



URGENT PLEA TO OUR FRIENDS AND SUPPORTERS:

The Gibbon Conservation Center needs to begin collecting funds now to purchase property in order to relocate. Encroaching local development will soon become a very real threat to the health and well-being of our gibbons. Stress from the sight and noise of construction, and microorganisms in the dust stirred up in earth moving, pose unacceptable and lethal dangers.

Such a move will be, by far, the greatest and most difficult undertaking GCC has ever faced. While maintaining the facility in its present location, we must find the additional funds to purchase property, obtain permits, build enclosures, offices and living space for the director and staff, then move the entire contents of the current facility. Most importantly, the safety and health of the gibbons during the move must be carefully planned for and assured. This move will take at least a year and a half, but we must begin immediately.

Our most urgent need is for at least 20 usable acres (or the funds to buy) in Los Angeles, Ventura, San Luis Obispo or Monterey County, or other mild climate more suitable for the gibbons.

Can you help with a donation of land or any amount of money to help purchase it? All contributions are tax deductible. Please write us at PO Box 800249, Santa Clarita, CA 91380, call 661-296-2737, or email gibboncenter@earthlink.net. Thank you!



photo by Abi Tanim

Adult female hoolock gibbon in the Borajan Reserve Forest

In 2006 the western hoolock gibbon (*Hoolock h. hoolock*) was listed as one of the 25 most endangered primates. Assam, India has declared 11 September as Hoolock Gibbon Day.

FRAGMENT-LIVING – A STUDY OF HOOLOCK GIBBONS IN ASSAM, INDIA

By Kashmiri Kakati, Wildlife Institute of India and University of Cambridge, U.K.

INTRODUCTION

The hoolock gibbon (*Hoolock hoolock*) is at the western-most end of distribution of gibbons, the small apes of South and South-east Asia. It is found in north-east India, Bangladesh, Myanmar and in Yunnan, China. The Chindwin river of Myanmar was earlier thought to be the geographical barrier between the western (*H. h. hoolock*) and eastern (*H. h. leuconedys*) subspecies, but

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scientists have recently recorded *H. h. leuconedys* within India as well (Das *et al.* 2006), and the lines of separation or inter-gradation may well have to be redrawn. Within the last two decades or so, there have been several studies on the hoolock—landscape-wide surveys as well as detailed behavioural observations at several sites in Bangladesh, India and China that have brought this previously little known species into prominence and set alarm bells ringing regarding its endangered status. Estimates of the total number of the hoolock gibbon are 2600-5000 in India (Biswas *et al.* 2003; Das 2002, 2005; Molur, *et al.* 2005), 200 in Bangladesh (Feeroz and Islam 1992; Biswas *et al.* 2003; Molur, *et al.* 2005) and 200 in China (Yang, *et al.* 1987; Lan, 1994; Daoying Lan pers. comm.). There are no current reports of the status of hoolock gibbons

in Myanmar. The detailed surveys of the hoolock gibbon in India revealed that of the 111 known populations, only ten have more than 50 individuals, and more than half of the populations are made up of fewer than 15 gibbons (Das *et al.* 2003, 2005). Widespread habitat destruction and fragmentation are the gravest threat to hoolocks, compounded by hunting for meat and traditional medicine.

opportunity to get a snapshot view of what was happening to the isolated gibbons.

I carried out a rapid survey for hoolocks in 11 fragments (Borajan, Buridehing, Dirok, Doomdooma, Kakojan, Kumsang, Nalani, Phillobari, Tarani, Tinkopani and Tokowani), and three large forest blocks (Upper Dehing East, Upper Dehing West and Jeypore) to compare encounter rates and age-sex ratios. I also observed 6 groups of gibbons closely for 1 year—one in each of four fragments in two size classes (small: <5 km² - Borajan and Tokowani; and mid-sized: 20-30 km² - Buridehing and Kakojan); and 2 groups in a relatively large, undisturbed forest (108 km² - Jeypore). I then compared home-ranges, diet profiles and activity budgets of the fragment groups with the control groups in the large forest.

