CONSERVATION ACTION SERIES 20080205

WALKING THE BEARS

Rehabilitation of Asiatic black bears in Arunachal Pradesh

Wildlife Trust of India

10 years in Service of Nature

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INTERNATIONAL FUND FOR ANIMAL WELFARE
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Department of Environment & Forest
Government of Arunachal Pradesh

केन्द्रीय चिड़ियाघर प्राधिकरण

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10 Years in Service of Nature

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Wildlife Trust of India (WTI), is a non-profit conservation organisation, committed to help conserve nature, especially endangered species and threatened habitats, in partnership with communities and governments. Its principal concerns are crisis management and the provision of quick, efficient aid to those areas that require it the most. In the longer term it hopes to achieve, through proactive reforms, an atmosphere conducive to conserving India's wildlife and its habitat.

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A team at bear release site, Khari Pong, Pakke, Arunachal Pradesh

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PREFACE

Bears have been rehabilitated in several countries of the world. However, it is surprising that in India rehabilitation of bears has not been practiced before. One of the limitations must surely be the very few areas left in the country where carnivores can be put back. Arunachal is one of those rare exceptions where sufficient forest is left for such conservation ventures and the low human population density too encourages it. Even though these are good signs, yet a lot needs to be done before bears are put back into the wild. The Centre for Bear Research and Conservation is a pioneer in this regard. Building on the principles that I had first seen with the Pazhetnovs and IFAW's orphan Bear rehabilitation centre in Russia, CBRC has achieved some success in five years of operation. It has been the first project in India to have put back 5 bears (and is on the verge of putting back 5 more) and despite its initial lack of success in preventing poaching of the bears once let out, has shown encouraging signs in the recent past. Of most interest is the evolution of the protocol and technique of putting bears back from the initial hard release to a walk-the-bear protocol.

This conservation and welfare experimental and pilot project will have many firsts if the project manages to run for the next few years. It is already the first to put bears back scientifically and monitor its success in India. It will soon be the first carnivore reintroductions once general principles are learnt and therefore might be useful in other parts for other species. Also, as data collection in and around the release sites increase, we may well have an intensive study site for the Asiatic black bear in India, something that has not been there through the Himalayan range of the species in the country. It is also a pioneer project for Arunachal and has the prospects of being a conservation showcase for the state.

While these could be the results of this long-term project, the challenges are clear after having run the project even for the initial five years. The reason that this project originated was the large number of bear cubs that various tribes keep with them and then surrender once wildlife authorities approach them or when the bear gets too big to be controlled. The repeated hunting of bears (including the early ones that were released) shows that hunting of bears continues to be a critical conservation issue in the state that needs to be handled. The awareness levels among the Arunachal population on bear conservation is still fledgling and needs encouragement and support. Many techniques being tried in the project needs refinement. The lack of skilled local manpower makes all this doubly difficult and finally there is still a large lacunae in the knowledge of wild bears and the Pakke landscape that will guide restocking. In a strict conservation sense, the CBRC is a rehabilitation and restocking exercise as also an awareness building one that initiates conservation in a tribal culture that needs an exemplary project. In a welfare sense, the lives of several individual bears are being bettered from a life behind bars. Scientifically, this is a project that will yield new techniques, field tested protocols and first-time data on wild carnivores. And culturally, this is one of the finest conservation efforts of the Nishis in the Kameng area. For these reasons, I consider the Centre to be a pioneer of conservation in Arunachal.

Vivek Menon
Executive Director

ACKNOWLEDGEMENTS

The Centre for Bear Rehabilitation and Conservation (CBRC) is a project that is inexorably linked with the legacy of Arunachal Pradesh, the 'land of the rising sun' and the conservation ethic of a people who eschew hunting while still steeped in their tribal mores. It is to this glorious land and its people we express our gratitude for keeping the faith.

The Department of Environment and Forests, Arunachal Pradesh, Wildlife Trust of India's collaborator provided all start-up inputs for the project and keeps fine tuning it as well. It allocated a precious plot of land at Pakke Tiger Reserve at Seijosa for housing orphan bear cubs and care givers along with permissions to release the bears, besides hosting meetings, workshops and experts from abroad and within the country. We are very grateful to the Department.

We thank all the Chief Wildlife Wardens of Arunachal Pradesh who conceptualized the Asiatic black bear rehabilitation centre and paved the way for a Memorandum of Understanding with WTI. We are fortunate that Mr. Chuku Loma, Deputy Chief Wildlife Warden of the state is our project leader. He leads from the front and energizes this project even as we confound the variables. Right from rescuing bear cubs from remote villages to honing on his bear rehabilitation skills in Russia, Mr. Loma has been there and done that. All the Divisional Forest Officers of Pakke Tiger Reserve, namely Mr. Abo, Mr. Umesh Kumar, Mr. Tana Tapi and Mr. Nani Sha made significant contributions to the project and actively participated in the events pertaining to bear release.

The funding for all things in metal and concrete came from the Animal Welfare Division of the Government of India. We acknowledge the efforts of Smt Maneka Gandhi, the then Minister for Social Justice and Empowernment, in expediting the process of CBRC establishment. Without her support and constant encouragement this project would'nt have come through. To the Central Zoo Authority (CZA), we are thankful for the permissions to release the bears and for recognizing CBRC as CZA recognized rescue centre. A project is not complete only with legal permissions and enclosures and other establishments. It needs to be commissioned and sustained for a long period to come and this is where we acknowledge with great significance the contributions of Wildlife Trust of India's partner the International Fund for Animal Welfare (IFAW). We acknowledge the contribution made by British High Commission that helped us to kick off the project during its fledgling stage.

To our Russian colleagues Valentin Pazhetnov, Sergey Pazhetnov, Maria Voronstsova, our thanks for sharing with us their expertise on brown bear rehabilitation. IFAW- Russia hosted our first trainees Chuku Loma, Murali Pai and Prasanta Boro for five weeks in 2005. CBRC has benefited from this and several other cooperative efforts with IFAW- Russia. Svetlana has always hosted the Indian visitors with a warm heart and hot meals at Bubonitzy, and that hospitality is remembered with affection. We also acknowledge the contributions of Curtis Clumpner who along with Valentin Pazhetnov had visited India in 2002 to sow the first seed for bear rehabilitation in Inida. As a booster dose to this project were inputs from Gabriella Fredriksson who has rehabilitated sun bears in Borneo, Indonesia. We acknowledge her inputs as well.

We thank our local cooperators, NGOs, and the villagers of Seijosa, where CBRC is located, for hanging in there and backing us despite their own issues.

EXECUTIVE SUMMARY

Rapid population growth, agricultural practices (*jhuming*) and the development of towns have led to fragmentation and degradation of forests in the state Arunachal Pradesh. Asiatic black bear (*Ursus thibetanus*), perhaps the only species of bear found in the state, is under threat due to habitat loss and traditional hunting practices. Orphaned bear cubs that end up in captivity are maintained as pets for sometime until they are grown up, when they are either confiscated by the state's Forest Department or voluntarily handed over to zoos for further care.

The IUCN Action Plan for the conservation of bears states that bear populations at greatest risk include the Asiatic black bear threatened throughout its distribution range in all its range countries. To address the issue of bear cubs ending up in cramped enclosures, Wildlife Trust of India (WTI) and the Department of Environment and Forests, Arunachal Pradesh launched the Asiatic black bear rehabilitation project. The project is run in partnership with the International Fund for Animal Welfare (IFAW).

The project was officially launched in March 2002, following the signing of a Memorandum of Understanding (MoU) between the Department of Environment and Forests, Arunachal Pradesh and Wildlife Trust of India. Pakke Wildlfie Sanctuary, Seijosa was identified as the project site for establishing a facility where bear cubs could be housed during their rehabilitation period. The rehab centre was name the "Centre for Bear Rehabilitation and Conservation" (CBRC) and the facility was built with the support of the Animal Welfare Division, Ministry of Statistics and Program Implementation, Government of India. The construction of all the shelters and field camp of CBRC was completed in 2003.

A protocol on Asiatic black bear rehabilitation was developed in consultation with experts on bear rehabilitation at the Orphan Bear Rehabilitation Project (OBRP) in Russia and based on the published information available on the rehabilitation of bears in other countries. The protocol was frequently updated as and when new information on bear rehabilitation was made available. The project methodologies were also honed from the exchange of project personnel between OBRP, Russia and CBRC, India. Wildlife rehabilitation workshops were also organized in the Itanagar, Arunachal Pradesh in 2002 focusing on the subject of bear rehabilitation

The initial protocol recommended a 'hard-release' technique of releasing the bears after 18 to 20 months of care in different captive environs, which included a last six to 12 months of pre-release orientation at the centre. Suitable sites for their release were identified in Pakke Wildlife Sanctuary after taking into consideration different criteria that would increase their survival prospects after release. All the three bears thus released were radio-collared and monitored for their post-release movements and rehabilitation success. The results of the hard-releases after *ex-situ* acclimatization were not encouraging as the bears got killed in 9-35 days post-release, due to either predation or hunting. These pilot releases showed that younger bears are prone to predation by leopards or tigers, while older bears wander long distances in an effort to home back to the centre and in this process get killed by people, either near human settlements or in the forests.

The protocol was subsequently changed according to the guidelines followed in Borneo to rehabilitate Malayan sun (*Helarctos malayanus*) bears using a rehab technique of assisted release. Accordingly, two Asiatic black bear cubs of less than five months age were moved to the designated release site and taken for "daily walks" by one dedicated person. By nine to ten months of age, they were radio-collared and no longer confined to the cage at night. Soon they were left to forage by themselves in specific areas and brought back to the 'point area' in the evenings. At the age of 13-14 months, the cubs were 'released', with the practice of accompanying them to the forest coming to a complete halt. The bears ventured into the forest on their own, at times not returning to their point-area for supplementary feeding which was also stopped subsequently.

Unlike the first hard-released bears, pre-release orientation for the last bears happened at the release site itself. The 'assisted' release method of 'walk the bears' provided the bear cubs a longer acclimatization period at the very site of their future home thereby considerably lessening their overall time at the centre. Both the soft-released bears, released after eight months of gradual acclimatization to their release site, not only survived predation but also managed to establish a focal point of activity of their own, independent of each other. Both bears lived a perfectly normal and wild life for over six months before one was injured and had to be withdrawn for treatment. The other bear monitored for eight months post-release till its collar dropped as per the scheduled date of 31st December 2007. The study has shown that in a tropical country like India, a soft-release technique of gradual acclimatization *in-situ* at the release site is preferable over hard-release method after acclimatization *ex-situ*.

CHAPTER 1

Bear beginnings

1.1. Introduction

Arunachal Pradesh is a bio-diversity hotspot gifted with 75% forest cover and extremely rich flora and fauna. In the last three decades, however, rapid population growth, agricultural practices (*jhuming*) and the development of towns have led to rapid fragmentation and degradation of forest and forest resources of the state. Asiatic black bear (*Ursus thibetanus*), perhaps the only bear found in the state, is under threat due to habitat loss and hunting. There is evidence of killing of Asiatic black bears in northeast India, for meat and the sale of body parts in medicinal preparations. Bear cubs that end up in captivity, after the killing of their mothers, are maintained as pets for sometime until they are grown up, when they are either confiscated by the Forest Department or voluntarily handed over to zoos for further care. The IUCN Action Plan for the conservation of bears states that bear populations at greatest risk include Asiatic black bear, sun bear, giant panda, sloth bear, brown bears of Mongolia Tibet, France Spain and Italy and the spectacled bear of Venezuela, Columbia and the Desert population in Peru (Servheen *et al* 1998). Asiatic black bear (*Ursus thibetanus*) is classified as Vulnerable (VU - A1cd) on the IUCN Red List 2002 and listed on Appendix I of CITES since hunting for bear parts has been perceived as a major threat to their survival. The species is listed under Schedule II, Part II of the Indian Wildlife Protection Act (1972).

In many temperate countries, where licensed hunting of bears is legalized, rehabilitation of orphaned bear cubs goes hand in hand. In tropical countries like India, where hunting is widespread though illegal, rehabilitation of bears has never been taken up as a project. Though 'surplus' captive bears have been occasionally released to the wild, no record of the success or failure of such attempts has been maintained. The Asiatic black bear (*Ursus thibetanus*) rehabilitation project, taken up jointly by the Department of Environment and Forests, Arunachal Pradesh and the Wildlife Trust of India (WTI) in partnership with the International Fund for Animal Welfare (IFAW), is the only of its kind to have been initiated in India. The project was largely an

Fig 1.1 C. Loma, the then Divisional Forest Officer of Pakke Wildlife Sanctuary, holding bear cubs confiscated in 2002.

initiative of the Deputy Chief Wildlife Warden of the state Mr. C. Loma, who was earlier the Divisional Forest Office of Pakke Wildlife Sanctuary where the centre was finally established in 2003.

1.2. Wildlife Rehabilitation and Bear rehabilitation: Global scenario

Internationally, Wildlife Rehabilitation is an emerging discipline in the science of wildlife conservation, with both conservation and welfare issues being intricate components. The International Wildlife Rehabilitation Council defines Wildlife Rehabilitation as the treatment and temporary care of injured, diseased, and displaced indigenous animals, and the subsequent release of healthy animals to appropriate habitats in the wild.

The fact that bears are not social animals leading a solitary life makes them ideal candidates for rehabilitation (Maughan, 2004).Bear rehabilitation is a major conservation and animal welfare activity practiced throughout the world. Bears have been successfully rehabilitated and released back to the wild in many countries. Some of the well-known examples include brown bears and Asiatic black in Russia (Pazhetnov *et. al.*, 1999; Phoenix, 2005), American black bears in North America (Wasserman and Clumpner, 1995; Carney and Vaughan, 1997), spectacled bears in South America (Black, 1996; Peyton and Plenge, 2005) and sun bears in Borneo (Fredriksson, 2005).

1.3. Case for rehabilitating Asiatic black bears in India

1. According to IUCN/SSC, all bear species have declined in numbers and distribution due to the impacts of human activities. Major human activities that impact bears adversely are habitat destruction due to conversion of forest to agriculture, human encroachment on forest land and excessive forest harvest.
2. There is evidence of killing of bears in northeast India, for meat and the sale of body parts in medicinal preparations. Bear cubs are also captured whenever they are encountered and possibly also traded in the national and international market. In Arunachal Pradesh alone, four bear cubs were confiscated in the year 2001-2002, adding to the already existing nine individuals in Itanagar zoo. The zoo continued to receive bear cubs that were resigned to captivity in cramped enclosures comprising their welfare. Wildlife Trust of India realized the possibility of putting an end to this misery of lifetime confinement by initiating a rehabilitation project and a subsequent awareness campaign that would in the long run stop people from hunting bears.
3. IUCN reports that bear populations at greatest risk include **Asiatic black bear,** sun bear, giant panda, sloth bear, brown bears of Mongolia Tibet, France Spain and Italy and the spectacled bear of Venezuela, Columbia and the Desert population in Peru. (Servheen *et al* 1998).
4. Besides releasing bears back to the wild, one of the major impacts of rehabilitation projects is that the efforts to release rescued bears often creates awareness amongst the locals on the plight of the species. In the long run, this would help in the promotion of conservation of bears in the wild.

1.4 The Idea is born

The state of Arunachal Pradesh is ideally placed to rehabilitate displaced bears to the wild as it still retains vast tracts of undisturbed forests which are essential for any rehabilitation operation.

The Kameng Elephant Reserve which covers both Pakke and Eagle Nest WLS covers a total area about 1892 km2 has altitudes that range from 334 mtrs to 3213 mtrs above msl (Abo, 2002). The climate and rainfall are important factors determining the unique status of the landscape and based on these two factors the year can be divided into four seasons: (1) Winter (December to February), (2) Pre-monsoon (March to May), (3) Monsoon (June to September) and (4) Post-monsoon (October to November) (Borthakur, 1986). The distribution of rainfall is uneven (approximately 2500 mm; in 1991, 3056mm rainfall was recorded at Seijosa of Pakke) and the month of June and July are the wettest. The lower portion of the reserve has high temperature during summer and moderate in winter. But the high altitude areas are very cold during winter and the temperature goes below 00 C. The higher areas receive heavy snowfall during winter (December, January and February) and dew in the night is a common feature throughout the year. The humidity ranges from 40 to 85% (Abo, 2002) and the landscape is drained by several nallah, streams and rivers. Pakke, Kameng, Khari, Nameri, Tipi, Pani, Pinjoli, Dunukho, Diji, Sessa are the important rivers and nallahs of the area. The important tribes of this part are Akas, Mijis and Nyishis. Nyishi are one of the largest groups of people inhabiting the area. The villagers traditionally are agriculturists. Other sources of livelihood are negligible. Land around the human habitation is neither rich nor easy to cultivate due to its tough terrain and only a few places which are accessible are cultivated for the subsistence. Literacy level is very low and only few people are employed in government jobs. Hence, the dependency of most of the people is on forest (Fuentes *et al.*, 1989) for their day to day requirements.

(a) Pakke Wildlife Sanctuary

The Pakke Wildlife Sanctuary (260 55’ to 270 15’ E; 920 35’ to 930 10’ N) is under the administrative control of the Seijosa Wildlife Division. It covers an area of 861.95 km2, which is composed of 20% of the East Kameng district of Arunachal Pradesh. The park

is almost completely hilly with altitudinal ranges starting from 100 to 2040m above MSL. The terrain occupied by the forest is highly rugged with mountainous ranges, narrow plains and valleys with hill slopes, which are moderate to steep. The mountainous part of the reserve consists of temperate climate and subtropical to tropical climate is generally found in the lower belt comprising narrow plains and valley areas. Floods frequent peripheral zone and valleys. The annual average rainfall is approximately 2500 mm. In 1991, 3056 mm rainfall was recorded at Seijosa (Abo, 2002). As per Champion & Seth (1964), the vegetation profile of the Pakke Wildlife Sanctuary is classified mainly as Assam valley tropical semi-evergreen forest. Pakke Wildlife Sanctuary has got six types of vegetations namely**:** Assam valley tropical semi-evergreen forest, Sub Himalayan light alluvial semi-evergreen forests (2B/C/151), Eastern Hollock forests (3/152(b)), Upper Assam valley tropical evergreen forest (1B/C. 2B), Tropical riverine forests (4E/RSI) and Secondary moist bamboo tract (E1/2/SI). The area abounds in epiphytes and variety of lianas and other creepers (Kaul & Haridasan 1987).

The Reserve has a great diversity of fauna (Gupta and Shukla, 1988; Singh, 1999; Katti *et al*., 1992; Chanda, 1994; Datta and Goyal, 1997; Sinha, 1998; Kumar and Singh, 1999; Nath and Dey, 2000; Borang, 2001; Pawar and Birand, 2001) having 120 species of mammal and 268 species of birds, 35 species of reptiles, 29 species of amphibians, 40 species of fishes and 33 species of butterflies (Tiwari *et. al,* 2006). Some of the major important faunal species of the sanctuary is rhesus macaque (*Macaca mulatta*), Assamese macaque (*M. assamensis*), capped langur (*Trachypithecus pileatus*), sambar (*Cervus unicolor*), barking deer (*Muntiacus muntjak*), wild pig (*Sus scrofa*), Indian hare (*Lepus nigricollis*), gaur (*Bos gaurus*), elephant (*Elephus maximus*), tiger (*Panthera tigris*), leopard (*P. pardus*) clouded leopard (*Neofelis nebulosa*), wild dog (*Cuon alpinus*), jackal (*Canis aureus*), Indian fox (*Vulpes bengalensis*), Asiatic black bear (*Ursus thibetanus*). Himalayan yellow throated marten (*Martes flavigula*), Malayan giant squirrel (*Ratufa bicolor*), common otter (*Lutra lutra*), brush-tailed porcupine (*Atherurus macrourus*), large Indian civet (*Viverra zibetha*), mongoose (*Herpestes* spp..*)*, fruit bat (*Sphaerias blanfordi*). Several species of birds, reptiles and amphibians are also observed in this region.

