguished as representing the same or different individual based on a number of factors, including: 1) track size, which is related to both sex and age of an animal (for example, tracks with a pad width greater than 10.5 cm are almost invariably adult male tigers); 2) the date and time of day that a track was made; and 3) the distance between tracks (tracks far apart, made at approximately the same time, are obviously made by two different animals). Because snow provides a continuous tracking medium, and because Amur tigers travel so widely, the probability of encountering tracks of any individual tiger are very high. Another key factor that makes counting tigers across huge areas in the Russian Far

East feasible is the hunting management system, which allocates individual hunters to specific territories, providing a network of knowledgeable woodsmen uniformly dispersed across tiger habitat. Therefore, beginning with Kaplanov, and continuing with Abramov's work in the 1950's and 1960's, Yudakov and Nikolaev's 1970 survey, Pikunov and Bragin's 1985 work, as well as the most recent 1996 survey sponsored by the USAID Environmental Policy and Technology Project and WWF, this methodology, with changes and modifications, has been consistently used to estimate tiger numbers.

Despite the obvious advantages of this approach, there are a number of serious problems as well. First and foremost, the details on how to allocate sets of tracks to one or more tigers have never been clearly delineated. For instance, it is unclear how far apart tracks of the same size must be before they are categorized as different animals – are tracks of the same size 10 km apart considered different animals, or do they have to be 50 km apart? For the most part, the answer to this question has been "it depends" and experts have made judgment calls, based on their experience and local knowledge. For the 1996 results, Matyushkin et al. developed "soft" and "hard" criteria that could be used to develop a range of estimates, but in fact these criteria were not employed in the actual count. Instead, results were dependent on regional coordinators "expert assessments" of the number of tigers in the areas they were responsible for surveying. Expert assessments are often the most accurate estimates of the true number of animals in an area, but such estimates are non-repeatable (i.e., a second expert will almost always come up with a different estimate) and have no statistical confidence limits placed on them – i.e., we really don't have any idea of the error associated with the estimate. Therefore, it is not surprisingly that no sooner had results of the 1996 survey become available, than experts (including those who had authored the report and signed off on the results) started to disagree with the results – each of course claiming that he/she had correctly counted tigers in his/her respective area, but others had incorrectly counted tigers. These problems, and others, makes comparisons between different surveys very difficult, and comparison among different areas of one survey (if done by different experts) also problematic.

A second fundamental problem with the

traditional range-wide surveys of Amur tigers is that the effort and expense required to conduct the survey are so enormous that surveys are rarely conducted – on average not more than once every 10 years. Dramatic changes can occur in such a time period – populations can fall, rise, or do both – making it exceedingly difficult to make conservation decisions or assess effectiveness of conservation actions. The yearly surveys done in zapovedniks (strict nature reserves) like Sikhote-Alin, Lazo, and Ussuriisk are an exception, but surveys done only in protected areas do not provide an indication of the trend of populations outside protected areas.

In an attempt to alleviate some of these problems, in the 1996-1997 winter, one year after the last range-wide survey, we initiated a program to monitor tiger populations with a more standardized methodology that can be employed at more consistent intervals. To make the program more affordable, we have not attempted to survey all tiger habitat, but have selected 16 survey units that represent the full range of conditions where tigers are found – from their northernmost range in Khabarovsk, to their southernmost range in Southwest Primorye, from protected areas to unprotected areas, and from the eastern, coastal "macroslope" of the Sikhote-Alin Mountains to the inland western "macroslope." Although we are still requesting that regional coordinators count tigers, our focus is on tiger track density (and not tigers themselves) and our interest is in determining changes in density of tiger tracks.

Although such an approach is less satisfying to those continuously asking the question "how many are there?" in fact, for managers and conservationists, the critical question is really "have numbers changed for better or worse?" In fact, although we will always want to know how many individuals are out there, there will always be errors and debate associated with any count, and it is more cost-effective, as well as more scientifically rigorous, to ask the question about changes in numbers rather than absolute numbers. Millions of dollars are going into tiger conservation in the Russian Far East, and without a monitoring program that can detect changes in numbers, there is no way to assess what programs are working, or what can be changed to make programs more effective. Therefore, we strongly feel that the shift in focus from "how many" to "relative changes in numbers" is not only more scientifically rigorous, it addresses

conservation needs more directly and is more fiscally responsible.