SOME IMPORTANT RESULTS

The results of the survey illustrated the expected, grim pattern. The lowest encounter rates, smallest group sizes and lowest immature-to-female ratios of gibbons were in the smallest forest fragments (<5 km²). In the mid-sized fragments (20-30 km²) and large forest (>100 km²), we encountered nearly three times and over seven times as many gibbon groups respectively. Similarly, group sizes went down from 3.9 and 3.29 gibbons in the large and mid-sized forest, to an average of 2.5 gibbons in the small fragments. Although the numbers of infants was similar to that in the larger forests, there were no juveniles in the small fragment groups. Hunting is not a major problem within the study area, although stray incidents have been reported. Therefore, severe nutritional stress after weaning or fatal falls while negotiating the discontinuous canopy could be the reasons for the high juvenile mortality in the small, depleted fragments.

Comparisons of satellite imageries from 1990 and 2000, and assessments of cut-stump densities showed that the smallest fragments had the highest rates of forest loss as well as the highest levels of disturbance. One of these (Borajan) had lost up to 70% of forest cover in the one decade preceding the study. One of the mid-sized fragments (Buridehing) was highly disturbed too and showed habitat characteristics similar to that of the small fragments, while the other (Kakojan) was relatively less disturbed and its vegetation profile was similar to that of the large forest. This influence of disturbance in the habitat was echoed in the ranging and calling behaviour of the gibbons at the different sites, as well as in their diet. For example,

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Photo by Kashmiri Kakati



Field Assistant Montu Munda with abandoned neonate hoolock gibbon, Borajan Reserve

MY RESEARCH

I carried out a 2 year field study (2000-2002) on the impact of habitat fragmentation on hoolock gibbons in eastern Assam, north-east India. The original forest landscape here has been impacted for over a 100 years by large tea plantations, forestry operations and mining for oil and coal. Human settlement and agricultural expansion accompanied and contributed to the destruction of the forests. I chose this landscape because it is among the last stretches of lowland evergreen forest left in South Asia. Here, the juxtaposition of large forest with several forest remnants strewn around a matrix of tea plantations and settlements presented an

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- home range sizes in the three highly disturbed fragments varied from 13 to 47 ha, but in the relatively less disturbed mid-size fragment, Kakojan, and the large forest, home ranges were 24-28 ha. There was no correlation with forest size.
- the gibbon groups in the three disturbed fragments sang on fewer days in the dry season of low fruit availability than those in the less-disturbed fragment and large forest. During the long rainy season, however, the numbers of days that gibbons sang were not different among sites. Food tree density was lower in the disturbed sites and might have explained the difference in the frequency of calling, except that on average 65% of gibbon food species were lianas or climbers—densities of which I could not quantify adequately.
- food species richness among all the foods (fruit, fig, leaf, etc.) that made up the top 75% of the diets of the gibbons was much lower at the disturbed sites. The difference was most noticeable for plant species providing fruit, with gibbons at the disturbed sites eating merely 4-5 species of fruit while the less-disturbed ones picked fruits from 9-14 different plant species.

Surprisingly however, over the year there was no significant difference in the proportion of time spent feeding on fruits and figs among the various gibbon groups. I had expected that gibbons in small fragmented forests might be limited by fruit/fig availability. Examining the data across the months, however, showed an interesting observation. A definite shift to leaf-eating (from predominantly fruit) was seen in most of the gibbon groups during the dry season. But only in the smallest fragmented forests was there practically no fruit at the end of the dry season (January-February). During this period the mid-sized and large forest gibbon groups continued to eat at least 14-28% fruit. This near-total absence of high-energy fruit, even if for a short period, could be a key factor in determining the survival of gibbons in small fragmented forests.

IMPLICATIONS AND CONSERVATION NEEDS

That fragmentation adversely affected hoolock gibbon populations in terms of their demographics was apparent from the survey findings. Also, more than the size of the fragment, the level of disturbance it suffered, determined how well or how badly the gibbons fared. Theoretically, even a 5 km² forest left undisturbed will be able to accommodate 10-15 gibbon groups (or 30-

45 gibbons), but none of the fragmented forests surveyed in this size class came anywhere close to these numbers. It was seen that the smaller fragments lost forest cover much faster than the bigger ones. As a direct fallout of this habitat loss, reduced dietary diversity and availability can possibly be identified as the ultimate cause for the decline of hoolock gibbons in fragmented forests. The associated situations include reduced social interaction, lack of mates and mating opportunities, lack of suitable territories, and increased susceptibility to disease, predators and accidents—due to both reduced fitness and because of the habitat being internally fragmented and thus difficult or dangerous to negotiate.



photo by Kashmiria Kakati

Disturbed mid-sized fragment (Buridehing Reserve Forest)