Pakke has two Ranges vis, Seijosa (540.79 km2.) and Tipi (321.16 km2.). Prior to 1980, the west bank of the Pakke River was leased to the Armed forces for firing practices and the east bank for settlement of the retired Army (Abo 2002) although currently the area has no leases.

(b) Eagle Nest Wildlife Sanctuary

The Eagle Nest Wildlife Sanctuary (260 55' to 270 15' E; 92030' to 93010' N) is also under the control of the Pakke Wildlife Division located in the West Kameng district of Arunachal Pradesh. It covers an area of 217 Km2. The Eagle Nest Wildlife Sanctuary has hilly terrain with altitude ranging from 334 m to 3213m above msl (Abo, 2002). The terrain has highly rugged mountainous ranges with a narrow plain and valley having moderate to steep slopes. The PA has varied kind of vegetation ranging from Semi-evergreen and Evergreen forest in the foothill areas and Temperate to Coniferous forest at higher elevation. By and large, the forest dealt with may be classified as: i) Tropical Evergreen and Semi-evergreen forest, ii) Sub-tropical broad-leaved hill forests and iii) East Himalayan dry temperate coniferous forest (Kaul & Haridasan, 1987; Datta, 1999; Abo, 2002).

The Sanctuary is home to various endangered species like Red panda (*Ailurus fulgens*), musk deer (*Moschus chrysogaster*), snow leopard (*Uncia uncia*), blyth tragopan (*Tragopan blythi*) etc. It is also home to five varieties of hornbills beside tiger, elephant, Assamese macaque (Datta, 1999; Abo, 2002) etc.

Considering the tremendous potential that exists for rehabilitating bears back to the wild in Arunachal Pradesh, Wildlife Trust of India (WTI) signed a Memorandum of Understanding in March 2002 with the Department of Forests and Environment, Arunachal Pradesh, to establish a rehabilitation centre to address the issue of displaced bear cubs (MoU, 2002). The centre was planned to provide food, shelter, veterinary care and other rehabilitation measures to them until they are fit enough to be released back into their habitat. The Centre also planned to treat injured/sick temporarily displaced bears with the aim of returning them to the wild. The centre has been established in an area of four acres of undisturbed semi-evergreen forest in Pakke Tiger Reserve, Seijosa. The center has a quarantine facility, apart from the main complex consisting of shelters, 2 small cub enclosures, 5 large holding pens (5x10x5 m), two huge covered enclosures (15x10x8 m) and a pre-release orientation yard of 4,800 sq. m. This facility was primarily designed to hold bear cubs meant for hard release.

1.4.1 Memorandum of Understanding

The Asiatic bear rehabiltation project was officially launched on the 15th of March 2002, following the signing of a Memorandum of Understanding (MoU) between the Department of Environment and Forests, Arunachal Pradesh and Wildlife Trust of India. As per the MoU, the project will be governed by a Governing Council, headed by the Forest Secretary of Arunachal Pradesh. While the Department will provide all the logistics for the establishment and smooth running of the Centre in Arunachal, WTI will ensure that the project is successfully run. The project has a Project Leader designated from the Department and a point person appointed by WTI. The Governing Council members will meet once a year and take review of the project's progress at the Governing Council meeting.

Fig 1.2. CBRC being inaugurated by the Forest Minister of Arunachal Pradesh Shri Newlai Thingkhatra.

1.4.2 Funding for construction of shelters

In March 2002, WTI submitted a proposal to the Animal Welfare Division, Ministry of Statistics and Program Implementation, Government of India, seeking funds for establishing a rehabilitation centre for Asiatic black bear cubs confiscated in Arunachal Pradesh. To expedite the initiation of the project, a temporary enclosure was built and two bear cubs were moved from Itanagar Zoo. The ministry meanwhile approved the project and released the first installment of fund for construction in 2002. With additional support received from IFAW, the construction of the entire facility was completed in 2005. For the running of the project, the first year 2003-04, the British High Commission came forward with financial support which was followed for all the remaining years by IFAW. The centre was officially inaugurated in February 2005 by Shri Newlai

1.4.3 The layout plan

A conscious effort was made to keep the support facilities away from the animal enclosures. CBRC was thus built in two complexes:

(A) Animal shelters and
(B) Field camp

Detailed architectural schematic drawings of the shelters and field camp have been provided in Appendix I. schematic Human and animal areas have been placed apart to prevent the bears from getting acclimatized to people. The site chosen for building the hospital cum residential area lies on the West Bank of the Pakke river in Pakke Tiger Reserve, Seijosa, Arunachal Pradesh (Fig 1.2). This area has the office and residence of the Forest Range officer and other department staff. The site chosen for the Animal Shelter lies about 600 meters from here and inside the semi-evergreen forests of Pakke Tiger Reserve.

(A) Animal Shelters

The shelter area comprises a series of bear enclosures, a support building and a perimeter fence or wall encompassing a free ranging area for orientation of bears before release (Fig 1.3). The enclosures are made of chainklink mesh and MS pipes with sliding doors for moving animals and doors for keepers to enter. The support building is an Assam type RCC construction with an animal examination room, retiring room for animal attendant, an animal kitchen and a small control room. The perimeter fence encompasses all these structures. It is a chain-link mesh reinforced with live wires on either side.

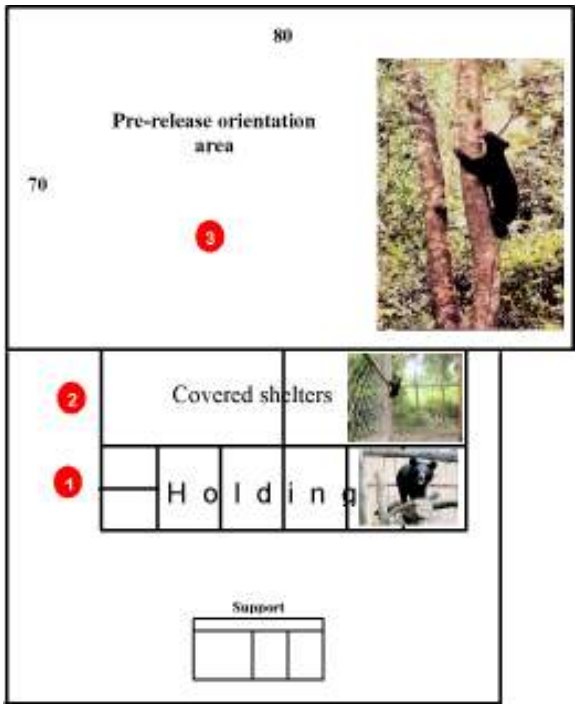

Fig 1.3 Layout of the animal shelters

(i) Bear enclosures

The bear rehab facility has ten enclosures of varying sizes, the smallest ones being the cub enclosures (5x5x5 meters dimension) in the holdings and largest one being pre-release orientation yard (80x70 meters dimension) which is open to sky The cub enclosures are designed to hold the cubs during the suckling period and the five holding cages (5x10x5 m dimension) for accommodating them after weaning period. The large covered enclosures (15x10x8) are in place to accommodate the bears in case of security issues in the pre-release orientation yard (Fig 1.4). A series of sliding doors permit the movement of bears from one section to another. These large enclosures lead into the Pre-Release Orientation yard where the bears are released to acclimatize themselves to the forest environment before they are being considered for release. The 5600 square meter pre-release orientation yard has a six feet tall chainlink mesh reinforced with three lines of live wires to prevent the bears from climbing on to the chainlink mesh. However, no live wires have been used in any of the covered enclosures. In order to prevent the bears from getting habituated to the keepers and veterinarians, the entire facility has been cordoned off with nylon netting screens. Visitors are not allowed entry into the shelter area.

(ii) Support building

The support building, located within the shelter complex is meant solely for the caretakers to prepare food for the bears and for the veterinarian to treat bears in case of emergency. It has an animal examination room, retiring room for animal attendant, a kitchen and a small control room to monitor the solar power fence. Each room is approximately 8 feet by 12 feet in dimension, while the treatment or examination room is double this size (16 feet by 12 feet).

All the bears at the time of their admission are taken to the examination room before being moved to the quarantine enclosure or hand-raising section depending on the age of the bear on arrival. A ramp has been provided to facilitate movement of crates with wheels. The quarantine cages are located away from the main shelters amidst the jungle. The control cabin houses all the solar power fence accessories, like the lightning arrester, batteries and energizers.

Fig 1.4. A bear in the orientation yard with the large covered enclosures in the background.

Fig1.5 The solar fencing around the shelter area.

(iii) Perimeter fence

The perimeter fence is roughly 340 meters in length encompassing all these shelters and the support building. The fence has a six feet high 3x3 inch chainlink mesh of eight gauze thickness. Since live wires are required on either side of the fence, specially fabricated 10 feet high L-angles with 2½ feet overhang has been used at a distance of every five meters (Fig 1.5). The corner poles are strengthened by supporting poles on either side in order to withstand the tension of live wire strings. There are nine strands of live wires outside and three strands of live wires inside. The insides wires discourage bears from climbing on the fence and escaping from the pre-release orientation yard, while the live wires outside helps to prevent leopards and tigers from entering in and also to prevent species like elephants from damaging the fence.

The solar power fence system comprises three solar panels, three energizers, three batteries and an lightning arrester.

(B) Field camp

Located right on the edge of the West bank of river Pakke, this building functions as the office cum clinic of the Centre for Bear Rehabilitation and Conservation (CBRC). This facility has the medicines storage room, clinics, nursery for hand-raising bear cubs below 3 months of age, rooms for the veterinarian and rehabilitator, staff kitchen, dining room and a dormitory for caretakers (Fig 1.6).

1.5. Training, workshops and capacity building through partnership

1.5.1 First ever workshop on wildlife rehabilitation in Arunachal Pradesh

In order to address the problem of increasing number of wild animals being rescued in different parts of North East India, the Wildlife Trust of India conducted its first ever Wildlife Rehabilitation Workshop in Itanagar from the 27th of February to the 1st of March 2002. The workshop was sponsored by the Central Zoo Authority and hosted by the Department of Environment and Forests, Arunachal Pradesh.

The workshop attracted more than 40 participants from the states of Manipur, Assam, Meghalaya, Arunachal Pradesh and Nagaland. Some of them were from zoos and forest departments, while many others were NGO's from different parts of North East India. There were also two participants from "Wild Aid" organization in Cambodia. The highlight of the workshop was the presence of bear rehabilitation experts from United States and Russia. Dr. Valentin Pazhetnov and Mr. Curtiss Clumpner, the two bear rehabilitation experts, were specially flown in from these countries solely for the purpose of sharing their expertise with the participants on the techniques of rehabilitating and releasing the rescued bears.

Fig 1.6 The land on the West bank of Pakke river in Pakke WLS (above) where the Field Camp has now been built (below)

Curt Clumpner, founder and former director of HOWL Wildlife Rehabilitation Centre in Lynnwood, WA, has been involved in wildlife rehabilitation since 1981.Curt is a former board member of the International Wildlife Rehabilitation Council, a current member of the Board of Directors of the National Wildlife Rehabilitators Association, NWRA, and is a member of numerous professional associations. Currently Curt, working at the International Bird Rescue Research Centre (IBRRC), had been associated with American black bear rehabilitation in the past.

Valentine Pazhetnov, a doctorate in Biology, is the Director of Toropetsk Biological Research Station in "Clean Forest". He was a student of Professor Krushinsky's of Moscow State University. He has been studying brown bears (*Ursus arctos*) in Russia for 30 years and is the author of a well known monograph "A Brown Bear" in Russian. He has written more than 40 scientific works devoted to brown bears and over 80 popular scientific articles on habitat protection and wildlife conservation. Dr. Pazhetnov worked out and successfully tested methods of hand-raising and releasing of orphan bear cubs to the wild. The entire Pazhetnov family has been involved in the rehabilitation of brown bears for three decades.

1.5.2. Visit by Pazhetnovs from OBRP, Russia

Valentin Pazhetnov, the founder of the Orphan Bear Rehabilitation Project in Russia, visited Pakke Wildlife Sanctuary in March 2002 to help WTI in identifying a suitable location for starting a rehabilitation centre for Asiatic black bears. He had earlier he visited Itanagar zoo to inspect all the 11 rescued bears held captive at the zoo and assess their suitability for rehabilitation. Most of them were subadults and adults and were not considered ideal candidates for release. He taught the WTI and zoo staff on the techniques of aging suckling bears cubs (Fig 1.7). He also gave a detailed presentation the protocol followed in Russia for rehabilitating brown bears and how best some of his techniques could be used employed while developing the protocol for Asiatic black bear in India.

Following the visit by Valentin Pazhetnov in 2002, his son Sergey Pazhetnov from OBRP, Russia visited CBRC in 2004 and spent more than two weeks helping the project personnel on the rehabilitation of Asiatic black bears. (Fig 1.8)

Fig 1.7 Valentin Pazhetnov with an Asiatic black bear cub at Itanagar Zoo

Mr. Sergey Pazhetnov, visited the bear rehabilitation project site in Pakke to (i) assess the suitability of four bears at the CBRC for release and (ii) suggest ways to improve rehabilitation techniques followed at CBRC.

Observations on the suitability of bears: After inspecting the two younger bears, Sergey was of the opinion that both the young bears (both less than 18 months of age at the time) are ready for release. He recommended that bears be well fed for two months before release. The other two bears (Lucky and Leela), then over two years old, were brought from Itanagar Zoo when they were six months of age and have since then been living in isolation from public contact.

- Sergey made a den out of leaves, netlon and twigs to observe the sub-adult bears for two consecutive days. The objective was to study the response of the bears to the arrival of animal keepers. In order to observe the bear's reaction to keeper's presence, he recorded the activities from a hide.

- After the end of his study for 3 days, Sergey was of the opinion that one of the bears has not been habituated, whereas the other has to be worked on a little more. He was of the view that two to three months of acclimatization in the newly established pre-release condition yard would prepare the animal for release.
- He suggested that both these sub-adult bears be trial released near Khari.
- In order to study their response to total withdrawal of food, the bears were starved for two days and only water was provided to see if they show tendency to `hibernate'. Sergey observed them taking twigs and other nesting materials inside the den in preparation for exhibiting dormancy.

Comments on the rehabilitation techniques and methods of release: Sergey was impressed with the facility being created for housing the rescued bear cubs. He expected the bears to be shifted to these rehab yards at the earliest. He emphasized the importance of ecological studies for any successful rehabilitation program. Commenting on the soft and hard release techniques, he said either of the methods could be adopted. Dr. Valentine Pazhetnov, who visited Arunachal before the project was launched, was of the view that the project should begin with a soft release program before experimenting hard release techniques.

Fig 1.8 Sergey Pazhetnov at CBRC

Feeding regime for bears during rehabilitation:

- Some water should be provided to the bears especially during summer.
- The bears need not be provided with a pool of water since they can anyway learn to swim in the wild after release
- Bears should be fed at different periods of the day so that they are not habituated to the feeding schedule
- Sergey was of the view that bears being omnivorous are facultative meat eaters.
- Keepers should wear gloves while handling the utensils to minimize the bears getting imprinted to human odour.
- More than providing the natural food, and providing them opportunities to exhibit natural behavior (which according to Sergey, can anyway be learnt in the wild after release), the fear for humans should be retained. Otherwise, bears will fail to recognize the threat of humans approaching them in the wild.

Release considerations: Sergey emphasized that males should be released outside the mating season in the wild so that wild males do not harass them. He also recommended that bears be released in pairs in areas where there is abundant food and no human settlements. After release, supplementary feeding will be necessary for a period of one month. Bears that cannot go back for various veterinary and behavioral considerations could serve for education purposes. Alternately, they could be moved to a lifetime care facility.

1.5.3 Enclosure for in-situ *acclimatization*

Soft release method involves *in-situ* acclimatization. In consultation with Sergey Pazhetnov, the following illustration was prepared for fabricating the enclosure (Fig 1.8).

- The enclosure shall have the minimum space to accommodate two bears for a period of not more than 2 months
- The dimension shall be 5 x 4 meters floor area and the roof 4 meters above the ground level.
- The enclosure will be of portable nature so they it can be dismantled after 4 months in the wilderness.
- MS pipes and frames of weldmesh shall be used for fabrication
- The only entrance to the enclosure shall be a sliding door to move the bears inside
- The only approach to the enclosure will be through a covered netted pathway for feeding the animals through a feeding tunnel. This side of the enclosure where the keeper or biologist will approach will be screened using appropriate material.
- The entire structure shall have a 2 feet deep weldmesh netting below the ground level to

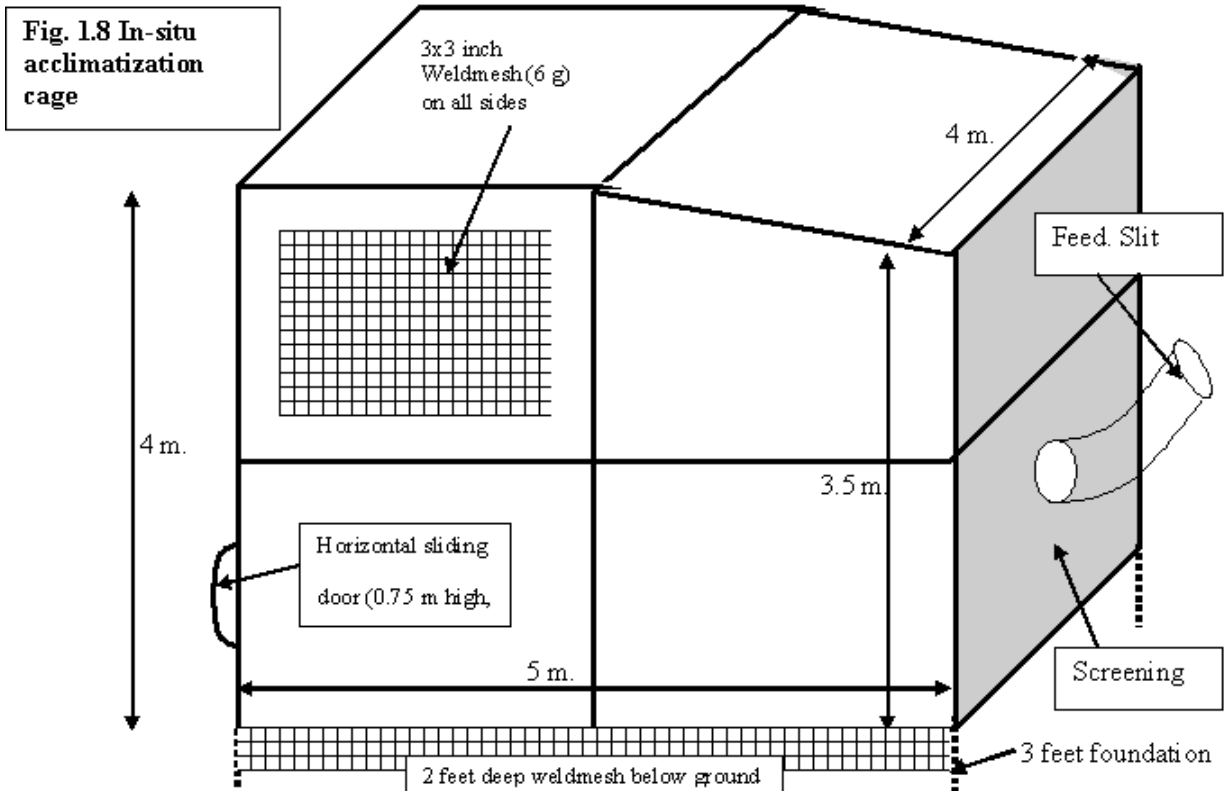

Fig. 1.8 In-situ acclimatization cage

prevent the bears from digging their way out side the enclosure.