There are many additional benefits to the monitoring program. Our methodology requires that track counts of prey be conducted to determine trends in their numbers as well as those of tigers. We also record information on human hunting intensity, poaching activity, human impacts on habitat, and reports of tiger deaths and births, all as a means of assessing changes, not only in tiger numbers, but in the key parameters that determine habitat quality and tiger density. We have included most of the local tiger experts into a unified team – D.G. Pikunov, Y.M. Dunishenko, I.G. Nikolaev, V.K. Abramov, G. Salkina, E.N. Smirnov, V.V. Aramilev, and P. Fomenko, each of whom is responsible for a set of monitoring units. Their expert assessments of tiger numbers provides continuity of estimates within each unit, and counts of tiger tracks provide a standardized measure for comparing monitoring units.

With generous support of the Exxon-National Fish and Wildlife Foundation's

Save-the-Tiger Fund, WWF, and the Tiger-Rhino Conservation Fund of the U.S. Fish and Wildlife Service, the program has completed its third season of data collection, which is still being entered into a spatially explicit (GIS) database. Results from these first three years will allow an assessment of changes in tiger numbers, at least within our sampling units, which should reflect changes across tiger range. The first two years of data (too few to statistically test for trends) suggested no major changes in tiger numbers, with some monitoring units demonstrating slight increases, and others decreases in tiger track density. However, our results clearly indicate that prey densities are dramatically lower outside protected areas than inside, and suggest that prey densities are precariously low to support the existing tiger densities. We suspect that if prey populations do not recover, that tiger densities outside protected areas are likely to decrease. By making comparisons between protected and unprotected areas, we should be able to document these changes with our incoming data, and docu-

mentation will hopefully act as a catalyst for change in management strategies.

We strongly believe that our monitoring program represents a break-through in the process of "counting tigers," a move away from the continuous arguments of "how many are there" towards a process that provides information that is directly relevant to conservation priorities. We will no doubt have to adjust and modify the program as we learn more about what works and what doesn't, but we believe the program is more than just a scientific accounting. We hope it will be used as a real management tool to gauge the effectiveness of the collective efforts of federal and provincial agencies, as well as international NGO's, to protect the Amur tiger in the Russian Far East.

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Harsh Siberian Winter Affects Tigers and Prey

by Dale Miquelle

This winter has been a very hard one on tigers in the Russian Far East. There have been many losses. In the past we have fed tigers when we there was a chance it would work, but not this last winter. But, however many cubs have been lost, does not mean the end of the population. Most adult tigers will survive the winter to reproduce again.

We are more concerned about the depletion of prey, and we are organizing a range-wide survey of prey this coming winter because it is one of the key factors now threatening tigers outside protected areas (i.e. across most of their range). Bad winters come and go, and tigers will survive them IF there is a prey base. So in the short term we are not looking at extinction, but steps to increase prey numbers and protect habitat have to happen immediately.

(Yuri Dunishenko, leading tiger scientist in Khabarovsk Province, adjoining Primorsky Province, was reported by Agence France Presse as saying that 80 per cent of cubs had died in the winter cold. He also said that the unusually low temperatures, some 10 degrees C. below normal, froze the snow and tigers could not noiselessly approach their normal prey. Deer, major tiger prey, had dramatically decreased in number.)

UK zoos joined together, following an appeal by fellow tiger conservationists in Russia, to help rescue wild Amur tigers that have been affected by the severe winter. The special Tiger Response Team, set up by the Russian authorities to deal with conflicts between tigers and humans, has requested tiger crates to hold and move wild tigers that have strayed into villages during the bad

winter. Five UK and seven European zoos have responded and the crates are now under construction in Moscow Zoo.

With temperatures 10 degrees lower than usual, the past winter was particularly hard on tigers and their prey. Numbers of the tiger's natural prey species, red deer and wild boar, are low from poaching and overhunting and because of the hard winter, resulting in the tigers being deprived of their natural food resource.

One very thin tiger was discovered in a villager's basement, and tiger conservationists Boris Litveenov and Dale Miquelle had to move the full-grown animal to a veterinary centre in the back of a car, with their fingers crossed that the anaesthetic would not wear off too soon!

"The crates will be an invaluable asset in our attempts to safely rescue these tigers and ensure that they can be moved to areas where they have some chance of survival," said Dale Miquelle of the Wildlife Conservation Society. "The crates will also be used for shipping tigers to zoos in cases where there is no alternative, but the primary aim is to help the tigers survive in the wild."