It might be an easy option to give up these fragmented forests as lost and concentrate on securing the larger forests, but as other surveys have found, a large proportion of hoolock gibbons are small populations that live in fragmented forests. Most of these are not protected areas, and it is necessary that conservation plans are comprehensive enough, not only to protect these forest fragments, but to actively manage them. In this region, habitat restoration, and growing forested corridor connections between fragments or large forests, are still practicable options since the matrix is predominantly agriculture/plantation and would not require large-scale relocation of either people or houses. Offering economic incentives to the land owners to contribute land for the corridors—in the form of high-return, conservation-friendly activities such as mixed fuel wood plantations, crops such as vanilla or spices, etc.—could be an option worth trying. Tea companies could be lobbied to contribute as part of their corporate social responsibility. It is also important that the oil and coal mining companies mitigate their impact by carrying out effective, scientifically-informed clean-up and restoration programs and desist from

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further opening up any more of the forest areas. These profit-making companies could also help ease the dependence of the local communities on the forest for firewood and timber by sponsoring alternate fuel sources and plantations in village areas; maybe even by supplying natural gas (a lot of which gets flared off) for household use at nominal prices.

Now is the time for combined action by government, NGOs, industry, and communities here, to ensure that the hoolock gibbons' voices do not fade away from one besieged fragmented forest after another.

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DR. JEREMY RAEMAEKERS

By Elliott H. Haimoff

When David Chivers finished his pioneering behavioral study of the Malaysian siamang (*Symphalangus syndactylus continentus*), and became a professor at Cambridge University in England, he wanted to establish a constant stream of graduate students to follow in his footsteps studying other primates in Southeast Asia, with an emphasis on gibbons. So in 1975, he recruited two students to be his first Ph.D. researchers – Paul Gittins was to conduct the first modern-day field study of the agile gibbon (*Hylobates agilis*) in Malaysia, and Jeremy Raemaekers was to conduct the first modern-day field study of the Malaysian lar gibbon (*Hylobates lar lar*).

I was recruited in the "2nd generation" of David Chivers' graduate students in 1978, who began their Ph.D. work just as Paul Gittins and Jeremy Raemaekers were



photo courtesy Elliott Haimoff

r.-l.: Warren Brockelman, Elliott Haimoff, research team, and Jeremy Raemaekers (tall – in back) in the tropical rainforest of Chantaburi Province in Southeast Thailand.

finishing up their Ph.D. dissertations and getting ready to be examined. I was to study the gibbon loud calls or "songs", and the tape recordings made of the gibbon songs by Chivers, Raemaekers, and Gittins proved to be critical to my research, and they gave me a running start to my own Ph.D. dissertation work on gibbons.

Jeremy Raemaekers and I crossed paths on several occasions, if only for a brief time, but Jeremy struck me from the first time I met him as one of the most brilliant men I've ever had the pleasure to meet, combined with a perfect amount of common sense and English "stiff-upper-lip" class and dignity. In fact, Jeremy gave me several new ideas from his own observations, that he was more than happy to pass on to me, that I incorporated into my Ph.D. dissertation.

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Dr. Jeremy Raemaekers... continued from page 4

Jeremy comes from a famous family in Europe. His grandfather, Louis Raemaekers, was the son of a noted newspaper editor in the mid-1800s. Louis became a cartoonist at the turn of the century, and the most famous and acclaimed European cartoonist of World War I. He moved his family to England during the war, but returned to Holland afterwards, where Jeremy's father was born. He became naturalized British after WW2. Jeremy was born in Australia and raised in France.

I only met Jeremy briefly after he turned in his Ph.D. dissertation (on the comparative ecology and niche separation between the lar gibbon and the siamang), and to look at him one would think of this tall, gangly, soft-spoken Englishman with the perfect upper-class accent, to be more of an English boarding school teacher or a banker, rather than a field researcher who slogs through mud in a hot tropical rainforest fighting off leeches and mosquitoes.

His examiners passed Jeremy's PhD thesis work with hardly any changes at all (almost unheard of in Cambridge PhD circles), and his work still remains as one of the most comprehensive and well-analyzed field studies ever conducted on a gibbon species.