- The enclosure shall be in place before the bears are moved to the field (refer illustration on the next page).

1.5.4 Training and capacity building of CBRC personnel in Russia

There has been a constant exchange of project personnel between CBRC and OBRP since 2000 (Fig 1.9). As part of the staff exchange program between CBRC, Wildlife Trust of India and OBRP, International Fund for Animal Welfare, a team of the CBRC's project personnel made a study tour to OBRP in Bubonitsy, Russia in April 2005. The three member team included the Project Leader and the Deputy Chief Wildlife Warden of Arunachal Pradesh Mr. C. Loma, the then Regional Manager Dr. Murali Pai and the CBRC veterinarian Dr. Prasanta Kumar Boro.

The team members were apprised of the strict hands-off approach the OBRP personnel follow while rehabilitating European brown bears. Unlike at CBRC, brown bear cubs at OBRP are released at their young age of seven months when they are said to attain self sufficiency. The team took part in the routine husbandry practices, veterinary care, release site selection exercises and post-release monitoring of soft released bears in Bubonitsy (Fig 1.9). The study was of immense use to the team members in learning how bear cubs are rehabilitated in temperate counties and how different are their conditions when compared to the conditions at CBRC. A detailed report of the training program in Russia has been given in Appendix II.

1.5.5 First International workshop on bear rehabilitation in Russia

International Fund for Animal Welfare (IFAW) organized the first international workshop on "Bear Species Rehabilitation, Release and Monitoring" in Russia in Tver Region at the Orphan Bear Rehabilitation Project (OBRP) in Bubonitsy, Tver Region, Russia. The aim of the workshop was to enable all participants share and contribute their knowledge, experience and expertise on the critical components of bear rehabilitation, so that the best practices in bear rehabilitation could be documented and made available to all rehabilitators. Such an information sharing would enhance the survival of released bears and minimize the risk of released bears coming into conflict with people.

The workshop attracted 42 participants from different parts of the world, working on five species of bears, namely the European brown, American black, Asiatic black, Andean spectacled and the Malayan sun bear. The workshop was an ideal platform for CBRC

Fig 1.9a. WTI Executive Director

project personnel to present their case and also learn a few lessons from bear rehabilitators across the world. Dr. N.V.K. Ashraf, the Principal Investigator of the CBRC project, attended the celebrations and presented on the Asiatic black bear rehabilitation in Arunachal Pradesh as a case study on bear rehabilitation in tropics. Overall, there was one presentation each on the rehabilitation of sun bear, polar bear and spectacled bear, whereas the European brown bear, American black bear and the Asiatic black bear dominated the proceedings with three or more presentations each. A comprehensive report on the workshop proceedings have been given as Appendix III.

Fig 1.9b. CBRC Project Leader (left) and Wild Rescue program Director (right) during their visits to OBRP, Russia.

CHAPTER 2

Getting the science right: Protocols and criteria

The rehabilitation of bears is a first in India. There is no precedence and the first several months of the project was spent in trying to write up protocols and criteria for rehabilitating bears into the wild in India following several global examples. Much of the first five years of the project has then been spent in trying to field test these, make modifications and corrections and arriving at a working formula. It is only after Phase I of this project (2002-08) was over that the protocol has evolved to be a successfully field tested one. This chapter gives the details of this evolution of the working documents that scientifically guided this project

2.1 Rehabilitation protocol

The method a bear rehabilitator employs appears to be governed by the following considerations:

1. What age the rehabbers consider ideal for the bears to establish and fend for themselves in the wild
2. What degree/duration of contact with the bears is considered detrimental to the survival of released bears
3. What level of acclimatization to natural habitat is considered essential for the bears' survival after release
4. What facilities and resources the rehabbers have at their disposal to realize these considerations

All these four factors put together determine the intensity of husbandry inputs provided, the kind of facilities created and how the bears are released (hard, soft or gradual). Accordingly methods of rehabilitating bears could be grouped into the following three categories:

1. Hard release, either before the bear cubs turn a year old or when they are between 1½ to 2½ years of age.
2. Gradual or assisted release after acclimatizing the bears to the release site by walking them.
3. Soft release after acclimatizing the bears to the release site by holding them captive for sometime.

In the absence of any formal protocol or guidelines on rehabilitation for any bear species, a draft protocol for rehabilitation of Asiatic black bears was prepared based on the published information available on the rehabilitation of other species of bears and other documents like the IUCN guidelines on reintroduction and placement of confiscated animals (IUCN, 1998 and 2002) and health screening protocols for release of wild mammals (Woodford, 2001). The protocol was fine-tuned based on the lessons learnt while visiting rehabilitation centres in other countries and on the expertise made available during the visits of expert bear rehabilitators to CBRC. Since the project is run in joint technical collaboration with the Orphan Bear Rehabilitation Project (OBRP) in Russia, a considerable part of the inputs for the protocol was gained from interacting with rehabilitators at OBRP. The following flow chart summarizes the protocol thus prepared:

The rehabilitation project at CBRC thus began with a rehabilitation protocol that would encourage a relatively hands-off approach. The bears, received at the age of about six months, would spend two years in captivity in large enclosures that would allow them to have some access to natural forests in the 5,600 sq.m pre-release orientation yard. (Fig 2.1) The bears were also fed twice a day, with a diet dominated by wild fruits collected from the forest (*Garuga pinnaat*, *Syzigium cumini*, *Ficus pomifera*, *F. scandens*, *Eugenia malaccansis*, *Dillenia indica*, *Musa* spp.). When the bears attained more than two years of age, their suitability for release was determined by behavioural studies and veterinary screening. The selected bears were then taken to the chosen release sites and hard-released in 2005. The first three bears released following this hard-release method were all females. They were radio-collared with drop-off VHF transmitters (Telonics, USA) to track their post-release movements.

Fig 2.1 One of the bears during pre-release orientation *ex-situ*.

A soft-release method of gradual acclimatization at the release site was followed for the next two bears. The protocol was revised following the reports of successful rehabilitation of sun bears in Indonesia (Fredriksson, 2005). Two hand-raised bear cubs about 4-5 months of age (a male and a female) were moved to the release site in August 2006 and taken for daily walks to a designated 'rehab' area by a rehabilitator. The bears were initially confined to an enclosure and fed on porridge in the evenings, and in four months time, they were radio-collared and allowed to sleep on trees outside the enclosure. By the time they were a year old, the rehabilitator would 'drop' them in the 'rehab' area and collect them in the evening. Three months later, the bears were 'released' as they were found to have adequately acclimatized to the site. Supplementary feeding outside the enclosure area continued for one more month. Since supplementary food is already in place in the enclosure before they come back after the walk, the bears do not

2.1.1 Flow chart of the protocol followed for bear cubs that were hard-released after pre-release orientation ex-situ.

(Bears will be subjected to a minimum period of 21 days quarantine, subject to the discretion of the veterinarian)

In the case of infants less than 1 month

Age/ Duration	Stage	Place	Features
0 – 4 months	1. HAND-RAISING	Small animal nursing boxes	Caretakers restricted to one or two Choice of appropriate milk formula Protection from extremes of weather
	If cubs are ≥ 3 months		
4 – 5 months	2. RELOCATION	Night shelter in forest (4x3x5 m)	Moved to the release site 1 caretaker identified as point person Disease screening before relocation
	First stage of Rehab		
5 to 9 months	3. HANDS-ON ACCLIMATIZATION	Night shelter in forest (4x3x5 m)	Weaned from milk & fed concentrate Cubs fed in shelter every evening Cubs taken for daily excursions into forest
	Second stage of Rehab		
9 to 12 months	4. *IN-SITU* ACCLIMATIZATION	No shelter	Cubs no longer sleep inside the shelter Feeding continues inside the enclosure Daily excursions to rehab site continue
	Third stage of Rehab		
12 to 16 months	5. *HANDS-OFF* ACCLIMATIZATION	No shelter	Radio-collared at the end of this stage Cubs dropped at rehab site and brought back to shelter area at night
14 to 16 months	6. RELEASE TO THE WILD	At the site of acclimatization itself	Suitability of cubs for release examined No caretaker. Bears are on their own Feeding gradually stopped in two months
(Minimum six months)	7. POST RELEASE MONITORING	At the release site	Movement pattern and habitat use of bear cubs studied through GPS locations

Fig 2.2 One of the bears during *in-situ* acclimatization at release site

associate the food with human presence. As Sally Maughan (2004) says, the cubs identify the enclosure in the same way as a cub playing near its sleeping mother.

Initially the bears were being walked in diverse terrain and habitats found within the vicinity of night shelter to acclimatize them to their new surrounding. Gradually this area of acclimatization was increased, which was 2-4 km of aerial distances from the night shelter. This area has been selected on being hilly and presences of abundant growth of food plants such as cane (*Calamus spp*), bamboo and toko (*Levistonea jenkensii*) trees. This prolonged period of acclimatization provided the caretaker an opportunity to observe bears at close quarters and record their changing behaviour and feeding habits over a period of eight months. (Fig 2.2)

Thus two different protocols were followed at CBRC to rehabilitate Asiatic black bears cubs. While in the first method, efforts were made to minimize human contact with the bears as much as possible, in the other the caretakers assumed the role of foster parents and maintained constant contact with the bears until they were gradually let free.

2.2 Protocol for the Rehabilitation of Asiatic black bears (*Ursus thibetanus*) employing soft release option

2.2.1 Acceptance of bears at the centre

Bear cubs are often confiscated from villagers who keep them when young for various reasons. Usually the cubs are sometimes handed over to the government after keeping them in captivity for periods that may range from less than a week to more than two years.

1. The center will not accept bear cubs that have spent considerable length of time in captivity. Any cub above three months of age will not be considered for admission, unless the cub is found to be suitable for putting into a soft release programme.
2. All confiscations will be done by the Forest Department and the CBRC ambulance can help in the transportation of the animal to the centre with the permission of the Forest Department.
3. All new arrivals will be subjected to 21 days of quarantine period, during which they will be examined for behavioral aberrations and infectious diseases.
4. All cases of admission will be registered in appropriate databases. Ideally, all cubs will be micro chipped with transponder implants.
5. No cub with deformities (mental or physical) diseases that cannot be cured in a short period of time shall not be considered for admission.

2.2.2 Hand-raising of displaced cubs

1. Bottle feeding of suckling cub is the most crucial stage in the rehabilitation process. This is also the nurturing stage, where the rehabilitator takes on the role of surrogate mother to the bear cubs and provides them not just food but also comfort and security.

2.1.2 Flow chart of the protocol followed for bear cubs that were soft-released after a prolonged period of acclimatization in-situ.

(Only cubs below fives months of age were accepted for rehabilitation)

In the case of infants less than 1 month

Age/Duration	Stage	Place	Features
0 – 4 months	1. HAND-RAISING	Small animal nursing boxes	Caretakers restricted to one or two Choice of appropriate milk formula Protection from extremes of weather
	If cubs are ≥ 3 months		
4 – 5 months	2. RELOCATION	Night shelter in forest (4x3x5 m)	Moved to the release site 1 caretaker identified as point person Disease screening before relocation
	First stage of Rehab		
5 to 9 months	3. HANDS-ON ACCLIMATIZATION	Night shelter in forest (4x3x5 m)	Weaned from milk & fed concentrate Cubs fed in shelter every evening Cubs taken for daily excursions into forest
	Second stage of Rehab		
9 to 12 months	4. *IN-SITU* ACCLIMATIZATION	No shelter	Cubs no longer sleep inside the shelter Feeding continues inside the enclosure Daily excursions to rehab site continue
	Third stage of Rehab		
12 to 16 months	5. *HANDS-OFF* ACCLIMATIZATION	No shelter	Radio-collared at the end of this stage Cubs dropped at rehab site and brought back to shelter area at night
14 to 16 months	6. RELEASE TO THE WILD	At the site of acclimatization itself	Suitability of cubs for release examined No caretaker. Bears are on their own Feeding gradually stopped in two months
(Minimum six months)	7. POST RELEASE MONITORING	At the release site	Movement pattern and habitat use of bear cubs studied through GPS locations

2. It is essential that the rehabilitator plays the role of mother bear, gaining the confidence of the cubs and interacting with them just like the mother would. It will ensure easy handling of the cubs and the cubs will not consider the rehabilitator a threat even when sick or injured. This will be advantageous when the cubs begin on their walks in the forest.
3. All the cubs will be handled by one or two designated persons who will eventually walk the bears.
4. Bedding and warmth are essential for neonates. The bedding will comprise a hand towel that can be replaced every day. Adequate warmth especially at night is essential for all suckling cubs. Warmth using infrared lamps will be provided to all cubs whenever deemed necessary.
5. All suckling cubs will be handled with gloves to maintain strict hygiene. Wherever possible, they will be raised in groups of 2 or 3 individuals.
6. An appropriate milk formula will be selected. Considering the fact that an appropriate milk replacer for bears is not available in India, Lactogen-II will be used as it has been found to be adequate. Bear cubs have not been observed to exhibit formula intolerance like elephant and rhino calves.

Fig 2.3 Asiatic black bear cub, few week old at rescue, being bottlefed

7. The cubs will be fed every two hourly in the beginning with night feeds till the age of two months. The frequency of feeding will be subsequently reduced to four times a day with no night feedings by 4 months of age, to once a day by 6 months of age. All cubs will be weaned off milk by the age of 6 months (Fig 2.3).
8. Milk will be bottle fed as opposed to bowl feeding to maintain a level of intimacy between the cubs and the rehabilitator. Moreover, it is easier to bottle feed cubs as opposed to using feeding bowls as bear cubs can be very messy causing a lot of wastage.
9. A high level of hygiene will be maintained during nursing as the cubs are prone to pick up infection. This would include:

    a. Personal hygiene of the keepers handling the cubs
    b. Maintenance of hygiene while preparation of food
    c. Frequent disinfection of the cage of confinement
    d. Daily cleaning of the kitchen or milk preparation area

10. Growth is a good indicator of wellbeing. The cubs during this phase will be weighed and the body length recorded every month to monitor growth.
11. Adequate nutritional supplements in the form of vitamins and minerals will be given until they are moved over to solid foods.
12. Solid food can be introduced to the cubs' diet at the age of two months. This can range from fruit mush, cereals etc. mixed with the milk formula.
13. As the cubs get older, say at about 4 months of age, dry dog food can be introduced into the diet.
14. Once the cubs are weaned at the age of 5-6 months of age, formula, porridge, fruit etc can continue to be provided in bowls as additional feeding in the wooden cage at the acclimatization site.
15. All cubs will be dewormed at the age of one month. They will again be dewormed when they are moved into the cub enclosure at the age of 2 months. Stools will be examined for parasite ova at every stage of rehabilitation.
16. If the cubs are under 2 months of age they will be housed in a protected nursery room in small plastic or wooden rectangular containers of 2x3x2 feet dimension.
17. After two months they will be moved to the cub enclosure with adequate provision for shelter against elements of weather. This enclosure will be in the form of a wooden den (0.7x1.5x0.7m). During this period, the rehabilitator will get the cubs used to following him/her in and around the CBRC campus itself.

2.2.3 General Principles

Most bear releases have happened in temperate regions where bears are sometimes released during hibernating. Hibernating bears are chemically restrained and released into a den in the wild. This is the standard 'hard release' technique followed in temperate countries to avoid homing. Bears in the northern hemisphere (temperate regions) are released into 'hibernating' dens when they are barely 7-9 months of age (Pazhetnov *et al*, 1999). These techniques cannot be followed in most parts of Arunachal where climate is tropical and bears are active throughout the year (Clark, *et al*, 2002). Moreover, releasing bear cubs of similar age is not advisable in a tropical situation like Arunachal where tigers and leopards are also found. Bear cubs less than 15 months of age will not be released under normal circumstances.

Research was done to identify a soft release methodology that will enable the bear cubs to graduate to adulthood at the site of release, gradually acclimatize to the wilderness and enable them to establish a home range, develop site fidelity thereby increasing their chances of survival post release. The rehabilitation technique being enumerated in this protocol is an "assisted release" method used in Indonesia to rehabilitate Malayan sun bears.

Using this technique, the bear cubs will be taken for a walk on a daily basis by one person who acts as the surrogate mother. This enables the bears to gradually familiarize themselves to the new environment, learn predator avoidance, obtain their own food and establish a home range. The bears will be fed on a combination of natural food from the forest and supplementary food in captivity. But food will also be provided intermittently by the surrogate mother during the walk to have control over the movement of the bear during the period of acclimatization. The bear cubs will be brought back to the enclosure/den every night. According to the technique followed in Indonesia, eventually the bears begin to resist being brought back to the enclosures. At this point they will be fitted with radio collars and not be forced at any point to return to the enclosure. The dependence of the bear to supplementary food would be gradually reduced as the bear becomes more and more independent in the forest.

The soft release method using 'walk the bear' technique gives the bear cubs:

1. A longer acclimatization period at the site of their future home.
2. Less overall time in captivity (younger age of beginning the acclimatization process)
3. Younger age at the time of release (possibly less threatening to wild bears)

The soft -release method follows the assumption that bears must feel at home when they are released in an area. It is a gradual assimilation of the bears back into their natural habitat. Here the rehabilitator does with the cubs in rehabilitation what the mother bear does with her cubs in the wild, the fundamental principle being to allow them to graduate to adult hood in the same area where they will be "weaned" from their surrogate mother

2.2.4. Selection of release site

The proposed site of release will be assessed by a committee of rehabilitators for suitability of release. The site thus chosen will be informed to the Chief Wildlife Warden requesting the permission for release. A habitat suitability study will also be initiated to evaluate the proposed release site. The team will consider the following variables while assessing the suitability:

a. The site selected will be within the natural distribution range of Himalayan black bears in Arunachal Pradesh.
b. Based on the dietary habits of bears in the wild, the food availability in the prospective release area will be assessed by identifying the vegetation type.
c. The site chosen will have few or preferably no resident bears.
d. The release site will not be close to any village and/or with any evidence of bear hunting, but at the same time approachable for post-release monitoring.
e. The bear will not be released if habitat loss or any other factor detrimental to the survival of bears is visualized at the time of release.

2.2.5 In-situ acclimatization for soft release

1. Rehabilitation would be carried out at CBRC by in consultation with the bear rehab experts, members of the CBRC Governing Council and IUCN bear specialist group.
2. The overall success of the rehabilitation project shall be evaluated as per the objectives laid down in the beginning. If necessary, decision shall be made to revise, reschedules or discontinue the program.
3. The process and duration of rehabilitation would vary for injured, sick bears, orphaned bear cubs or sub- adults. Rehabilitation process may not be initiated or continued if it becomes clear that there are no chances of release of the healthy animal into the wild. But CBRC would strive to weigh pros and cons to give the bears a chance to go back into the wild.
4. Bears will be subjected to a minimum period of 21 days quarantine, subject to the discretion of the veterinarian.
5. Once the cubs reach the age of three months and are ready to initiate their walks into the forest, they will be moved to the *in-*

situ acclimatization site along with their wooden crates.