In another of many incidents over the winter, two tiger cubs were abandoned under a house when their mother was chased off after she had killed a villager's dog. Both were rescued by Litveenov and members of the Hornocker Wildlife Institute's Siberian tiger project. They were found to be severely underweight and one had a badly infected facial wound, possibly caused by a dog. Because of the infection, and because their mother could not be found, these two cubs are now in Moscow Zoo as part of the European Endangered Species Breeding Programme (EEP) for the Amur tiger. Co-ordinated by Sarah Christie at London Zoo, the programme includes zoos from Britain to Russia and Finland to Italy.

(Compiled from a report from Dale Miquelle of US Wildlife Conservation Society and a London zoo press release)

South China Tiger Survey in Progress

A Sino-American team has begun a survey to establish whether South China tigers (*Panthera tigris amoyensis*) are present in Yihuang County of Jiangxi Province. The survey is being supervised by Ronald Tilson of The Tiger Foundation and Minnesota Zoo, with Jeff Muntiferer leading the field team.

There have been several recent reports of tigers by farmers in Yihuang County, and it is believed that at least five tigers are in the South China Tiger Reserve, founded in 1992 and recently expanded to 58,600 hectares.

In March, over 20 conservation officers from seven provinces participated in a workshop, where Tilson and his team led discussions on tiger tracking and search techniques, based on experience in Way Kambas reserve in Sumatra.

The South China tiger is thought to have numbered some 4,000 before the Communist government in China declared it a pest to be extirpated. Hunting teams handed in 3,000 skins in the 1950s and 60s, and the tiger came under grave threat of extinction. A survey in the early 1990s found tiger tracks, including those of cubs, as well as scratch marks on trees and other signs of tiger presence, but none was sighted.

The Secret of a Tiger's Roar

A tiger's intimidating roar has the power to paralyze the animal that hears it, and that even includes experienced human trainers, says a news release issued by American Institute of Physics – Inside Science News Service.

Elizabeth von Muggenthaler, a bio-acoustician from the Fauna Communications Research Institute in North Carolina, presented her research at the Acoustical Society of America meeting in Newport Beach. Bio-acoustics is the study of the frequency or pitch, loudness, and duration of animal sounds to learn about an animal's behaviour. At the meeting, von Muggenthaler discussed her work analyzing the frequency of tiger sounds to better understand the part of a tiger's roar that we can feel, but can't hear.

She said humans could hear frequencies from 20 hertz to 20,000 hertz, but whales, elephants, rhinos, and tigers can produce sounds below 20 hertz. This low-pitched sound, called "infrasound," can travel long distances permeating buildings, cutting through dense forests, and even passing through mountains. The lower the frequency, the farther the distance the sound can travel. Scientists believe that infrasound is the missing link in studying tiger communication.

In the first study of its kind, von Muggenthaler and her colleagues recorded every growl, hiss, chuff, and roar of 24 tigers at the Carnivore Preservation Trust in Pittsboro, North Carolina, and the Riverbanks Zoological Park in Columbia, South Carolina.

The bio-acousticians found that tigers can create sounds at about 18 hertz and when tigers roar they can create frequencies significantly below this. "When a tiger roars – the sound will rattle and paralyze you," says von Muggenthaler.

IUCN Tiger Conservation Resolution

The following resolution on tiger conservation was passed by consensus at the World Conservation Congress in Amman, Jordan, 4-11 October 2000:

RECOGNISING that loss and degradation of natural habitat is one of the key factors leading to the decline of populations of tiger (*Panthera tigris*) in the wild,

NOTING the potential of poorly planned developmental projects to have grave impacts on wildlife habitat,

AWARE that bilateral and multilateral funding agencies have, in the past, supported development projects that adversely impacted the integrity of tiger habitats,

The World Conservation Congress, at its 2nd Session in Amman, Jordan, 4-11 October 2000:

1. URGES bilateral and multilateral funding agencies and national and local Governments to desist from making financial investments that adversely affect tiger habitats.
2. RECOMMENDS that such funding agencies and governments heighten the priority given to tiger conservation within their policies.

This Recommendation was adopted by consensus. State and Agency members The United States refrained from engaging in deliberations on this Motion and took no national government position on the Recommendation as adopted, for reasons given in the US General Statement on the IUCN Resolution Process.