Almost immediately, Jeremy got a job as a lecturer in primate behavior at Mahidol University in Thailand that lasted about 3 years. I did some of my fieldwork studying the songs of wild gibbons in Thailand in 1979, and Jeremy offered to take me out into the field for the first time and "show me the ropes". I will be forever grateful for his "on the job training" that he helped me with. I'll never forget that trip out to Thailand, because that was the time when Vietnam invaded Cambodia and Laos, and there was a hysterical fear that all of Pol Pot's anarchistic revolutionaries in Cambodia who murdered millions of their own countrymen, would take refuge in Thailand, and the fear was also that the Vietnamese had plans to invade Thailand as well. All Americans were ordered (or strongly requested) to leave Thailand, but Jeremy's advice was to just stay put in the jungles. I ultimately left about a month or so later, just as China went to war with Vietnam, and all of Southeast Asia was in danger of exploding again. However, Jeremy and his girlfriend (now, wife) happily stayed in the jungles studying lar gibbon singing (*Hylobates lar*). Those papers, published in *Behaviour* and *Animal Behaviour*, are considered by Jeremy to be his most useful gibbon research output. Shortly after I left Thailand, I got a note from Warren Brockelman

(another gibbon behavior expert) telling me that Jeremy came down with a bad case of malaria while he was in the jungle, and had to be literally carried out on a pole.

I met up with Jeremy again in 1980 at the biggest gibbon convention ever held, at a castle in Ulm, Germany. Jeremy was already talking about coming back to Great



photo courtesy Elliott Haimoff

l.-r.: David Chivers, Jeremy Raemaekers, Elliott Haimoff, Paul Gittens at the castle in Ulm, Germany

Britain and settling down and starting a family with his long-time girlfriend in Edinburgh.

Jeremy went on to become a noted town planner in Scotland, where he influences development and environmental planning of towns and communities. He has written several books and articles on conservation and planning. Jeremy is now a senior lecturer in Urban Studies, Town Planning, and Conservation at the Heriot-Watt University in Edinburgh, Scotland. He can be contacted at j.j.raemaekers@hw.ac.uk

(Dr. Raemaekers' note: Tragically, Paul Gittens, may he rest in peace, died young of a wasting disease)



Recent Efforts Made to Save the Western Hoolock Gibbon (*Hoolock h. hoolock*) part 2

By Alan Mootnick

After the 5 day Population and Habitat Viability (PHVA) workshop, I was honored to visit the Dhaka Zoo with Sally Walker and Phil Miller. I felt it was important to see the current and future gibbon enclosures, food prep area, food storage, and veterinarian clinic. First, Phil gave a presentation on a captive management plan, then Sally spoke on the roles of South Asian zoos, especially concerning western hoolock gibbons. I gave a 3-hour lecture on gibbon captive care and had a good dialog with the entire group. Afterwards, Sally said she would like to see improvements to the Dhaka Zoo

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gibbons' enclosures within a 6 month period. Sally and I decided that, since I had the next day available, I would come back to the Dhaka Zoo at 7 AM to improve the enrichment in the gibbon enclosures. I had 10 zoo staff assisting me with the addition of 12 branches to

photo by N.C. Banik



Alan with Dhaka Zoo staff fabricating "S" hooks for the hemp rope for the hoolock enclosure

photo by Alan Mootnick



"S" hook woven into the hemp rope

create a second height of branches and adding 14 ropes to the primary and secondary gibbon enclosures. My first step was to find the necessary material in their metal storage area. I then designed the necessary hardware and helped make the first prototypes. I explained how to attach the ropes and bamboo branches, then our work crew made

great headway. This process gave each person the knowledge to add additional apparatus to the enclosures later. We removed the old swing and tire that the gibbons were not using. I explained that gibbons are arboreal primates that live in the upper canopy in a very clean environment. The leftover branches and rope would go in the enclosure of the critically endangered Bangladesh capped langur.



photo by Alan Mootnick

Final stage of the installation of bamboo and ropes



photo by Alan Mootnick

These four western hoolock gibbons, which make up the first captive breeding in Bangladesh, can now utilize additional space in their enclosure. The hoolock gibbon has rarely bred in captivity anywhere in the world.

The next day, we stopped at the Chittagang Zoo, which was an older style zoo, with very good signage. The following day we visited the Dulahazara Safari Park, Chakoria, in the Cox's Bazaar District, and assisted them with future enclosure design, husbandry practices, diet changes, and important information on tranquilization of gibbons with a Telinject dart rifle and blow pipe. Their gibbons appeared in good condition.