6. At the selected acclimatization site, a *machan* will be constructed for the rehabilitator to stay in. The wooden cage to hold the bear at night will be grouted under this *machan*.
7. Ideally, at least two bear cubs will be taken to the *in-situ* acclimatization site. The enclosure at the site will be similar to the dimension of the cub enclosure (4mx5mx4m). Alternatively a small wooden cage (2x3x2m) can be employed to hold the bears at the in-situ site and placed below the *machan*.
8. The *machan* (3m x 2m) and the cage will be protected by an eight line power fence of 10m x 10m x 9.5m to keep leopards and other predators out.
9. The cubs will be walked through the forest by the rehabilitator during the day and kept in a cage at night where they will receive additional food. They can be active in the forest for a period of 9-10 hours in a day. They may even show signs of exhaustion and a need to come back to the cage. This should not be discouraged.
10. The cubs will be given ample opportunity to forage for food in the forest and introduced to fruit and vegetation while they are walked in the forest.
11. To supplement this wild diet, cubs will be fed on a mixture of vegetables (mostly tubers), fruits of cultivated varieties, and fruits and branches, shoots and leaves collected from the forest.
12. The bears will also be fed with some animal diet (large pieces of bone with some meat, entire birds or chicken heads etc.) once in 15 days.
13. The cubs can also be provided the additional food inside the forest at times. Food is provided in the cage in order to habituate the cubs to the cage and let them identify it as a security blanket.
14. It was observed in the case of the Malayan sun bears that the cubs began exhibiting refusal to enter the cage after 6 months of being walked in the forest (Fredrickson).

Once the cubs are reluctant to enter the cage, they should be radio collared immediately. At no point should the cubs be forcibly put inside the cage.

15. All released animals will be radio-collared and monitored for a minimum period of one to two years. Detachable or drop-off collars will be used to take into consideration the growing neck girth of the bears.
16. The frequency of the bears coming back to the cage for additional feeding or security will gradually decline over a period of time (2.5 years in the case of the Malayan sun bears). However food must be readily available to them whenever the cubs appear and they should not be discouraged from doing so.
17. The number of people walking the bear should be ideally just one. This will ensure that the bear associates with just the one person and not human beings in general.
18. Bears will quickly adapt to the forest environment and show instinctive knowledge of feeding behaviour. Malayan sun bears in rehabilitation were eating a large variety of the same foods that were observed to be eaten by wild bears in the same area (Fredricksson, 2005).
19. Time spent in captivity is an important factor. Bears that have spent more time in captivity will be more difficult to release due to the time period necessary for them to learn foraging skills and establish a home range (Fredricksson, 2005).

2.2.6 Pre and Post Release Considerations

(A). Behavioural considerations

The bears will not be released under the following situations:

1. When following the soft release option, if they have not been adequately habituated to the wilderness situation.
2. If some of the behavioural abnormalities, prevalent at the time of rescue, failed to disappear during the course of rehabilitation.
3. Bears with permanent disabilities due to injuries/disease acquired during *in-situ* acclimatization, will be moved to permanent care centers or zoos.

(B). Veterinary considerations

1. Bear cubs will be screened for infectious disease like mange, tuberculosis and if needed against infectious canine hepatitis (ICH) also before being taken to "release site" and for *in-situ* acclimatization. Evidence of pruritis and alopecia will be considered signs of possible mange, the animals will be tuberculin tested to determine presence of tuberculosis, and fecal samples will be screened for ICH virus.
2. Weak, nutritionally deficient and anemic bears with poor body condition will not be considered for soft release.

2.2.7 Contingency plan

- There is a concern that rehabilitated bears may prove to be a threat to people living in adjoining villages. But, published data on rehabilitation of bears suggest that only few hand-reared bears resort to nuisance behaviour once independent in wild (Stringham, 2003). Since bears have a large

home range, they may wander near human settlements. If there is danger to the lives of either bears or humans, the bears will be captured and moved to a lifetime care facility.

- The possibility of losing track of the animal soon after release also cannot be ruled out. It is very likely that bears can pull out radio collars from their neck. In such cases, attempts will be made to retrieve the collar and the animal recollared after tracking and recapturing.
- There are also chances of bears getting attacked by predators and getting injured. In such instances, they will be treated after darting. Bears with irreparable injury shall be captured and brought back to CBRC for later transfer to a lifetime care facility.

2.2.8 Monitoring the bears during the 'walk'

1. The biologist will walk with the bears twice a week in order to collect data on the movement of the bears, range use, activity, behaviour and food habits.
2. Data will be collected on the movement of the bears, range use, activity, behavior and food habits.
3. The rehabilitator will however monitor the bear cubs daily of course. He/she will collect a sample of each item eaten by the bears and identify its local and scientific name. A preference rating of each item will be given.
4. The distance walked, direction of walk, duration of walk and area covered will be noted down every day using a compass readings, timers, a pedometer and GPS.
5. The bears will be equipped with radio collars the moment they exhibit refusal to get inside the crate.

2.2.9 Legal considerations

1. No bear will be moved to the designated site without the permission of the Project Leader and/or Chief Wildlife Warden of Arunachal Pradesh.
2. As per the amendments made to the Indian Wildlife Protection Act (1972), all rehabilitation/rescue centers will henceforth be called zoos and will come under the purview of the Central Zoo Authority (CZA) (Section 13-A). No bear will therefore be released without the written permission of CZA, MoEF.
3. Use of radio-telemetry in wildlife requires the permission of the Ministry of Telecommunications. No bear will be radio-collared without the permission of this ministry.

CHAPTER 3

The Bears Arrive: Care at the centre

3.1 Age at arrival

Bear rehabilitators in temperate countries receive bears when young, especially during the suckling stage. In countries where hunting is legalized and restricted to a particular season, bear cubs of roughly equal age are admitted to rehab centres. The cubs at Orphan Bear Rehabilitation Project (OBRP) in Russia are typically less than 2-3 months of age upon arrival. Therefore incidents of habituated cubs ending up in rehabilitation centres of US, Russia, Canada and European countries is rare.

As the rehabilitators at OBRP plan to hard-release bears when young, they need to receive cubs that are not imprinted or habituated to people to any degree. When their objective is to release bear cubs at seven or eight months of age, they have only three to five months time left to work with them. On the contrary, gradual or assisted release programs and projects that release bears when they are above 1½ years of age, can afford to receive slightly older cubs as there is more than a year at hand to rectify evidence of imprinting or habituation to people.

Fig 3.1. Bear cubs, Seppa and Seppi were a month old when admitted.

It is only in the tropics where illegal hunting takes place throughout the year that older cubs are confiscated from people for rehabilitation. The three sun bear cubs chosen for rehabilitation in Borneo were three to seven months of age when brought in (Fredriksson, 2005). To cite another example, nine of the 17 Asiatic black bear cubs received at the Centre for Bear Rehabilitation and Conservation (CBRC) in Arunachal Pradesh, India were five to nine months of age on arrival.

All confiscations were done by the Forest Department in the presence of the CBRC veterinarian who would assess the condition and suitability of bear cubs before accepting them. Since younger bears had greater rehabilitation potential, bears more than one year old were not accepted at the center in the beginning. Since the revision of the protocol in 2005, only cubs below five months of age are being accepted for rehabilitation.

Table 3.1 Age and sex of bear cubs received for rehabilitation at CBRC during the past five years (from 2002 to 2007).

No	Names/ Identity of bears	Place of confiscation	Sex	Age at confiscation	Date of admission	Months held captive before confiscation
1	Lucky #	Itanagar, Arunachal	Female	6 months	21/09/02	3 months at the zoo
2	Leela #	Itanagar, Arunachal	Female	6 months	21/09/02	3 months at the zoo
3	Teddy	Seppa	Male	6 months	10/8/03	3 months
4	Liza #	Singsun, Arunachal	Female	8 months	07/3/04	6 months
5	Bana-1 *	Bana, Arunchal	Male	9 months	30/7/04	5 months
6	Bana -2	Bana, Arunachal	Female	9 months	30/7/04	5 months
7	Diyun	Diyun, Arunachal	Female	5 months	16/09/04	1 month
8	Zoo-1	Hojai, Assam	Male	5 months	16/8/05	2 months
9	Zoo-2	Mongaldoi, Assam	Male	2 months	28/8/05	1 week
10	Karbi	Samaguri, Assam	Female	8 months	22/10/05	8 months
11	Seppa	Seppa, AP	Male	1 month	04/04/06	< 1 month
12	Seppi	Seppa, AP	Female	1 month	04/04/06	< 1 month
13	Harang	Karbi anglon, Assam	Female	1 week	11/02/07	Few days
14	Mangaldoi	Goroimari, Assam	Male	4 months	26/06/07	1 month
15	Pacha	Salna, Assam	Female	3 months	16/06/07	2½ months
16	Talasema	Seppa, Arunachal	Male	1½ months	12/04/07	< 1 month
17	Deomali	Deomali, Arunachal	Male	2 months	07/07/07	1 week

The centre has so far received 17 bear cubs, out of which five were from the neighbouring state of Assam. Majority have been females (Table 3.1).

All new arrivals above three months of age were subjected to a month long period quarantine, during which time they were examined for behavioral aberrations and screened for tuberculosis, either by intra-dermal tuberculin test or ELISA or both.

Fig 3.2. Caretaker at CBRC entering shelter area.

The husbandry practices followed at CBRC depended on the protocol being followed; whether the bears were acclimatized *ex-situ* in the orientation yard or acclimatized *in-situ* at the release site.

By employing suitable screening materials like bamboo thatches and nettings around the enclosures and along the pathways, adequate care was taken to avoid human contact (Fig 3.2). However, this was not always possible as the power-fence required frequent servicing and the bears had to be sometimes approached and darted for medical examination and treatment.

3.2 Behavioural enrichment

Since bears are intelligent animals that need complex environments to satisfy their diverse behavioral requirements, prolonged captivity can lead to the development of stereotypy. As reintroduction or augmentation programs using captive-reared animals

Fig 3.3. A bear cub at CBRC with all the furnishings.

are perceived to be less successful than those involving wild-reared conspecifics, any undesirable behavioral persistence in captive bears will be considered the reason for such failures. In the wild, where behaviour must be adaptive and flexible to meet fluctuating conditions, such behavioural deficiencies could help account for reduced survivorship of reintroduced subjects (Vickery and Mason, 2003).

Behavioral enrichment is therefore critical in rehabilitation facilities that hold the bears in enclosures for more than a year before release. This is more so in rehab facilities located in urban environments, where bears have limited or no access to large enclosures built in the natural habitats. Since the facility at CBRC was built in the forest area, the three bears hard-released in 2005 had enough opportunities to climb, forage and make sleeping 'nests' in the 5,600 sq.m. pre-release orientation yard. All enclosures had resting platforms and den for bears to take refuge during extremes of weather (Fig 3.3). The question of behavioural enrichment, however, does not arise in rehabilitation methods like "walking the bears" as the bears have free access to the habitat.

3.3 Feeding bears

Depending on the stage of rehabilitation, these three bear cubs (Lucky, Leela and Liza) were fed on a diet comprising vegetables (mostly tubers), fruits of cultivated varieties, and fruits and branches, shoots and leaves collected from the forest (Fig 3.4). The bears

Fig 3.4 Fruits collected from the forest for feeding bears.

were also fed with some animal diet (large pieces of bone with some meat, entire birds or offal) once in every two to three months. Bear rehabilitation facilities in the West provide largely artificial diet even during the last day of the release. The pre-release conditioning food recommended for American black bear (*Ursus americanus*) comprises dog food, apples, carrot and mealworm (Papageorgiou, *et al* 2002). On the contrary, nearly 75% of the food of an American black bear in the wild comprises of natural vegetation consisting of twigs, buds, leaves, nuts, acorns, grass, roots, tubers and fruits (Papageorgiou *et at* 2002). At the Orphan Bear Rehabilitation Centre (OBRC) in Russia, a homogenous dietary mixture of cow's milk, porridge, buckwheat and eggs are fed (Pai, 2005). This would mean that CBRC is one of the few rehabilitation

centres providing the bears with dietary items collected from the wild. At the Chaparri Ecological Reserve in Peru, the spectacled bears are fed with 19 different food-items including tree fruits, cactus, bromeliads and beehives collected from the forest (Peyton and Plenge, 2005).

To prevent bears from associating human presence to food availability, specially made feeding troughs were designed to hide the source of food from view. They were also fed at different times of the day to prevent habituation to a particular feeding time.

Typically the caretaker would enter the cage every now and then to clean the enclosure. Keeping bears in small enclosures means frequent entry in and out for feeding the bears and cleaning the enclosures. The degree of habituation can range from tolerating the presence of the caretaker in the enclosure to seeking out and attempting to interact with the caretaker during feeding and cleaning activities (Beecham, 2006). At CBRC, however, the bear cubs were moved soon after weaning into the large pre-release orientation yard where caretakers hardly enter.

The last two bears soft-released after *in-situ* acclimatization were never housed or fed in the holding cages or the pre-release orientation yard. As they were relocated to an enclosure (4x3x4 meter in dimension) in the forest and taken to the forest every day for habituation, they had the freedom to choose the dietary items they preferred while foraging (Fig 3.5). The caretaker would see that the enclosure is cleaned during the day when the bears are out in the forest. One of the crucial issues while feeding bears under rehabilitation has been avoiding personnel contact with bears while the caretaker enters to feed the bears. However, this does not appear to be a major problem as long as the caretakers are restricted to one or two. At CBRC, whenever the cubs are fed the concentrate in the enclosure, the caretaker ensured that the food was already in place before the cubs return after their habituation exercise.

3.4 Hand-raising bear cubs

Bears are generally hardy species and are quite adaptable to commercially available human milk formulas or even cow milk. However, survival of neonates is not the only criteria to judge the suitability of milk formula. Oftedal (1980), who classified mammalian milk into six categories based on percentage dry matter composition of protein, fat and sugar, placed bear milk in the category of milk with very high dry matter content (Table 3.2). Bear milk is low in sugar but high in fat and protein. The composition of commercially available baby milk formulas and cow's milk differ considerably from bear milk composition. It is therefore essential for bear rehabilitation centres to prepare the appropriate milk formulas for hand-raising bear cubs.

Fig 3.5 Radio-collared bear cubs feeding on canes in the wild during acclimatization.

Table 3.2 Oftedal's classification of mammals based on the milk composition

Milk Category	Mammalian families	Dry matter %	Composition of Dry Matter		
			Fat %	Protein %	Sugar %
I	Equines, Rhinos	LOW (8-12)	Very Low (12-15)	Low (15-20)	Very High (60-75)
II	Primates (man)	Medium (12-16)	Medium (25-35)		High (50-60)
III	Elephants, Cloven footed (except deer)	Medium (12-23)	Medium (12-23)	Medium (30-45)	Medium (20-37)
IV	Rodents, Deer, Carnivores (Fissip)	High (18-31)	Med/High (32-50)	High (28-42)	Low (10-25)
V	Hares, Bears, Beaver	Very High (30-40)	High (40-50)	High (25-45)	Very Low (5-10)
VI	Seals, Sea lions	Extreme (50-65)	Very High (70-80)	Low (10-20)	Negligible (0-2)

At CBRC, the bears were weaned off milk by the time they were five to six months of age. By this time, they are already on a special weaning diet, given during the brief period of transition from milk to concentrate. The most common diet given at the time of weaning is the standard porridge comprising a cereal mix cooked in milk and a little bit of sweetening agent like honey or jaggery. Fruits and vegetables are also introduced at this stage.

At CBRC, the bear cubs are bottle-fed for up to five months, oftentimes without subjecting them bowl-feeding with the milk formula. This is particularly so when the cubs are meant for relocation to the release site along with the caretaker at an early age for *in-situ* acclimatization. All hand-raised cubs get imprinted to the handler and naturally tend to follow them wherever they go and this was considered essential to encourage the bear cubs follow the rehabilitator in the forests. The probability of cubs getting imprinted on the caretaker is said to be rather high until the age of five months (Pazhetnov and Pazhetnov, 2005). At OBRP, Russia, brown bear cubs are moved to the free-ranging rehab facility as soon as they learn to take milk from feeding bowls (Fig 3.6). There the idea is to discourage imprinting or habituation to any degree as the bear cubs are hard-released at an early age of seven to eight months.

Fig 3.6 Bear cubs being bottle-fed at CBRC and bowl-fed at OBRP

3.5 Pre release acclimatization: *Ex situ* and *in-situ*

3.5.1 Ex-situ acclimatization in the orientation yard

While the first batch of bears (Lucky and Leela) spent eight months in the large pre-release orientation area, the third bear Liza, along with another bear Teddy (not considered for release that

time) spent seven months. The four bears in the pre-release orientation area were the subjects of a behavioural study conducted between August and October 2004. The objective was to study their activity pattern, behavior and enclosure utilization in the orientation yard in order to assess their suitability for release (see Akhtar *et al.*, 2005).

Though the vegetation inside the orientation yard contained fruiting trees, they were inadequate to sustain the bears for longer period of time. Supplementary food in the form of fruits of wild origin (eg. *Dillenia indica, Syzigium cumini, Garuga pinnata, Emblica officinalis, Ficus pomifera, F. scandens, Eugenia malaccansis, Musa* spp.) and cultivated varieties (eg. *Zea mays, Cariya papaya, Ananas comosus, Mangifera indica, Arachis hypogaea*) were provided either in the covered cages or in the orientation yard.

The bears never used the den located below a fig tree in the pre-release area. Studies on the denning ecology of Asiatic black bears have shown that they den in tree hollows, in ground nests, in caves or under rocks (Izumiyama, *et. al.*, 2001; Seryodkin, *et. al.*, 2003). Denning is a necessity for bears, during `hibernation' and for breeding (raising cubs). The bears could have probably used the den if the studies were conducted in December-January. All the bears were seen engaged in some form of `nest' building activity in high forks of trees, the structure being made by simply pulling the branches and leaves together to one place (Fig 3.7). There were at least eight such `nests' used by different bears (Akhtar *et al.*, 2005). The bears invariably returned to their respective nests when they were released again after four to five days interval.

3.5.2 In-situ *acclimatization at the release site*

For the last set of bears (Seppa and Seppi), pre-release orientation happened at the release site itself. The soft release method using 'walk the bear' technique gives the bear cubs a longer acclimatization period at the site of their future home by lessening their overall time in captivity. Both Seppa and Seppi were acclimatized to their release site for nearly eight months, beginning from the 15th of August 2006 to the 8th of April 2007. By the time the bears were 8 months of age, they were reluctant to enter the night shelter in the evenings. Soon they were no longer confined to the enclosure at night. The bears built their own sleeping 'nests' on trees nearby the enclosure by simply folding the slender branches and foliages together. Till early March 2007, both bears used same tree near the shelter but gradually by late March and early April they began using different trees. They were just a year old this time.