(Editor: The General Statement referred to by the US delegation said, in part, that there was "a large group of motions directed primarily to a single government or group of governments on national, bilateral or regional issues. We welcome and take seriously the interest of IUCN members in important national and regional issues... but we believe that responses to these motions are best left to the country or countries affected. We will not take a position as a government on such motions (which often concern issues where we lack sufficient factual information, except as they are directed at the US government.)")

Villages in Bandhavgarh National Park, India

by Anjali Goswami*

Bandhavgarh National Park and Tiger Reserve, in the Umaria district of Eastern Madhya Pradesh, is prime tiger habitat, with plentiful water, ample prey, and stunning topography. The park boasts over 500 species of plants, 45 species of mammals, 27 species of reptiles, including 16 species of snakes, over 299 species of birds, and 92 identified species of butterflies, with several more thought to exist. The area of the park consists of a 637 km² core zone, surrounded by 514 square kilometers of buffer. A 67 km² area in Tala Range, the former hunting ground of the Maharaja, is open to tourism. In addition, the Panpatha Wildlife Sanctuary has recently been added to the park.

Madhya Pradesh is home to some 22% of the world's population of tigers, as well as being an extremely poor and uneducated state. The large tribal population and the thousands of forest villages inhabiting the same range as tigers are, therefore, crucial to their protection. Bandhavgarh Tiger Reserve is plagued by the problems typical of efforts in tiger protection in India, including habitat destruction, wildlife and wood poaching, human disturbance, and extreme pressure on limited forest resources. The park houses 14 villages and is surrounded by another 73 villages, with an estimated human population of 30,000. The burden on the tiger reserve from human and cattle dependence on the resources is extreme. Grazing pressure and wood poaching leave their mark on even the most core areas of the protected area. Poaching of wildlife is a significant problem in the Bandhavgarh area, as highlighted by a few well-publicized seizures of tiger skins and bones in recent years. The abundance of spotted deer and sambar meat available in the nearby cities attests to the severity of the issue. Vigilant patrolling may deter some criminals, but fully controlling entry into an area bound by over 70 villages is unrealistic given the current resources and management of the reserve. Forest communities must be enlisted to truly protect the wildlife and forest.

The history of man in Bandhavgarh goes back thousands of years, and the forest is dotted with artifacts of these ancient communities. In recent years, however, population explosion and outside pressures have made the relationship a hostile one. The economic dependence on the forest resources has not been replaced by any other significant income source after the notification of the tiger reserve, leaving villagers with little alternative to illegal entry. The thriving of wild herbivore populations has also wreaked havoc on subsistence farms, with damage exceeding 75% in many bordering farms. Revenue from tourism rarely reaches past the main village of Tala, failing in its goal of alleviating the economic hardships suffered by villagers.

Villagers generally distrust the Forest Department, viewing it as an enemy blocking their access to the plentiful and formerly available resources of the forest. The massive destruction of their crops by wild herbivores without any compensation, relief, or al-

ternative income source fuels this animosity, which is directed at both the wildlife and the department. The profiting of some department officers through corruption and misuse of funds is another source of contention. These sentiments result in mistrust of the Forest Department and a general apathy toward their programs.

The tourism industry has further aggravated this situation. While tourism is lauded as the perfect alternative income source for villages, the actual situation is much different. Hardly 7% of revenue from tourism is actually returned to locals, in the form of salaries or payment for goods. This small amount rarely reaches past the main tourism village of Tala (from the author's research project, *The effects of tourism on the land, the wildlife, and the local population of Bandhavgarh National Park*, conducted in 1999). The further profiting of department officials from this source exacerbates the hostility of villagers, who feel they rightfully deserve to benefit from the park as well.

Villagers are frustrated by their lack of access to necessary facilities and little opportunity to improve their living standards. Health care is among the most pressing issues. Villagers must travel up to 30 km. by foot over extremely difficult roads and trails to reach clinics. The ill can rarely make this trip, and doctors, when summoned, rarely come. Preventative health care is nonexistent, and illnesses are often reported only when advanced. Payment for services and medicine is also a problem, as the majority of families survive on yearly incomes of less than US\$50.00. When surveyed last year, most villagers named this as one of their major grievances. The Forest Department and other NGOs occasionally hold clinics; however, they usually are held once or twice a year and only in the most accessible villages from the highway. Residents from remote villages are often ignored for the sake of convenience. Regular access to doctors and provision of medicines are desperately needed for immediate relief, as well as the training of more educated villagers in basic medical care, midwifery, population control, and holistic and preventative medicine for long-term progress.