The following day, we went to the Chittagang Veterinary College and Sally spoke on veterinarian medicine with wildlife, zoo ethics, the roles of zoos, and the good, the bad, and the evil of zoos. I gave a 4 hour slide presentation similar to that at the Dhaka Zoo, but this time I included gibbon species identification.

I am most grateful to Twycross Zoo East Midlands Zoological Society, England, for the financial support which made it possible for me to participate in the PHVA in Bangladesh.

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VISITORS

We were pleased to be visited by old and new friends:

photo by Erin Bell



I.-r.: Jared Madden, former volunteer, now a Doctor of Osteopathy; Alan

photo by Erin Bell



I.-r.: Susan Lutter, Alliance Development Director, The Gorilla Foundation; Alan



photo by Erin Bell

I.-r.: Gabriella Skolár, Alan, Adrienne Zihlman and Carol Underwood. Carol is Adrienne's research assistant at UC Santa Cruz, where they are focusing on the evolution of locomotion and life history of fossil hominids.



photo by Steve Stockdale

I.-r.: Jared, Lily & Ginger Stockdale (Ginger volunteered in the 1990s, did her study on Play Behavior in Captive Siamangs at the Gibbon Center, and came to visit with her family. Her Master's thesis was completed in 1998 at San Diego State University); Patti Dahle, Alan's Assistant; Alan



photo by Erin Bell

I.-r.: Paul Vercammen, Operations Manager of the Breeding Centre for Endangered Arabian Wildlife, United Arab Emirates; Alan; Dr. Kristin Leus, Coordinator Wetenschappelijk Onderzoek, Head of Centre for Research and Conservation, Zoo Antwerpen, Belgium



photo by Erin Bell

I.-r.: Ardith Eudey, Vice Chair for Asia, IUCN Primate Specialist Group; Gabriella Skollár (Master's thesis in Hungary on the behavior of gibbons, currently collecting data for her PhD and assisting in gibbon care at GCC); Alan, and Yongcheng Long, in charge of the Yunnan Golden Monkey Conservation Program for The Nature Conservancy of China.

FACTS ABOUT GCC

The Gibbon Conservation Center is a nonprofit organization devoted to the study and conservation of these increasingly rare apes. Among the species housed at GCC are white-cheeked gibbon, (*Nomascus l. leucogenys*); siamang, (*Symphalangus syndactylus*); pileated gibbon, (*Hylobates pileatus*) and Javan or silvery gibbon, (*H. moloch*).

GCC specializes in noninvasive behavioral studies on gibbons, conducted by students, scientists, and volunteers working at the center. Several mated pairs have produced offspring, making an important contribution to the world's captive gibbon population, both in terms of numbers and genetic diversity of the species. Offspring are housed at GCC in species-typical family units until they reach adulthood. At that time, they are removed from the family and housed with a mate, just as they would normally do in the wild. GCC also offers free advice to zoos, governmental agencies, and gibbon rescue centers throughout the world. A portion of donations are given to projects devoted to the conservation of wild gibbon populations, especially in Indonesia, India, China, and Vietnam.

For more information, see our website at www.gibboncenter.org

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Graphic Design: Patricia Dahle, Terry Olsen

DIRECTOR'S CORNER by Alan Mootnick



photo by R. Agha

Alan Mootnick

We hope you have enjoyed this issue of The Gibbon's Voice. Through this publication, we plan to emphasize the endangerment of gibbons, and their unique behavioral and ecological adaptations. This newsletter summarizes past and ongoing noninvasive behavioral studies at GCC. Each issue profiles current information on gibbons. All issues advertise opportunities at GCC and other venues. I hope you will consider subscribing to future volumes.

GIFTS

Have you thought about making a gift to GCC of real estate, stock, life insurance, a vehicle, hotel rewards points for a room certificate, or cash? Check with your tax advisor to see if this type of deduction is right for your tax situation. You may be able to save money on your taxes, and at the same time, make a huge difference in our ability to help endangered gibbons.

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*** \$50 or more makes you eligible for our Adopt A Gibbon program. Check here _____ for more information.

GCC also needs volunteers for feeding the gibbons, data collection and general maintenance. For information about volunteering, check here _____ or contact Patricia at gibboncenter@earthlink.net phone 661-296-2737 (9am-8pm Pacific Time), see our website at www.gibboncenter.org, or write to us.

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