The presence of the caretaker during the acclimatization period provided amble opportunities to study their feeding ecology at close quarters. Digital photographs of the bears' activities were taken at fixed intervals and were analyzed for dietary and behavioral studies. During the period of their acclimatization, the bear cubs were seen engaged in feeding on a diversity of food items. At least 21 species of plants and their plant parts were eaten by the bears during the first four months of their acclimatization (Fig 3.8). They

Fig 3.7 Opportunities for bears for arboreal activities in the pre-release orientation yard

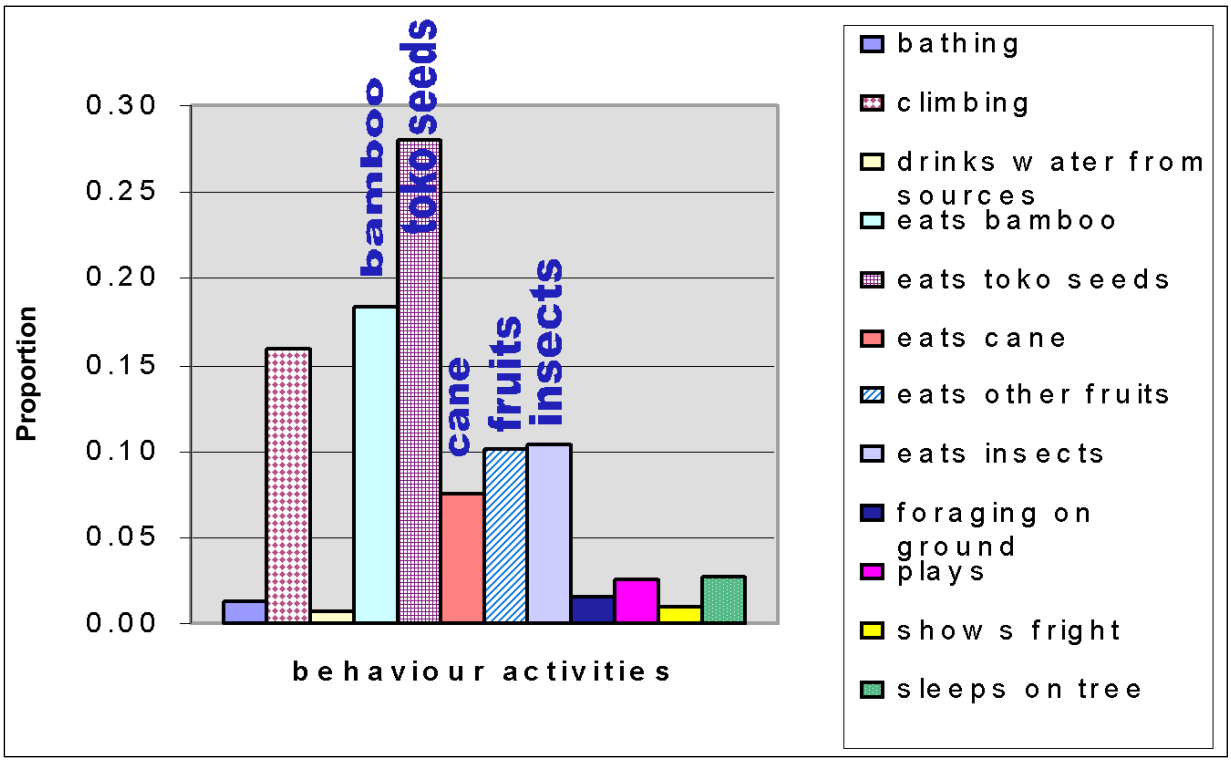

Fig 3.8 Dietary composition of bear cubs during *in-situ* acclimatization

spent majority of their time eating the fruits of *toko* palm (*Levistonea jenkensii*), its leaves, bamboo shoots and its other parts, cane and insects (Fig 3.9). This calls for conservation of these species in wild. On an average *toko* and various cane species takes 15 to 20 years to mature. Currently these species faces threats from local people as these species constitutes major raw material for constructing their houses and for other works. By the time they were a year old, they were strong enough to raid on dhole (*Cuon alpinus*) kills.

3.6 Selection of bears for release

All the bears were subjected to a rigorous suitability test into the following various considerations into account: Beharioural soundness, adequate rehabilitation and veterinary screening. Appendix V for instance shows the various proformas that were filled in by the project personnel for the bear Liza.

3.6.1 Veterinary considerations

Only healthy and behaviourally sound bears were selected for release and acclimatization. There are some basic guidelines available to us on the quarantine and health screening protocols of mammals prior to release (e.g. Woodford, 2001), but they are often prepared in the context of wild to wild translocations. All cubs subjected to the soft release program were dewormed thrice, at hand-raising stage, weaning stage and lastly once before they were released. The bear cubs under *ex-situ* acclimatization were dewormed after a periodical examination of their stools for the presence of parasite ova. Only bears that have attained satisfactory growth and body condition without any physical deformity that would hamper their survival in the wild were considered for release. Since sacrcoptic mange is a common feature in bears, any evidence of alopecia and pruritis were noted down and appropriate treatment rendered.

Among zoonotic diseases, tuberculosis is the most important disease to be considered while planning release operations involving captive reared animals. All the bears were therefore screened for tuberculosis before being moved to the release site for acclimatization. Bears being a hardy species, were not required to be immunized against infectious diseases.

3.6.2 Behavioural considerations

Rehabilitation protocols in general lay emphasis that bears not afraid of human presence should not be released as they would end up being nuisance bears by straying into villages. If habituated adult or sub-adult bears are released in areas where there are human settlements, they will in all likelihood move towards the settlements for food and security. Fredriksson (2005) mentioned how five of the confiscated bears that were released in the forests of Kalimantan in Indonesia moved towards villages, eventually some of them getting killed. The bears also have to be assessed for survival skills which include both foraging

Fig 3.9 Soft released bears feeding on a diversity of food items during in-situ acclimatization.

abilities and predator avoidance. Taking all these into account, the following questions were asked to determine the suitability of bears

1) If the cubs had enough opportunity to socialize with conspecifics
2) Whether they had enough opportunities to exhibit natural behaviour during the period of acclimatization
3) Whether the cubs have been adequately habituated or acclimatized (*ex-situ* or *in-situ*, depending on whether it is a hard-release or assisted release) to horn their foraging and survival skills
4) If contact with strangers except the caretaker has been minimized during rehabilitation process
5) If the bear cubs avoid strangers when approached
6) If there is any behavioural abnormality that would affect its survival when released

None of the bears chosen for release at CBRC were found with behavioral abnormalities or suffering from incurable diseases that may prove to be a threat to the resident population of bears. The first two bears to arrive at CBRC (named Lucky and Leela) were selected for the first release program in February 2005 (Table 3.3). Following our experience with the outcome of this first release, one only bear (named Liza) was chosen for the second release program in November 2005. All these three hard-released bears were females. The fourth bear Teddy, a male, failed to pass the behavioural tests as he was found to be 'friendly' to humans when approached.

In the case of the first batch of bears (Lucky and Leela), their behavioural suitability was assessed by conducting a detailed behavioural and enclosure use study when they were housed in the pre-release orientation yard (Akhtar *et* a,l 2005). During this study, the main behavioral criterion taken into consideration to assess their suitability for release was the bears' preference to stay in the pre-release area in spite of their access to the covered shelters where they were housed in the past. The fact that the bears were found missing on 38% of the occasions was taken as an indication of their preference to be on their own, away from humans. The third bear selected for release (Liza) was found to be very shy, spending most of the time on ground, hiding amongst bushes and avoiding humans when approached. The last two bears released after *in-situ* acclimatization (Seppa and Seppi) were acclimatized to their release site for ten months under the protection of one caretaker. They were adequately habituated to their habitat and were found capable of foraging and avoiding predation by themselves.

3.6.3 Age of bears at release

While it is true that cubs and yearling bears are said to have greater chance of survival because older bears get habituated to human presence and get conditioned to human foods (Anonymous, 2005), many rehabilitators consider that the optimum period for release of bears should coincide with the time of natural family break-up in the wild (Beecham, 2006). Therefore it becomes important to accept young bears that are not habituated to humans and at the same time ensure that they are released at 18 to 24 months of age when bear cubs leave their mothers. The intervening period between acceptance and release could vary from one to two years. In the tropics where tigers and leopards are sympatric with bears, it may not be anyway appropriate to release young bears, as they would easily fall prey to them. This point was taken into consideration while preparing the protocol and thus the minimum age of release of bears at CBRC was fixed at 15 months and above.

Table 3.3: Details of bears released in 2005 and 2006

No	Names/Identity of bears	Planned Release type	Sex	Date of admission	Months held "captive" during rehab
1	Lucky	Hard release	F	21/09/02	28 months
2	Leela	Hard release	F	21/09/02	28 months
3	Liza	Hard release	F	07/3/04	20 months
4	Seppa	Assisted release	M	04/04/06	12 months
5	Seppi	Assisted release	F	04/04/06	12 months

CHAPTER 4

Finding a home: Site selection in Pakke and Eagle Nest wildlife sanctuaries

The selection of an appropriate release site is an important step in the successful rehabilitation of any species. Two protected areas in Arunachal Pradesh, Eagle Nest Wildlife Sanctuary and Pakke Wildlife Sanctuary, were identified as prospective areas for releasing the bears. Considering the distance from the rehabilitation centre and the level of human trespassing in certain pockets of Eagle Nest Wildlife Sanctuary, the site selection team decided to look for release sites in Pakke itself. The site selection team comprised of the Project Leader, the Divisional Forest Office of Pakke Wildlife Sanctuary, Sergey Pazhetnov and the CBRC project personnel.

4.1 Site selection proforma (See Appendix II)

A specific site selection proforma was used to determine the suitability of these areas for release (Table 4.1). The proforma took the following criteria into account:

1. If the site is within the distribution range of the species/subspecies/population
2. If there is adequate cover, food and water available
3. If the vegetation type of the area is descriptive of the habitat type of the animal
4. If the altitude & terrain conforms to the species' distribution limit and habitat
5. To what extent is human settlements and trespassing reported
6. If the site is accessible for post-release monitoring
7. Whether the density of resident bears in the area is high or low
8. If there are any reports of hunting of wildlife in the area
9. If there are any reports of wildlife diseases of relevance to the bears
10. The level of threat from predators like tigers & leopards to released bears
11. The level of awareness created amongst the locals about the release plans.

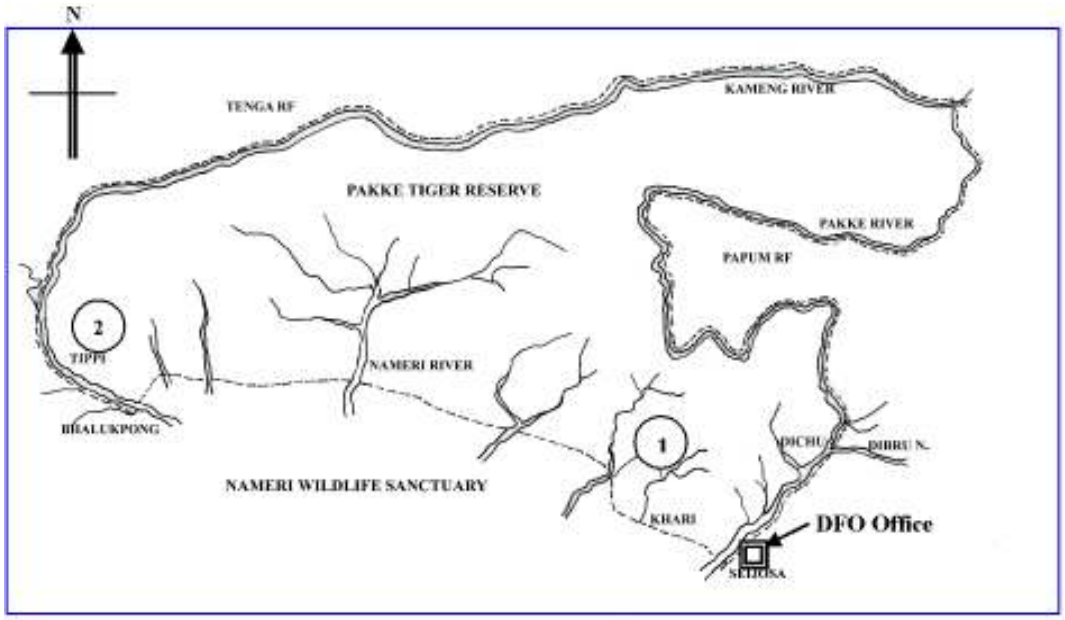

Fig 4.1 Pakke Tiger Reserve with the two release sites: (1) Khari Pong, (2) Tippi

Of all these mentioned above, three factors seem to be crucial from the point of successful establishment of released bears in the wild: Absence of human settlements or trespassing, low density of wild bears and the availability of abundant food. Bear rehabilitators have emphasized that the bears be released in areas where they do not encounter humans for at least a month after release, and where wild bear densities are low so that they are not challenged by them (see Maughan, 2004; Fredriksson, 2005; Beecham, 2006). A remote location with least human disturbance can solve many of the problems that could be anticipated after release.

After a series of site inspection trips, the team short-listed the two locations for releasing the bears (Fig 4.1). Khari Pong was selected for releasing the first two bears (Lucky and Leela) and the fourth and fifth bears (Seppa and Seppi). Tippi in West Kameng district was selected for releasing the third bear, Liza. Both these sites are located at the extreme ends of the park, Khari (Fig 4.2) about 15 km away from the center at Seijosa and Tippi (Fig 4.3) about 50 km away. The contents of the site selection proformas filled in by the respective site selection teams have been provided in Appendix IV.

Fig 4.2 Top, below: Khari Pong site

Fig 4.3 Top, below: the site at Tippi

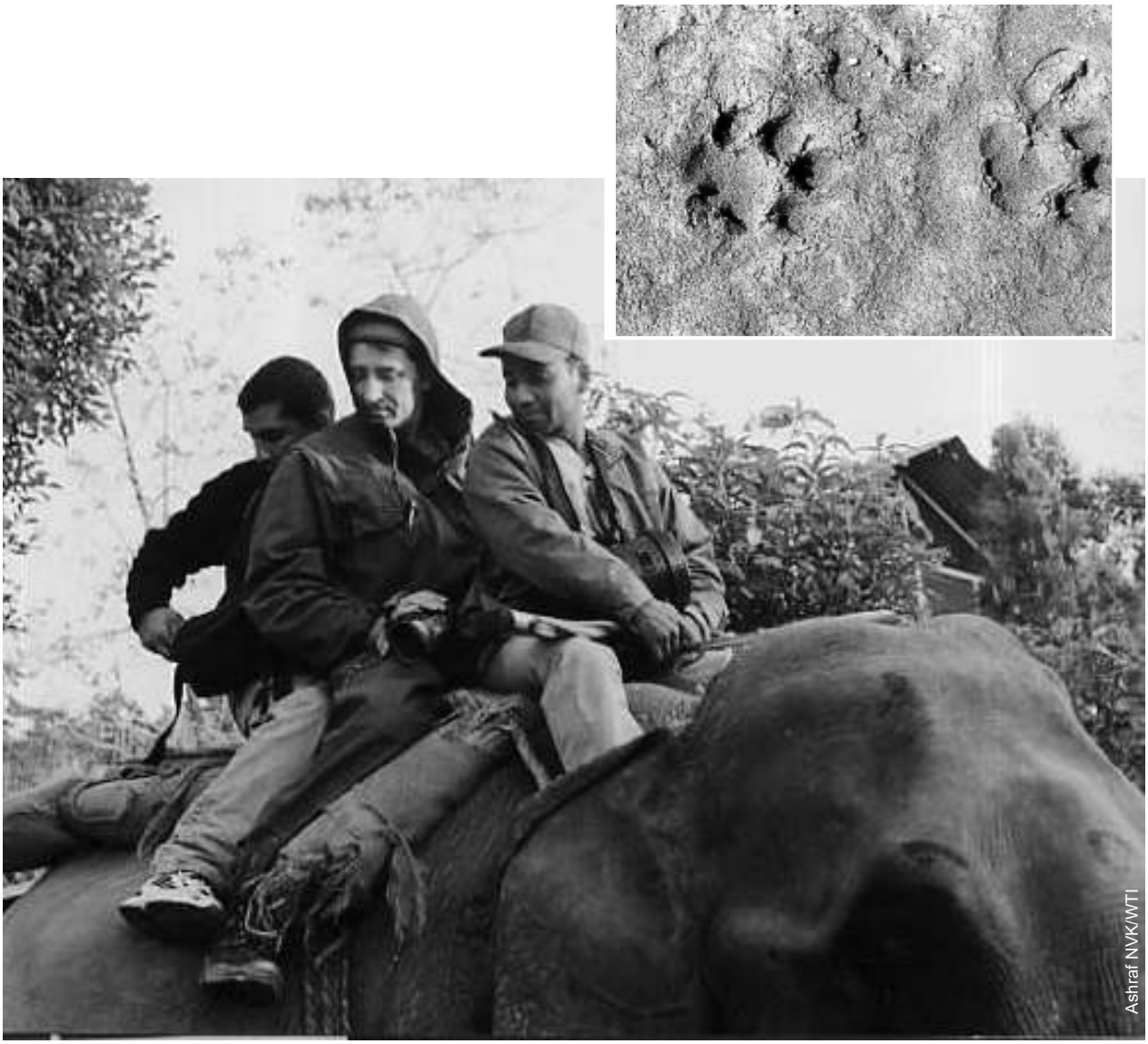

Fig 4.4 Sergey Pazhetnov during his field trip to Khari, one of the release sites. Inset: Tiger pug mark.

4.2 The site for the first two bears

Dr. Valentin Pazhetnov, an expert on brown bear rehabilitation in Russia, made a trip to India in 2002 to assist WTI in setting up bear rehabilitation centre in India. His son Mr. Sergey Pazhetnov visited CBRC in 2004 to study the bears being rehabilitated at the centre and identify potential release sites for bears in Arunachal Pradesh. Sergey Pazhetnov, NVK Ashraf, Dargey Tsering, CBRC veterinarian and Ranjan Kumar Borah, a Lecturer from Lakhimpur College, Assam visited Khari, a place located along the foothills of the Himalayan hill ranges in Pakke Tiger River in February 2004. The site had already been inspected by the Project Leader Mr. C. Loma and DFO Mr. Umesh Kumar to study the suitability of this site for release. While trekking along the river on foot and on elephant back, the team found sufficient evidence of wildlife use, especially tigers, leopard, small cats and ungulates (Fig 4.4). Though no indirect evidence of bears could be seen during the trip, reports from forest guards and other staff revealed that bears frequent the area.

In March 2004, a team comprising Sergey Pazhetnov, Mr. Umesh Kumar, the then DFO of Pakke TR, NVK Ashraf, Dargey Tsering and Mr. Ranjan Kumar Borah visited Eagle Nest Sanctuary near Ramalingam in Arunachal Praesh. The team looked at habitat features, accessibility of the site to monitoring and presence of human disturbance. Pakke and Eagle Nest Wildlife Sanctuary differed a great deal in vegetation and topographical details (Table 4.2). Though both protected areas were found suitable for release, a final decision on the release site was left to the Project Leader, the Divisional Forest Officer and other CBRC project personnel.

Table 4.2 A comparison of habitat features between Eagle Nest and Pakke

	Eagle Nest WLS	Khari, Pakke TR
1	Altitude of more than 1,500 meters. Typical bear country with a subtropical forest type with pines and bamboo as vegetation.	Tropical semievergreen. Seppa, from where one of the bear cubs at the Centre came from, has similar vegetation type of Pakke.
2	Major predators: No tiger but leopard is present	Has both tiger and leopard
3	Monitoring the released bears would be difficult because of difficulty in accessibility.	Monitoring will be comparatively easier because the site is accessible and has a place for the researcher.
4	GPS collars will work but sighting the bears will be difficult because of the terrain	GPS won't work because of dense canopy. However, normal telemetry will work even in dense forests.
5	Human settlements and hunting reported near the PA.	No report of hunting or disturbance to human settlement.