Education is another major issue in remote forest areas. While schools are present in nearly every village, few children continue past fifth grade, at which point they must move to one of the major villages to study up to eighth or tenth grade. There are presently no options for training in useful or profitable skills, and information on new technologies or different methods of construction, farming, or improving health and living standards rarely seeps down to their villages. Such methods, when they are introduced, often seem risky, expensive, and laborious. Their impact on forest resources and the consequences for the survival of their progeny are rarely considered.

At present, villagers are skeptical of outside help, as it is inconsistent and often impractical. Immediate relief, in the form of regular medical clinics, will prove more successful in gaining a positive response from villagers. Bandhavgarh Tiger Reserve, because of its fame, has attracted much attention, and a few organizations have been created to address various issues. However, all of these organizations are offshoots of local lodges or businesses. The secondary importance given to conservation work compromises the amount of attention and resources appropriated to projects. Consequently, projects are often inconsistent and inefficient. Monitoring for long-term success rarely occurs. Training and educating of villagers in improving their living and health standards and productivity will provide long-term relief and independence from outside help. Introducing conservation ideals and the need for it is for

ainable living through modeling and helping implement new methods will greatly reduce the impact on the forest resources and, hopefully, convince locals on the need for protection of forested areas. Regardless of the path and methodology chosen, incorporation of local villagers into conservation programs is crucial to the survival of wild tigers. As over 50% of Madhya Pradesh's tigers reside outside national parks and reserves, resident people will ultimately determine their fate.

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WWF Tiger Emergency Fund

The WWF Tiger Emergency Fund (TEF) is a funding mechanism, designed and managed for the rapid disbursement of small grants to address urgent threats to tiger populations in the wild. It is a joint initiative of WWF and IUCN—World Conservation Union and currently receives funds from private sources and from WWF National Organisations, including WWF-Belgium, WWF-Denmark, WWF-Germany, WWF-Netherlands, WWF-United Kingdom and WWF-United States.

Background

Despite major efforts by range states and their conservation partners, tiger populations continue to decline due to habitat loss, reduction in the numbers of prey species, poaching, poisoning, and the trade in tiger parts for traditional medicines.

WWF has selected the tiger as one of its focal flagship species and is funding a large portfolio of tiger projects. Through its Cat Specialist Group, the Species Survival Commission (SSC) of IUCN—World Conservation Union has also been involved in tiger conservation for many years. As a joint programme of both IUCN and WWF, the TRAFFIC network is also very much involved with tiger conservation through its work on trade in tiger parts.

The need to create a Tiger Emergency Fund was identified as a high priority by many wildlife departments and conservation organisations. WWF's *Year for the Tiger* campaign, linked to the traditional Chinese Year of the Tiger in 1998-1999, offered an ideal opportunity to set up such a fund. WWF and IUCN/SSC work together, combining their organisations' respective skills and resources to manage the Fund.

Selection criteria and conditions for eligibility

All applications for TEF support will be assessed by a small Selection Committee made up of representatives from WWF and IUCN/SSC. So that the Tiger Emergency Fund can operate optimally, the following selection criteria and conditions for eligibility have been adopted. In the interests of expediency, applicants are requested to comply with them as closely as possible.

1. Priority will be given to applications for emergency support directly related to the protection of tiger populations in the wild. Projects likely to have direct impact and benefit to tigers in the wild stand a better chance of being accepted than those re-

questing support for normal, recurrent expenditure. In general, applications relating to captive populations or animal welfare issues will not be accepted.

2. Applications must come from within a tiger range state.
3. Applications from individuals, local groups or non-governmental organizations must be endorsed in writing by the relevant regional or national wildlife authority and by the local office of WWF, IUCN or TRAFFIC (see the attached list of offices in tiger range states).
4. Applications from local wildlife or protected areas personnel must also be endorsed by the relevant officer in that administration.
5. The Fund's Selection Committee will judge each application on its own merits.
6. The amount of funding per application will not normally exceed \$US10,000.
7. Full applications should be concise and not exceed 3 pages in length. To speed up screening, the preparation of contracts, and the disbursement of funds, they should include the following information:
 - a) a brief description of the problem, emergency or issue for which TEF support is required and its relationship to the conservation of tigers;
 - b) relevant information on the tiger population threatened, its location, etc.;
 - c) what the TEF funding will be used for, purchase, etc.;
 - d) the identity, function and contact numbers (fax, phone, email) of the applicant;
 - e) if different from above, the identity and contact numbers of the contractee;
 - f) the identity and contact numbers of the endorsing agency;
 - g) an itemized budget in the local currency;
 - h) the title, number and location of the bank account to be credited;
 - i) letter(s) of endorsement;
 - j) any pertinent supporting documentation, maps, etc.
8. In emergencies, time may be saved by submitting the application through the local office of WWF, IUCN or TRAFFIC, together with their endorsement (see addresses appended).
9. In exceptional cases, and at the discretion of the Selection Committee, funds may be disbursed before the full supporting documentation has been submitted on the understanding that it will be provided at a later date.
10. Once the funds have been disbursed by the Tiger Emergency Fund, applicants have a maximum of 6 months to implement the proposed activities and a further 6 weeks to submit a short report on the initiative's outcome, together with the financial details, bank statement and copies of relevant invoices. Any unused funds will be returned to the Tiger Emergency Fund.
11. As part of its supervisory responsibilities, and in consultation with the relevant parties, the TEF Selection Committee reserves the right to audit the use of the resources provided by the Tiger Emergency Fund and evaluate their impact on tiger conservation.

Applications

Applications for grants under the Tiger Emergency Fund can be submitted by post, fax or email to the following person and address:

Nelda Geninazzi, WWF International, Avenue du Mont Blanc,
1196 GLAND, Switzerland

Tel: +41 (22) 364 9503; fax: +41 (22) 364 5829; email:
<ngeninazzi@wwfint.org>



Book Reviews



Saving Wild Tigers 1900-2000

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Permanent Black,
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The 20th century was both a period when nature conservation became a major international concern, and a period when the centuries old assault on nature reached new levels of destruction. Whereas literature on nature in the 19th century was mainly hunting-based, especially concerning the prime trophy, the tiger, expressions of concern about the threat to the big cat began to be heard. By the end of the century the tiger had become frontpage news, and a multitude of books and reports were appearing, with the advantage of global media distribution.

Valmik Thapar has performed a service by searching out 33 significant articles on tiger problems and conservation published in the 20th century.

It is interesting to see current issues being discussed during the early part of the past century. Sainthill Eardley-Wilmot wrote in 1911 about the importance of improved forest management in India, and the importance of forests for water conservation.

Forest Officer F.W. Champion, famous for his pioneering camera-trap photos of tigers, stressed in 1934 the importance of public opinion to promote conservation, declaring: "Without it all efforts to preserve wild creatures will prove abortive. Good work is already being done by propaganda and by lectures, but much more remains to be done. Good illustrated books help greatly and the formation of sanctuaries and national parks, where the general public can see wild animals in their natural state, would all help."

Jim Corbett can never be missing from a collection on tigers. His Author's Note at the beginning of *Maneaters of Kumaon* is

there, including his declaration: "The tiger is a large-hearted gentleman with boundless courage... When he is exterminated – as exterminated he will be unless public opinion rallies to his support – India will be the poorer by having lost the finest of her fauna."

Argument continues about whether India should have a Wildlife Service separate from the Forest Service. In 1933, S.H. Prater, long-time Curator of the Bombay Natural History Society, said in a speech: "The Forest Department, which ordinarily administers the Forest laws, has multifarious duties to perform and, while the Forest Officer has discharged this trust to the best of his ability, he cannot give the question his personal attention, nor can he find time, except in a general way, to control the protection of wildlife in our forests. Experience of other countries has shown the need of a separate and distinct organisation whose sole concern is the protection of wildlife in the areas in which it operates."

But, in 1964, E.P. Gee, in his book on the Wildlife of India, declared: "It may seem strange that the task of wildlife preservation is entrusted to the Forest Departments in India, and that there are no separate wildlife departments. When this problem came up in 1952 it was decided to entrust this work to the Forest Department of the various States because nearly all the wildlife and sanctuaries of this country happen to be in the forests and other lands which are under the jurisdiction of the Forest Departments. To create another department to preserve wildlife would lead to overlapping and unnecessary duplicating of work, and in any case it would difficult to find the trained personnel for another department".