4.3 Habitat evaluation of Khari Pong

As the site for release of the first two bears was decided to be Khari Pong area of Seijosa range in Pakke Tiger Reserve, a habitat evaluation study was conducted at this release site. Factors to be considered while selecting a suitable release site include overall habitat suitability, food availability, presence of predators in the area and public attitude towards the species in the area (Verdoorn, 1995; Miller, 2000). These requirements were taken into consideration while making the assessment.

For the identification and evaluation of the bear release site, a 10 day survey was carried out in and around Khari area of Seijosa range in the beginning of January 2005. Micro release site was selected, keeping in mind that the release site should not be in any way different from the vegetation type in the pre-release enclosure at CBRC. To know bear presence and abundance, all micro-sites at Khari Pong were intensively surveyed for bear evidences in terms of direct sighting or indirect evidences in the form of claw mark, foot prints and scats. All visits were made only during day time and total time spent in the forest was recorded. All possible and potential food items of bear diet were recorded from the release site and graded as high, medium and low category in terms of abundance. Evidences of carnivore (tiger, leopard and dog) species were also recorded to know the presence of major predator of bears. Intensity of biotic pressure was recorded in terms of human presence, their activities (fishing, hunting, and collection of non timber forest produce etc). Human activities were classified as high, low and medium categories. The method of transporting the two bears to the release site, measures to keep human contact to the bare minimum, need for supplementary feeding after release to the wild and schedule for bear monitoring were also investigated.

4.4 Topography and vegetation type at the release site

Khari is situated 14 km away from Seijosa town and Khari Pong 3 km further from Khari beat office, 3300 in the Northwest direction. Topographically, the area is hilly with the altitudinal range of 90 to 375 m and forest cover is interspersed with bamboo and cane patches. Primarily there are only two seasons, monsoon and winter. Winter begins in November and lasts up to February. Monsoon starts in March and last up to September. Both the south-west and north-east monsoons are prevalent here. The average annual rainfall is 2500 mm.

The vegetation type of the area falls under the semi-evergreen moist deciduous sub-tropical forest (Champion & Seth, 1968). The forest types is dominated by *Polyalthia simiarum*, *Chisocheton paniculata*, *Amoora wallichii*, *Tetrameles nudiflora*, *Pterospermum acerifolium*, *Sterculia alata*, *Callicarpa* species, *Turpinia pomifera*, and *Dysoxylum binectariferum*, *Stereospermum chelonoides*, *Ailanthus grandis* and *Duabanga grandiflora*. There are patches of tropical evergreen forests dominated by *Altingia excelsa*, *Mesua ferrea*, *Dysoxylum* species, and middle storey trees belonging to Lauraceae and Myrtaceae. Along the larger streams, there are patches of tall grassland, which give way to lowland moist forests with *Dillenia indica* and *Talauma hodgsonii*. Hill slopes here are dominated by *Mesua ferrea*, *Levistonea jenkensii*, *Castanopsis* spp. (Fig 4.5).

Fig 4.5 Monocots like canes (above) and palms (below) are abundant in certain pockets of the release site in Khari Pong.

Along the riverbanks, *Dillenia indica* is common. Cane extraction on a commercial basis occurred here till 1991.

4.5 Habitat suitability

One fresh foot print of black bear was found near the proposed bear release site and this is sufficient evidence to prove that the proposed release site falls under the distribution range of Himalayan black bears (Fig 4.6). Altogether, 70 hours in 10 days were spent in the field area. During a visit to the same area eight months ago, no evidence of bear activity could be found. The bears are probably winter migrants to Khari Pong area. Only when black bears do not have the option of migrating to low altitudinal areas like Khari Pong, they are known to `hibernate'. Graber (1990) mentioned that denning (hibernation) is not compulsory for all bears in some mild climates. Excluding parturient females, which must den to give birth, bears may remain active if sufficient food is available. Winter active bears have been reported for many south eastern black bear population (Taylor, 1971; Hellegren and Vaughan, 1989; Wooding and Hardisky, 1992; Weaver and Pelton, 1994). Schaller (1969) mentioned that Himalayan black bears, especially in Himachal and Uttar Pradesh, hardly go for hibernation and instead move into low altitudinal areas. Black bears in Dachigam National Park, on the contrary, are known to hibernate as evident by low sightings in winter and high sightings in summer (Saberwal, 1989).

4.6 Food availability

Since the proposed release site is a natural habitat of black bear and wild bears are doing well in this area and hence the question of food abundance become irrelevant. About 42 items of plant origin and 10 items of animal origin were identified in and around the site (Table 4.3). Bears are known to feed on fruits, leaves (foliages), tuber, and sometimes the whole plant. Though vegetable matter dominates a bear diet, the omnivorous bears are also opportunistic feeders taking advantage of animal food whenever available. Bears have been reported to kill sambar, barking deer, porcupine, fishes and birds, besides many feeding on invertebrates like honey bees, termites and even earthworms (Hwang *et al.*, 2002). All these species are also available in and around the release site. There were many honey hives and red ant nests on trees, all prospective food for the bears after release. The assessment indicated that the availability of food will not be a problem for the bears.

4.7 Predators at release site

The survey revealed the presence of three tigers (1 sub adult, 1 adult and 1 juvenile bearing only two toes in left forelimb), one leopard and a pack of wild dogs (at least six individuals) in and around the release site. Therefore possibility of predator attack, especially by tiger, cannot be ruled out. Since bears are well versed in climbing trees, as shown by behavioral and enclosure use study conducted in the pre-release enclosure (Akhtar, *et al*, 2005), the released bears can protect themselves from possible predator attack.

4.8 Biotic pressure at release site

The nearest human settlement (Bogijuli) is located about nine kilometers away from the release site. Cattle grazing and fuel wood collection by villagers was found comparatively lower than fishing and hunting. People do also extract the leaves of palms (tako patta), bamboo and cane. Regular patrolling of forest guards in the area can reduce the human movement effectively in the forest. In due course it will also curb hunting of animals and illegal collection of forest produce. Since bears are known to have large home ranges (3-340 km2), they may stray into the areas of human settlement in the fringe

Tamo Dadda/WTI

Fig 4.6 Asiatic black bear foot-prints in Khari Pong, Pakke WLS.

areas of Pakke Tiger Reserve and Nameri National Park. It is important that people in these areas are educated and made aware of the release programme. People should also be educated regarding the measures to be taken when bears are encountered. This can be started even before the release of bears.

4.9 Time of release

The common emphasis is to release bears when food is abundant. However this cannot be a sweeping recommendation for all circumstances since bears are also released when food is least abundant. In the tropics where food is available almost throughout the year, this becomes less important. Moreover bears, being omnivorous, are known to feed on a wide range of food items, even resorting to scavenging whenever opportunities arise. Studies on feeding habits of Asiatic black bear in Japan have shown that they feed on oak acorn, bamboo leaves, soft mast and other succulent plants, besides termites and occasional meat (Huygens *et al* 2003). The fact that bears feed on twigs, buds, leaves, nuts, grass, roots, and tubers besides fruits is an ample proof of the fact that they are versatile in their food habits.

One of the most popular ways of hard-releasing bears in temperate and high-altitude regions is to release them into dens during the lean period when bears 'hibernate'. For this reason, winter releases have also resulted in greater survival and reduced post-release movement (Clark *et al* 2002). In a tropical semi-evergreen forest type found in Khari Pong and Tippi, where food is not a limiting factor, induction of 'hibernation' was not deemed necessary. Moreover, bears in milder climatic regimes are not known to hibernate (Graber, 1990) as they have the option of even moving to lower altitudes during winter. Schaller (1969) mentions that Asiatic black bears, especially in Himachal and Uttar Pradesh, hardly go for hibernation and instead move into low altitudinal areas during winter. Black bears in Dachigam National Park, on the contrary, are known to hibernate as evident by low sightings in winter and high sightings in summer (Saberwal, 1989).

While all the hard-releases at CBRC happened in 2005, the first batch of bears (Lucky and Leela) released in February 2005 and the second release of a single bear in November 2005, the soft-release happened in April 2007. All the bears that had access to the pre-release orientation yard at CBRC were seen feeding on leaves, insects and digging for tubers and never observed to rush towards the feeding sites. They would invariably approach the feeding sites (that was changed from time to time) leisurely when keepers had left the scene.

Another important point to be considered while releasing bears is the hunting season. The timing of releases in relation to the start of bear hunting season can have negative effects on the survival of bears (Clark *et al*, 2002). Since hunting of bears is legal in many European and American countries, it is essential for rehabilitators in these countries to release bear cubs outside the hunting season. This rule does not apply to the situation in North East India where hunting is illegal and takes place sporadically throughout the year. The only season when the incidents of hunting could be considered minimal is during the monsoon (May to September). However radio-tracking bears during this time would be a challenging task for rehabilitators, especially when the bears are hard-released and as a result wander long distances. At CBRC, the release time of the two soft-released bears Seppa and Seppi coincided with the onset of monsoon.

Table 4.3 Abundance of wild food items for bears in and around release site

1.	*Mikania scandens*	Leaves	High
2	*Vitis* spp.	Fruits	High
3	*Piper* spp.	Leaves	High
4	Shatmool (*Dioscorea* spp.)	Tuber	High
5	Peela kochu (*Dioscorea* spp.)	Tuber	High
6	Safed kochu (*Dioscorea* spp.)	Tuber	High
7	Trapa Kochu (*Dioscorea* spp.)	Tuber	High
8	*Ficus* spp.	Fruits	Medium
9	Ficus nervosa	Fruits	Medium
10	*Ficus hetorophylla*	Fruits	Medium
11	*Ficus altissima*	Fruits	Medium
12	Jalpai (*Eleocarpus floribundus*)	Fruits	Medium
13	Dhuna (*Canarium bengalense*)	Fruits	High
14	Khokan (*Duabanga sonneratioides*)	Fruits	High
15	Grasses	Whole	High
16	Fern	Whole	High
17	*Selaginella* spp.	Whole	High
18	*Equisetum* spp.	Whole	High
19	Wild jamun (*Syzigium jambolana*)	Fruits	Low
20	Amoora (*Spondias mangifera*)	Fruits	Low
21	Bamboo (*Dendrocalamus* spp.)	Leaves	High
22	Bamboo (*Bambusa* spp.)	Leaves	High
23	Baints (*Calamus* spp.)	Leaves	High
24	Kaile (*Hedychium* spp.)	Whole	High
25	Wild bananas (*Musa* spp.)	Whole	Low
26	Semel (*Bombax ceiba*)	Fruits	Low
27	Otenga (*Dillenia indica*)	Fruits	High
28	Litsea spp.	Whole	High
29	Wild yam (*Colocasia* spp.)	Whole	High
30	Jungali kochu (*Colocasia* spp.)	Whole	High
31	Kanchan (*Bahunia purpuria*)	Leaves	Medium
32	*Bahunia variegata*	Leaves	Medium
33	Tako guti (*Livistona jenkensii*)	Fruits	Medium
34	*Premna bengalensis*	Whole	Medium
35	*Polyalthia simiarum*	Fruits	Medium
36	*Rubus* spp.	Leaves	Medium
37	Kanta lata (*Acacia* spp.)	Leaves	Medium
38	*Begonia* spp.	Leaves	Medium
39	*Randia* spp.	Fruits	Medium
40	*Boehravia* spp.	Leaves	Medium
41	*Polygonum* spp.	Leaves	Medium
42	*Commelina* spp.	Leaves	Medium
	Animal origin food items		
1	Sambar	Any part	High
2	Hog deer	Any part	High
3	Barking deer	Any part	High
4	Porcupine	Any part	High
5	Honey	Any part	High
6	Honey bees	Any part	High
7	Ants and termites	Any part	High
8	Pheasants	Any part	High
9	Water birds	Any part	High
10	Earthworms	Any part	High

CHAPTER 5

Hard lessons, soft success: Release and monitoring of Asiatic black bears in Pakke

5.1 Collared bears

Monitoring released bears is essential to know the success of any rehab exercise. Radio-telemetry studies are expensive but it has to be done at least till the rehabilitation technique is perfected and the protocol is proved to be foolproof. Radio-tracking besides providing information on the status of released bears, also provides valuable data on their dispersal and ranging patterns. The question is how long the released bears should be monitored to consider it a success. There are three options:

1. Looking at short term survival of bears (six months to one year from release)
2. Looking at long term survival (for 2-3 years after release)
3. Monitor to know whether released bears have contributed to the wild population

As rehabilitators consider radio-collaring a drain on their resources, tracking the bears for more than a year is considered a luxury. In a rehabilitation program handling five to ten bears every year, it may not be feasible to monitor all bears for their reproductive contribution to the resident population of bears. Moreover, any human intervention at a later stage for re-collaring would hamper the rehabilitation success of the released bears. Since the objective at CBRC was to look at the short-term survival of the bears after release, collars that would drop-off within eight months of collaring were preferred.

All the five bears were radio-collared during different periods of their rehabilitation with VHF collars (Telonics, USA) (Fig 5.1). Considering the dense canopy in the semi evergreen forests, VHF telemetry systems were preferred over GPS systems. Taking into account the growing age of the bear cubs, all the collars were programmed to drop-off after eight months of release. The transmitters had the mortality sensors as well. These sensors would beep out signals of different pulse in case of any prolonged inactivity of the bear. The idea was to monitor the bears for a minimum period of six months.

The first three bears hard-released were radio-collared on the day of their relocation and release. They were two to three years of age that time. The last two bears soft-released were collared when they were about 10 months of age, coinciding with the time when they were allowed to spend the nights outside the enclosure. All the bears were administered a combination of Ketamine and Xylazine hydrochlorides by an air-pressurized remote delivery system for restraining them for collaring. The standard reversal agent Yohimbine hydrochloride was used to reverse the effects of Xylazine after the following procedures were duly completed:

Fig 5.1 One of the bears being radio-collared prior to its release in Pakke WLS.

Fig 5.2 Bear cubs being carried to the release sites in Khari (left) and Tippi.(right)

1) Recording morphometry and body weight of the cubs
2) Parental administration of Ivermectin against endo and ectoparasites
3) Attending to injuries, if any, caused during darting
4) Implantation of microchips (Trovan systems) on the dorsal side of the neck, anterior to the scapular ridges
5) Trimming of hairs around the neck and radio-collaring

5.2 Free bears

The sites chosen were informed to the Chief Wildlife Warden while requesting for formal permission for release. Meanwhile, permissions were also obtained from the concerned ministries of the Central Government, namely the Central Zoo Authority (CZA) and Ministry of Environment and Forests for releasing the animal and from the Chief Wireless Officer, Ministry of Communications for using the designated radio-frequency for radio-telemetry.

The animals were loaded into a wooden box crate and transported to the release site once they had completely recovered from anaesthesia. Depending on the accessibility of the release site, various modes of transport were employed; by road, boat or on foot (Fig 5.2). The bears were of different age at the time of release (Table 5.1)

5.3 Radio bears

For every bear released, a tracking team comprising one or two technical personnel and two field assistants were placed to monitor the bears. They were monitored on a daily basis and temporary field camps established along the tracking trail. The team was also equipped with GPS (Geographical Positioning System), field compass and binoculars. Whenever radio-contact was lost with the bear, effort was made to re-establish contact by moving towards the direction where that last signal was received. Efforts were also made to sight the bears whenever possible.

Table 5.1 Release of five radio-collared bears

No	Bear	Date of release	Site	Age at time of release
1	Lucky	28/02/05	Khari Pong, Pakke TR	2 Yrs 11 M
2	Leela	28/02/05	Khari Pong, Pakke TR	2 Yrs 11 M
3	Liza	29/11/05	Tippi, Pakke TR	2 Yrs 2 Ms
4	Seppa	09/04/07	Khari Pong	14 months
5	Seppi	09/04/07	Khari Pong	14 months

Table 5.2 Details of the bears released in 2005

No	Names	Date of release	Place of release sites in Pakke WLS	Microchip Number	Outcome	Days survived in the wild
Hard-released bears						
1	Lucky	28/02/05	Khari Pong	000658D94D	Killed by locals	37 days
2	Leela	28/02/05	Khari Pong	00065D8CDE	Killed by locals	22 days
4	Liza	29/11/05	Tippi Range	00065ED048	Predated by leopard	9 days
Soft-released bears						
5	Seppa	09/04/07	Khari Pong		Rehabilitated	> 9 months
6	Seppi	09/04/07	Khari Pong		Rehabilitated, but withdrawn later due to injury	7 months

The first three bears died between nine to thirty seven days of their release (Table 5.2). In all these cases, the mortality sensors warned the tracking team of the damage caused to the bears. The first two bears (Leela and Lucky) were killed by hunters in Reserve Forests, far away from Khari Pong, the site of their release. Both bears moved in different directions, with Leela towards Southeast where human habitations exist and Lucky towards Northeast where hilly terrains containing typical black bear habitats are available (Fig 5.3). The locations from where both their radio-collars were recovered were taken as their sites of killing. Except for the taints of blood in the collar of Lucky, no trace of the carcass could be found at the release site. Both the collars were cut into two (possibly using a *dao*, local dagger) in order to remove the collar from the neck.

The third bear Liza was predated upon by a leopard after nine days of its release. The bear had not moved much, remaining within a square kilometer area from the site of release (Fig 5.3). The predator was identified as a leopard based on the pugmarks found around the carcass and the manner in which the carcass had been devoured. Her partly eaten carcass, along with the intact radio-collar, was recovered within 24 hours of its death. The postmortem confirmed the cause of death as predation and not hunting. Apart from the missing visceral organs of the thoracic cavity, which were apparently eaten by the leopard, all other organs including the gall bladder were intact.

Unlike the third bear Liza released in Tippi Range, the first two bears wandered long distances soon after release. While Leela covered an area of more than 25 km in five days to reach the west bank, Leela evidently moved even faster than the first one, moving day and night in the other direction towards the hilly country and reaching the hill top near Jolly-Lanka area in 16 to 20 days (Table 5.3). No information could be gathered as to how Leela was killed by the people. However, unconfirmed reports coming from Jolly-Lanka imply that the other bear Lucky was killed in self-defence following a conflict with cane-collectors deep inside the forests.

5.4 Site fidelity and post-release movement

Hard released subadult and adult bears are known to move long distances before they settle down to establish a home range of their own. On an average, released American bears have been known to move 35 kilometers from the release site, the maximum dispersal distance recorded being over 400 km (Beecham, 2006). Both the hard-released subadult bears traveled long distances making it difficult for the monitoring team to track them on a 24-hour basis. Translocated bears are known to return to their place of capture even when released in distant places (Rogers, 1986; Clark et al, 2002). To prevent bears from homing, it is therefore important to hold the bears for sometime in an enclosure at the release site. This can increase site fidelity and reduce this initial period of excitement and wandering. Studies have shown that brown bears held in pens for two weeks of acclimatization prior to release move significantly less than hard-released bears (Clark, *et al* 2002).

In-situ acclimatization therefore becomes important, not only when soft-release method is followed, but also when the release site is not very far away from the rehabilitation centre. This *in-situ* procedure will also enable the bears to establish a focal point of activity and remain so for some time until they disperse to establish territories of their own. The question is, if acclimatization alone is enough to make a released bear succeed in establishing itself in the wild.