Then, in 1977, S.P. Shahi, who rose to become Chief Conservator of Forests of Bihar and a renowned conservationist, defended the Forest Service. He pointed to arguments that East African countries had separate Wildlife Services and declared: "Few people realise that, in those countries, the wildlife lives in open grassy savannahs, unlike India, where the bulk of wildlife lives in forests. Wildlife and forests have to co-exist in this country. Even if a separate Wildlife Service is created, I doubt if it will attract men with the necessary aptitude and dedication. As it is, the Indian Forest Service is less glamorous than the other two existing All-India Services. A Wildlife Service will be still less so."

I wonder if his final argument would still be true, although it is often said that the Wildlife Wings of the Forest Departments, approved in 1974, and which went half way towards a separate Wildlife Service, are considered "punishment" appointments by

many foresters.

Another senior Forest Officer, P.D. Stracey, wrote in 1968: "Fortunately the Indian tiger is not exposed to any great extent to persecution resulting from superstitious fancy in regard to the alleged value of its various parts for medicinal purposes. Among the Malays and Chinese this cult is said to be highly developed..." He must be turning in his grave.

Stracey also put in a word for trophy hunting of tigers. – "Providing this commercial activity can be properly controlled it could do a lot for the future of the tiger."

Soldier-hunter Stanley Jepson, in a book on Big Game Encounters in 1936, defended his fellow hunters – "There is nothing selfish or incongruous in the idea of sportsmen taking up the preservation of wildlife. They are in the best position to do so, and in India and Africa have always supported these movements – people who spend leisure hours in the jungle soon become very keen on the preservation of the wild."

Some do, including those who have become distinguished leaders of conservation, not least Sir Peter Scott, a founder of WWF and the Wildfowl Trust, who wrote of how he finally put away his guns after watching the prolonged death of a goose he had shot. But there are still too many hunters who could not care less about conservation.

It is interesting to be reminded by George Schaller's article that his pioneering study of the tiger arose from an initial intention to study the chital deer. But it became apparent to him that the most information could be gained from a broader study of different species in a single locality. And so he headed for Kanha National Park. The rest is history...

Guy Mountfort's account of how he played a leading role in getting tiger conservation going in the Indian subcontinent is a useful record. Working at the time with WWF, I knew there was scepticism about his plan to press Prime Minister Indira Gandhi and Nepal and Bangladesh leaders, but Mrs Gandhi reacted at once and set up the Tiger Task Force which launched Project Tiger. In Nepal, tiger conservation won royal leadership.

After extracts from writings of other luminaries, such as Mel Sunquist, John Seidensticker and Alan Rabinowitz, it is saddening to read the current Director of Project Tiger, P.K. Sen's final word: "Today few care about the value of living tigers, and they are killed for the cash they bring in, be it skin or bones... The over-exploitation of natural resources has reached a peak and no one wants the tiger to survive, be it politician, bureaucrat, industrialist, human activist or villager. Even foresters are casual in their approach. Few realise that tiger habitats not only harbour tigers, but also recharge most of our river systems. Globalisation ruthlessly plunders our natural resources and we enter a doomsday scenario for the tiger."

Sen's reference to the river systems brings the book full circle, back to Sainthill Eardley-Wilmot's stress on the need to protect India's water supply, nearly a century ago. It deserves special notice at a time when India and many other parts of the world are facing a crisis over water, a necessity for life on earth.

In all there are 33 articles in *Saving Wild Tigers*, making it a fascinating book to dip into.

Peter Jackson

Cats on the Web

Cat Specialist Group: <http://lynx.uio.no/catfolk> is based on the book **Wild Cats: Status Survey and Conservation Action Plan**, compiled and edited by Kristin Nowell and Peter Jackson (IUCN 1996), newsletter **Cat News**, and other information about the group

IUCN-The World Conservation Union: <http://www.iucn.org> covers all activities of the Union

IUCN Red List of Threatened Species: <http://www.redlist.org> has the 2000 edition of the Red List. The site will have a major up-date annually

Species Survival Commission: <http://www.iucn.org/themes/ssc> covers SSC activities and has a complete list of specialist groups, their chairs and contact persons

Cat Action Treasury (CAT): <http://www.felidae.org> reports the activities of the CAT, an American non-profit, IRS-certified 501(c)(3) non-governmental organization established in August 1995 to promote and support wild cat research and conservation projects approved by the Cat Specialist Group

CITES: <http://www.cites.org> The Convention on International Trade in Endangered Species of Wild Fauna and Flora