Both the soft-released bears, released after eight months of gradual acclimatization to their release site, not only survived predation but also managed to establish a focal point of activity of their own, independent of each other. Supplementary feeding at the enclosure area was gradually reduced since their release on the 9th of April 2007. As evident from the consumption of the concentrate placed near the enclosure, the frequency of the bears' visit to the enclosure area also decreased

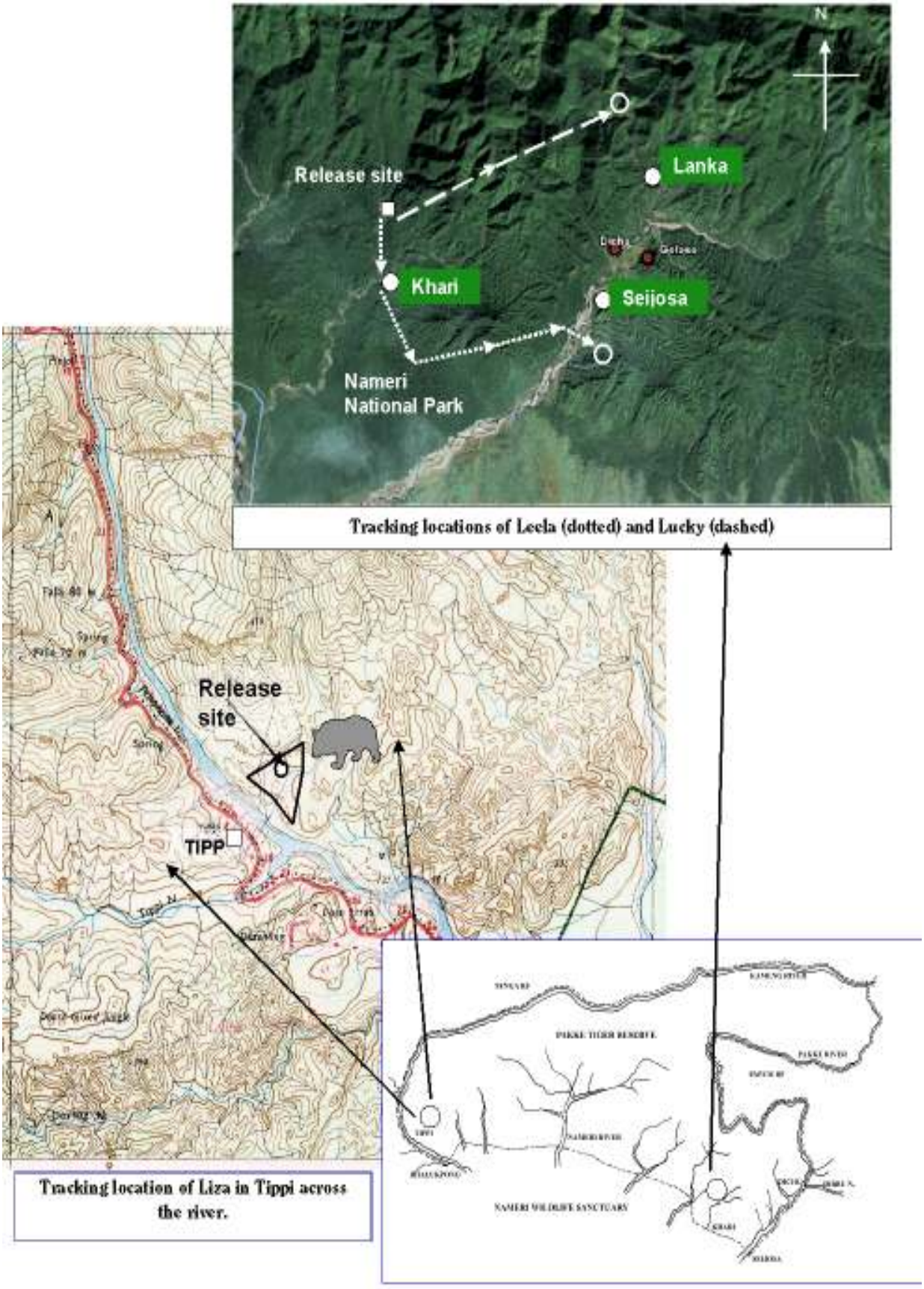

Fig. 5.3 Release sites: Khari Pong (right) Tippi (left)

gradually. Their return to shelter area in evenings soon became erratic, especially that of 'Seppa". However, it was the female (Seppi) which was found to venture into farther areas than 'Seppa". By the arrival of Monsoon in the month of May, 2007, their frequencies of returns to the enclosure area decreased further, and were also observed to be independent of each other. The bears were seen moving together for nearly a month after release, but soon established an area of their own (Fig 5.3). When the caretaker approached them a month after their release, the bears behaved indifferently to him who returned after a month long absence. Rehabilitators have seen bears becoming very wary of humans, including individuals responsible for caring them, within a short time (10-24 days) after they are released (Beecham, 2006).

Fig 5.3 Seppa and Seppi in Khari Pong shortly before their release

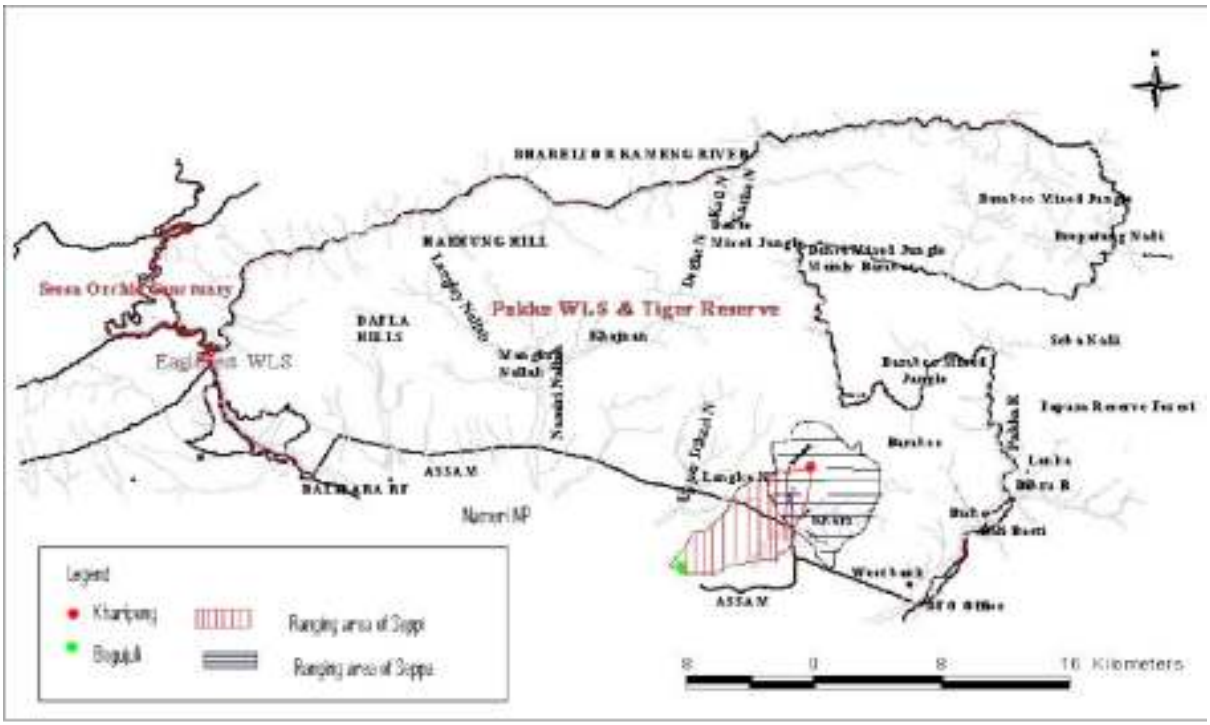

Fig 5.4 Range use of Seppa and Seppi in Pakke Tiger Reserve, Arunachal Pradesh and Nameri National Park, Assam.

While the male used the area north-east of the enclosure coinciding with the zone where he was being taken for acclimatization every day, the female preferred to utilize the forests south-west of the enclosure area which was predominantly inside the neighouring Nameri National Park in Assam (5.4). Both the bears till June 2007 were mostly ranging within the areas of their habituation though Seppi was sometimes found to venture beyond Khari Rest House. By the end of July 2007, Seppi was ranging within Bogujuli area of Nameri National Park, during which period time there were many signs of her being associated with other wild bears. There were footprints of large bears along her trails. She remained in and around Bogujuli area till early part of September, 2007. By late September, 2007, she was found using the range used by Seppa which included the enclosure area and the Khari rest house area. There they stayed together for a week and then parted.

None of the radio-tracking problems encountered with the hard-released bears Lucky and Leela was experienced while tracking these bears. The bears had to be re-collared as their collars were getting tighter. Both the bears were chemically restrained in the wild and their collars readjusted in September 2007. In spite of the monsoon season, radio-contact could be established every week as the bears have been habituated to the release site for eight months. Six months after their release, the female bear had to be withdrawn from the wild for treating an injury caused of unknown origin. The bear has since then recovered completely and has even begun climbing trees at the CBRC shelters in Seijosa.

Meanwhile the collar of the other bear Seppa dropped off on the 31st of December around Rowmony Nala, completing a nine month period of post-release monitoring. And he is still being sighted by the patrolling parties of the Forest Department and by the other researchers in the park (Fig 5.5).

5.5 Hard lessons; soft success

The rehabilitation program at CBRC followed two distinct protocols. While all the three hard-released bears got killed either by people or by predators, none of the soft-released bears died of such calamities. While the maximum days of survival in the wild for hard-released bears was possibly just over a month, that of the soft-released bears in both cases was over six months and in one case was more than 9 months. In this section we discuss the pros and cons of following such diverse rehab techniques in a tropical country like India where predators abound and human trespassing is frequent. This point had been taken into

Fig 5.5 Picture of Seppa taken six months after release.

consideration while preparing the protocol and thus the minimum age of release of bears was fixed at 20 months and above. As it turned out to be at the end of these five releases, what the bears have been doing during these 15-20 months is more important than what age is suitable for release. The fact that a two year old bear could not survive predation when hard-released and bear cubs less than 15 months of age could survive after soft-release only goes on to show how a different methodology could enhance the survival prospects of released bears.

Since the success of the rehab program is determined by the survival of the released bears, it is imperative to determine whether the bears have horned up their foraging skills, learnt to avoid humans and predators, and whether they are capable of establishing home ranges without coming into conflict with resident bears. Two of the major criticisms against orphan bear cub rehabilitation are that cubs need to be taught survival skills by their mothers and that these bears will not be assimilated into the wild populations because of behavioural deficiencies (Beecham, 2006). Two essential requirements for the survival of released bears in the wild therefore seem to be foraging skills and protection from predators when the bears are young. However, all rehabilitators have experienced that many of the survival skills, especially foraging skills, are innate in bears and they instinctively begin to exhibit these skills as soon as they are exposed to wilderness. The three sun bears during the rehabilitation period in Borneo, where bears were acclimatized and soft-released, quickly learnt the foraging skills and within six months of acclimatization to the forests, they consumed a large variety of the same foods that were observed to be eaten by wild bears of the same area (Fredriksson, 2005). Since a lot of these skills are learned through experience over a considerable length of time especially in highly evolved mammals like bears (Soorae, 2005), it becomes crucial to expose bear cubs to natural habitats and allow them to graduate to adulthood near their future home itself.

If a behavioral shortcoming in the bears is considered the prime reason for the bears getting killed within a period of one month, then the criterion of behavioural assessment should be more rigid but it is also to be seen if a captive environment would enable the bears overcome these shortcomings. The fact that one bear was caught live by villagers in less than a week of release and that both were 'killed' within a month of their release indicate that they were probably easy targets for hunters.

While the first two bears (Lucky and Leela) perhaps failed to run away from humans and thus became easy targets for poachers, Liza failed to avoid predators. Any area is new to a hard-released bear and they would naturally need some time to investigate the surroundings and eventually learn to avoid or escape from approaching humans and natural predators. Predation of released bears by other predators like tigers has been reported following the release of young Asiatic black bear cubs in Ussurisky Nature Reserve in Russia (Kira Skripova, *pers.com.* Three of their 30 released bear cubs were found predated by tigers. Four of the 11 bear cubs released this year in 2007 have already succumbed to predation, one by tiger and three by adult bears. It appears that a captive environment where pressures from predation are absent is inadequate for a bear to learn anti-predator skills.

The rehabilitation project at CBRC has shown that hard-releasing subadult bears can result in the bears getting killed. This is bound to happen if the release site is saturated with resident bears and has human presence in the form of trespassing and settlements. Sudden appearance of released bears into a population of bears already resident at the release site can lead to social intolerance (van Dijk, 2005; Fredriksson, 2005). Releasing young bears within a year of age in areas where predators abound can lead to their predation as well. Therefore releasing bears at their dispersal age (1½ to 2 years) after some period of *in-situ* acclimatization at the release site with no human trespassing (at least for a month or two after release) and no human settlements appear to be the best option for successful establishment of released bears. The project has thus underlined that *ex-situ* acclimatization is no substitute for *in-situ* acclimatization in tropics.

However, the important conclusion to the first phase of the project is the success of the last two bears vis-à-vis rehabilitation. Both bears lived a perfectly normal and wild life for over 6 months before one was injured and had to be withdrawn for treatment. The other one still survives in the wild. With five more bears (Harang, Mangaldoi, Pacha, Talasema and Deomali) ready to be sent into a new rehab site within Pakke (Upper Dekorai), there is every chance that this project is on the verge of breaking new ground. For that, the hard lessons learnt must be absorbed and the team, both WTI field personnel and the forest department must look to the next six years of 2008-14 (Phase II) of the project with renewed commitment and vigour.

Phase I, the establishment of a conservation centre in Pakke, pilot testing of protocols and guidelines, and the first few releases started in March 2002, and has ended six years later with this report in February 2008.

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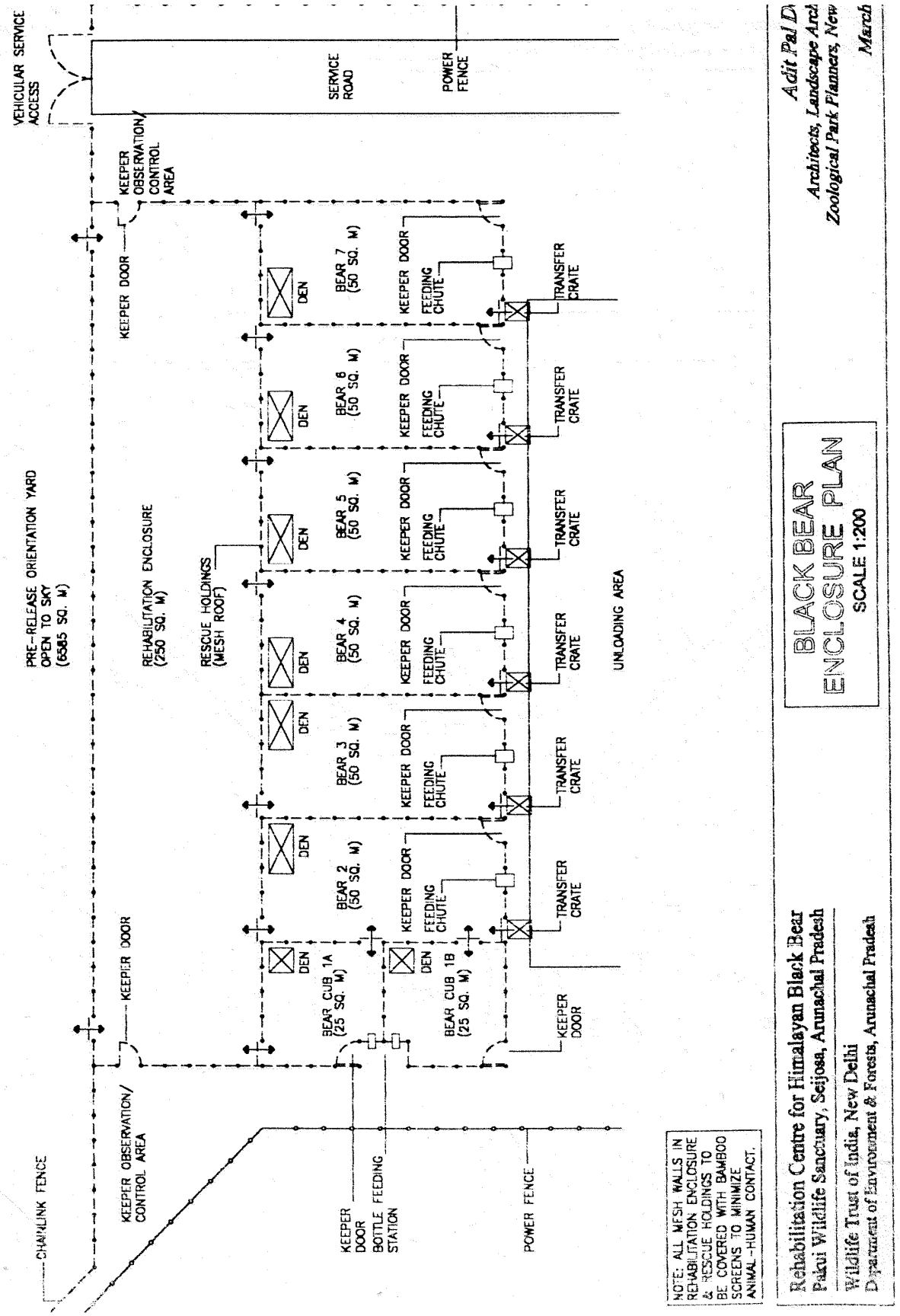
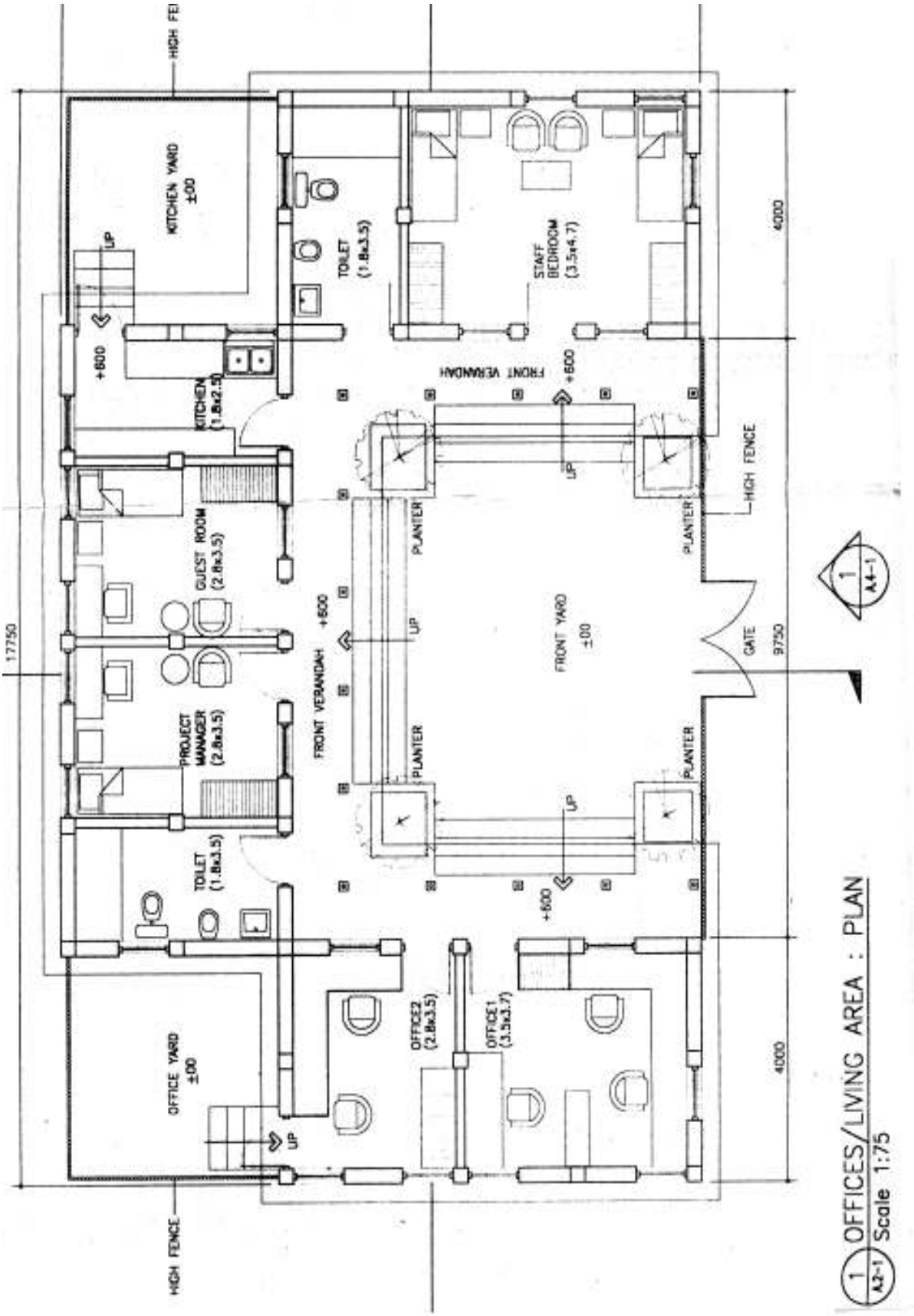
Appendix I

Schematic architectural layout of the shelter area at CBRC



Schematic architectural layout of the Field Camp at CBRC



Appendix II

Site selection proformas of Khari Pong and Tippi in Pakke Wildlife Sanctuary.