World Conservation Monitoring Centre: <http://www.unep-wcmc.org/right.htm> concentrates on species, forests, protected areas, marine and freshwaters; plus habitats affected by climate change. It also addresses trade and environment and biodiversity assessment

Tiger Information Centre: <http://www.5tigers.org>, put up by the Minnesota Zoo is a mine of data about tigers. The site also carries the contents lists of all issues of **Cat News**, as well as reproducing all the newsletter's items on tigers

Project Tiger, India: <http://envfor.nic.in/pt/pt.htm> is the official web site of the Indian tiger conservation programme

Help Save the Tiger: <http://chitwan.gis.umn.edu/tiger/tigindex.html> provides GIS maps of tiger distribution in south and south-east Asia, as well as information on on-going research activities

Save China's Tigers <http://www.savechinastigers.org> is dedicated primarily to the South China tiger

Hornocker Wildlife Institute: <http://www.hwi.org> covers Amur tiger studies and conservation, as well as on mountain lion (cougar) work in the USA

Wildlife Conservation Society: <http://www.wcs.org> covers Amur, Indo-Chinese and Sumatran tiger projects, as well as other projects worldwide

Tigris: <http://web.inter.nl.net/users/tiger/> is dedicated to saving the Amur tiger and Amur leopard

Big Cat Sites: <http://www.bigcats.com/bigcats/index.html> provides links to a wide range of cat sites

African lion research: <http://www.lionresearch.org> Research reports by Professor Craig Packer, University of Minnesota

Asiatic Lion Information Centre: <http://www.asiatic-lion.org/>

Kingdom of Lions: <http://home.worldonline.nl/~rlion/lkindex.htm>

Jaguar conservation: <http://www.savethejaguar.org> posted by the Wildlife Conservation Society which is coordinating jaguar conservation

Arabian leopard: <http://www.nimr.nl/leopard/leopard.html> is a website on the Arabian leopard put up by the Netherlands Institute for Metals Research (NIMR) in association with the Arabian Leopard Trust because it shares its acronym with the scientific name of the subspecies *Panthera pardus nimr*: <http://www.arabianwildlife.com> is the website of the Saudi Arabian wildlife magazine

International Snow Leopard Trust: <http://www.snowleopard.org/islt> covers the widespread activities of the Trust. Of particular interest is the related page on satellite tracking of snow leopards in Mongolia: <http://detox.mesc.nbs.gov:80/snow-leopard/mslm.html>

Snow Leopard Conservancy: <http://www.snowleopardconservancy.org> deals especially with methods to diminish snow leopard predation on livestock

Clouded leopard project : <http://www.cloudedleopard.org/>. Field studies of radio-collared wild clouded leopards in Thailand by Lon Grassman

Cheetah Conservation Fund: <http://www.cheetah.org>. Namibia-based, the CCF covers cheetahs worldwide

AfriCat: <http://www.Africat.org>. Namibia-based, AfriCat covers cheetahs and leopards in Namibia

Projeto Puma: <http://www.portadig.com.br/puma> reports on puma predation on livestock in southeastern Brazil

Florida Panther Society: <http://www.atlantic.net/~oldfla/panther/panther.html> reports on one of the world's most endangered cats

Mountain Lion Foundation: <http://mountainlion.org/>

World Lynx: <http://lynx.uio.no/jon/lynx/lynxhome.htm> has information on all four lynx species, including the species accounts from Wild Cats

Eurasian and Iberian lynx: www.large-carnivores-lcie.org .Website of the Large Carnivores Initiative for Europe

Proyecto Guigna: <http://www.c3.lanl.gov/~jgs/guigna/guigna.html> reports on studies of the kodkod in southern Chile

African-Arabian Wildlife Research Centre: <http://info.simplenet.com/AAWRC> is the home page of Chris and Tilde Stuart, leading field workers in Africa and Arabia

Felid Taxon Advisory Group (American Zoo and Aquarium Association): <http://www.csew.com/felidtag/>

Cats: Wild to Mild: <http://www.nhm.org/cats> put up by the Los Angeles County Museum

Mammal Species of the World: <http://www.nmnh.si.edu/msw> provides access to Mammal Species of the World (Smithsonian 1993) taxonomy

World Commission on Protected Areas: <http://wcpa.iucn.org>

Natural History Book Service: <http://www.nhbs.co.uk/> is an excellent book service for all interested in natural history