Centre for Bear Rehabilitation and Conservation (CBRC)

SITE SELECTION FOR THE RELEASE OF BEARS: LUCKY, LEELA, SEPPA & SEPPI

Names of sites inspected for release:

1. Eagle Nest wildlife Sanctuary
2. Kharipong, Pakke Tiger Reserve

Variables for habitat suitability for bears:

	Suitability variables (Rank them from 1 to 3)	**Site – 1**	**Site – 2**	**Site – 3**
1	Site in distribution range? (1: Within bear's range, 2: Fringe area, 3: Not part)	*1*	*1*	
2	Cover, food and water for the animal (1: Plenty, 2: Moderate, 3: Less)	*1*	*1*	
3	Vegetation type of the area: (1:Ideal, 2: Suitable, 3: Not appropriate)	*1*	*2*	
4	Altitude & terrain of release site (1: Appropriate, 2: Not bad, 3: Not ideal)	*1*	*2*	
5	Human settlements near release site (1: None, 2: Far, 3: Nearby)	*2*	*1*	
6	Accessibility of the site for monitoring (1: Easy, 2: Fairly, 3: Inaccessible)	*2*	*1*	
7	Presence of wild bears in the area (1: Less frequent, 2: Rare, 3: Frequent)	*3*	*2*	
8	Reports of hunting of wildlife (1:Absent, 2: Irrelevant, 3: Reported)	*2*	*1*	
9	Reports of any wildlife disease (1:Absent, 2: Irrelevant, 3: Reported)	*1*	*1*	
10	Threat from predators: tigers & leopards (1: Absent, 2: Present, 3: High)	*2*	*3*	
		16	15	

Release suitability index: 15 out of 30

Site selected for release: Kharipong area, Pakke Tiger Reserve

- Has the local community been informed of the release? Formally/Informally?/ Not informed
- Is the local community support supportive of the venture? Supportive?/Indifferent/Hostile

Names and signatures of the site inspection team:

- Mr. Umesh Kumar, DFO, Pakke Tiger Reserve
- Mr. C. Loma, Deputy CWW.
- Dr. N. V. K. Ashraf, Deputy Director, WTI
- Dr. Sergey Pazhetnov , Bear Rehabilitation project, Russia

Sd/-	Sd/-	Sd/	Sd/-
Project Manager	DFO, Pakke	Project Leader	Dr. Murali Pai

Centre for Bear Rehabilitation and Conservation (CBRC)

SITE SELECTION FOR THE RELEASE OF BEAR: LIZA

Names of sites inspected for release:

1. *Jolly nallah*
2. *Tippi area*

Variables for habitat suitability for bears:

1	Site in distribution range? (1: Within bear's range, 2: Fringe area, 3: Not part)	*1*	*1*	
2	Cover, food and water for the animal (1: Plenty, 2: Moderate, 3: Less)	*1*	*1*	
3	Vegetation type of the area: (1:Ideal, 2: Suitable, 3: Not appropriate)	*2*	*1*	
4	Altitude & terrain of release site (1: Appropriate, 2: Not bad, 3: Not ideal)	*1*	*1*	
5	Human settlements near release site (1: None, 2: Far, 3: Nearby)	*2*	*2*	
6	Accessibility of the site for monitoring (1: Easy, 2: Fairly, 3: Inaccessible)	*2*	*2*	
7	Presence of wild bears in the area (1: Less frequent, 2: Rare, 3: Frequent)	*3*	*3*	
8	Reports of hunting of wildlife (1:Absent, 2: Irrelevant, 3: Reported)	*3*	*3*	
9	Reports of any wildlife disease (1:Absent, 2: Irrelevant, 3: Reported)	*1*	*1*	
10	Threat from predators: tigers & leopards (1: Absent, 2: Present, 3: High)	*2*	*2*	
11	Degree of awareness amongst local community about bear project and release (1:Well aware, 2: Informed, 3: Ignorant)	*2*	*2*	
		20	*19*	

Release suitability index: 19 out of 33

Site selected for release: Tippi area (Left bank of river Kameng)

Names and signatures of the site inspection team:

- Shri.C. Loma , Project leader
- Shri. T. Tapi, Member Secretary
- Shri. Sunil S. Kyarong, Sr. Field officer, WTI
- Dr. Murali Pai, Regional Manager - NE, WTI

Sd/-	Sd/-	Sd/	Sd/-
Project Manager	DFO, Pakke	Project Leader	Dr. Murali Pai

Appendix III

Proformas on Behavioural, Biological and Veterinary Considerations taken into account before the release of bear Liza at CBRC

PROFORMA 1. BEHAVIORAL CONSIDERATIONS FOR BEAR: LIZA

1. Have you minimized human contact during rehabilitation process without impairing its rehabilitation potential?

   Yes

2. Does the bear avoid humans when approached? Yes

3. Did the bear have enough opportunities to exhibit natural behaviour during the period of confinement?

	Activities	**Yes**	**No**
a	Opportunities for climbing trees	Yes	
b	Opportunities for nest building (ground or on trees)	Yes	
c	Opportunities for foraging on ground and trees	Yes	

If the answer is "NO" for some of the above, explain why you believe these behaviours can be learnt after release:

_____

4. Is there any behavioural abnormality that has not disappeared? (Yes / No)

   If yes, indicate what it is and whether you think that the bear will be at a disadvantage when released.

_____

_____

Essential requisites:

1) Has the bear been provided with at least two of the behavioral opportunities (a,b,c) under point 3 ? .... : ***Yes*** _____

2) Will the behavioral abnormalities, if any, subsequently lessen the chances of survival when released? .... : ***No***_____

Sd/-	Sd/-	Sd/	Sd/-
Project Manager	DFO, Pakke	Project Leader	Dr. Murali Pai

PROFORMA 2. REHABILITATION, BIOLOGICAL AND RELEASE CONSIDERATIONS

Rehabilitation process

1. Have the bears been subjected through the following stages of rehabilitation, mentioned in the protocol?

	Yes/No
In holding pens (3 months)	Yes
Pre-release orientation (4 months)	Yes
In-situ acclimatization (1 month)	Yes
Induction of hibernation	No

If not, explain why some of these stages have been skipped?

Not applicable in this type of climatic Condition

2. Habituation or acclimatization to feeding wild fruits, foliage and tubers collected from the wild:

   a. How long? : More than 6 months

   b. Do you consider it sufficient? Yes

1) Did the cub get enough opportunity to socialize with conspecifics? Yes√ / No

2) Did the cub receive feed additives when young? If yes, mention the names:

Yes, commercially available mineral mixtures and vitamins

Biological and Release considerations

1. Method of release: SOFT / HARD?
2. Has the bear been radio-collared? Yes? / No

   If not, explain why? _____

   _____

3. Do you suspect the bears may be a threat to people living in the village? Yes / No√
4. Season of release

(Tick the box)	
a. Mating season	
b. Cubbing season	
c. Fruiting season	√
d. Rainy season	

Month of proposed release: 28th November, 2005

Do you consider this a the right season for release? Yes√/No

Remarks: Bear has developed wild temperament.

5. Age of bear meant for release: *2 years 1 month*

Do you believe if this age is ideal for release? Yes√/No

6. Are you planning to release the bear alone, in pair or more than two: *Alone.*

Essential requisites:

1. Has the bear been sufficiently habituated to wild fruits, foliage and tubers? : **Yes**_____
2. Will the bear be radio collared or ear tagged for post release monitoring? : **Yes**_____
3. Do you think the released bear may be a threat to people in the nearest village? : **No**_____

Sd/-	Sd/-	Sd/
Project Manager	DFO, Pakke	Project Leader

PROFORMA 3. VETERINARY CONSIDERATIONS FOR LIZA BEFORE RELEASE

Physical and Clinical observations:

		Yes / No
1.	Has the bear been dewormed regularly while in captivity?	*Yes*
2.	Are you satisfied with the growth and body condition of the animal?	*Yes*
3.	Is there any physical deformity that you consider will hamper the bear's survival in the wild?	*No*
4.	Does the cub suffer from any nutritional inadequacies?	*No*
5.	Do you find any evidence of alopecia, pruritis indicative of mange?	*No*
6.	Does the examination of visible mucus membrane reveal anaemia?	*No*
7.	Is vaccination against any specific disease considered essential?	*No*
	Vaccinations given to the animal: *Not considered essential*	

Give explanations if the answer is "Yes" for items 3, 4, 5, 6: _____

Give explanations if the answer is "No" for items 1, 2, 7: *Item 7. There is no such disease reported in Asiatic Black Bear, which require vaccination against it, so no vaccination has been done for the bear.*

Laboratory investigations:

		Yes / No
1.	Results of fecal sample examination for parasite ova	*No*
2.	Have blood samples been subjected to hematological/chemical analysis?	*No*
3.	Have fecal samples been tested to ICH virus using ELISA testing kit?	*No*
4.	Do you believe tuberculin testing is essential in this case?	*Yes*

If yes, mention the results of the same. If no, explain why you don't consider it necessary:
Item 10: No evidence of ICH in this climate.
Item 11. *TB is one of the common diseases among the bears of NE states. TB test result enclosed. The result was negative..*

Essential requisites:

1. Is the answer "NO" for points 3, 4, 5, and 6 ? : **Yes**_____
2. Are the results negative for tests ICH and/or Tuberculin tests? : **Yes**_____

Sd/-	Sd/-	Sd/-	Sd/-
Veterinarian in-charge	Project Manager	DFO, Pakke TR	Project Leader

Appendix IV

Bear Essentials

EN ROUTE TO A RUSSIAN WILDERNESS

Report on the training program in bear rehabilitation in Russia

(13th April 05 to 15th May 05)

Murali Pai
Regional Manager
Wildlife Trust of India

- Present Address: 261, Lehotsky Hall, Clemson University, Clemson, SC 29634, USA
- Email: *mpai@clemson.edu*

Acknowledgements

The training that Loma, Boro and I received at the Orphan Bear Rehabilitation Center, Chisty Les, Bubonitzy in the Tver region of Russia would not have been possible without the cooperation, assistance and advice of a great many generous people. I thank them all.

In the beginning, my Program Director at Wildlife Trust of India (WTI), Ashraf, fished me out of oblivion and brought me into the mainstream of wildlife work in India. Vivek Menon, Executive Director, WTI, backed a “dark horse” and encouraged me to struggle with the harshest of field realities having given me a platform for doing that.

To my co-trainees Loma and Prasanta, I owe much for their kind camaraderie and their keen insight into the subject. Prasanta helped in the analysis of data and the graphs.

To our local hosts, IFAW- Russia, hats off to them for being such great hosts and rescuing us from some trials and tribulations during out travels. We carry only pleasant memories of our trip back home.

To Masha Vorontsova, Director, IFAW Russia, I owe in large part what measure of success our training met with. And to to Mila Danilova I express my appreciation for the logistics, support and translation.

To Valentin, Svetlana, Sergey and Valia, a warm bear hug each for sharing their home and hearth with the Indian trainees.

1. Introduction

As I peck away on a borrowed lap top, I am in a well-furnished log cabin in Bubonitsa. Although it is springtime, the temperature is still freezing. The weather is least on my mind. I am thinking about the bear that has brought me on a one-month training program to Russia. Two other trainees have arrived from India, one is Mr. Chukku Loma, Project Leader-CBRC (Centre for Bear Rehabilitation and Conservation) and the other is Dr. Prasanta Boro, Veterinarian- CBRC. Flipping through notes jotted in my dateless diary, I read some excerpts:

"We heard them before we saw them. A cacophony of animal sounds - bawl, growl, grunt, squeal, smack, woof and roar - it would be difficult to make out the animal causing the ruckus - if one did not know this before hand."

But Brown (1993), who studied brown bear behaviour, identified different vocalizations indicating different behavior (Table 1). The brown bear (Ursus arctos) has the widest distribution of all bears in the world (Domico, 1988).

Table 1 Vocalization amongst young brown bears in response to different emotional states

Emotion	Vocalization
* Aggravation	chomp, smack, woof
* Anger	growl
* Anger (extreme)	roar
* Contentment	hum
* Nervous	grunt
* Pain	bawl
* Summon young	bleat

I continue reading:

"Mr. Loma and I were in front of wooden hut 2.5x3x6 metres in a forest enclosure in Chisty les. When Sergey Pazhetnov opened the door, out tumbled 6 brown bear cubs sniffing and scurrying for the food we had brought for them. We have just arrived at the Orphan Bear Rehabilitation Center (OBRC), an IFAW funded Center, in village Bubonitsa, 15 km from Thorpets town, 450 km from Moscow.

"We watched with wonder, as the cubs ate with relish, almost like pups, but not quite. While a puppy would lap up milk with its grooved tongue, a cub just sucks milk off the bowl and chews up semisolid food effortlessly. The feed consisted of ingredients carefully formulated by the world-renowned bear biologist, Dr. Valentin S. Pazhetnov. We would have the honor of working with three generations of the Pazhetnovs for a month and learn their methods in brown bear rehabilitation.

"After feeding the bear cubs, Valentin and his gracious wife, Sveltana, fed comrade Loma and me at their log cabin home near the bear nursery enclosure. Seven smaller cubs were being housed there and Svetlana was bottle feeding two weak cubs with partial paresis of both hind limbs. This is not an uncommon condition in carnivore neonates and I keenly examined the cubs and

Brown (1993), who studied brown bear behaviour, identified different vocalizations indicating different behavior (Table 1). The brown bear (Ursus arctos) has the widest distribution of all bears in the world (Domico, 1988)

advised the Pazhetnovs on treatment options. We talked over borsche, colbasa and other traditional Russian fare accompanied by bread, cheese and lots of tea! Valentin liked my treatment plan of warm water fomentation, oil massage and nerve tonics for the cubs, which I started immediately.

"We repaired to the guesthouse near Sergey Pazhetnov's home, a very nicely adorned and livable wooden lodge with modern amenities including running water in the bath. Vivek had remarked that we would more often have dry baths and banya, a sort of a Turkish bath. We took advantage of the presence of Mila Danilova, Program Officer, IFAW, Russia for English translation and fired a fusillade of questions to Sergey and his son, Valentin Junior (aka Valia).

2. The Pazhetnov School

The OBRC is located in Chisty Les (clean forest), an extension of Zapovednik "Tsentralno-Lesnoy" (Central-Forest State Nature Biosphere Reserve) in Central Russia. From the Russian word 'Zapoved' (biblical commandment), the idea came about early in the 20th Century when Russian scientists proposed the protection of areas where nature would be left to its own processes. Founded in 1931, the Zapovednik is 150 km from the OBRC and has an area of 24.5 thousand hectares. Forest cover is typical for southern taiga, spruce forests prevail, with green moss. Bog moss and bog grass appear near streams. Pine forests are located in the borders of bogs. Also black alder, birch and aspen are prevalent. Wildlife in this belt includes brown bear (*Ursus arctos*), lynx (*Lynx lynx*) and wolf (*Canis lupus*) and elk (*Alces alces*) among mammals, black grouse (*Tetrao tetrix*), capercaillie (*Tetrao urogallus*) and hazel hen (*Bonasa bonasia*) among birds. Golden eagle (*Aquila chrysaetos*) and black stork (*Ciconia nigra)* are particular species included in the Red Data book of the Russian Federation (Lagota 1988).

The European brown bear is being rehabilitated at the centre. Its worldwide population was estimated at 206,500, second highest to the American black bear (Brown, 1993). Russia has half the world population of brown bears (Valentin. *pers.com*). It was once thought that there were 13 subspecies of brown bears but this is not scientifically validated .

Valentin's concept of orphan bear rehabilitation is clear and simple. He is under no illusion about impacting the good of the species (or the group). His immediate concern is the good of the individual (or the gene). In 2005, he has 13 bear cubs to tutor and send back to the University of Nature!

Valentin S. Pazhetnov (68), wife Sveltlana (62), son Sergey (42), grandson Valia (22) constitute 3 generations to have studied brown bears in the wild in Russia. Valentin has worked at different positions as bear biologist with the Governmental agencies and he was a director of the Central –Forest State Nature Biosphere Reserve before his retirement. It was his vision and mission to rehabilitate brown bear cubs, so often orphaned as a result of the yearly legal winter bear hunt (trophy hunt) that starts in the December and ends on the last day of February. The hunters get a license from the Forest Department that costs around US $45. In theory, 10% of the bear population can be taken as a result of this hunt. For instance, the Tver region has a wild bear population of 1800, 180 licenses are issued per hunting season. But in practice, more than the prescribed number of bears get killed because there is also illegal hunting occuring. Also, as hunters take the big sized bears, sightings of larger bears have become a rarity. Just a few kilometers from the Reserve, we were dismayed to find in a roadside shop on the Moscow highway, a Bearskin with head for sale for US$1000, along with other skins and pelts including lynx and mink. There appared a quite a few shops in the vicinity doing a lucrative business. It is the orphaned cubs that deeply moved Valentin to start up his Biological station at Chisty les (Clean forest), 150 km from the Central Reserve in 1985.

Interestingly, Valentin started his life out in the wild as a hunter in 1960. "I became a hunter because I loved life in the wilds. I met Svetlana at a dance the night before I was due to move to Siberia to a job as a professional hunter. I asked her if she wanted to come along and to my great joy and surprise she said yes immediately. We went the next day." (as cited by Elander *et al*, 2002)

The couple lived in a tent the first few years on the banks of the Yenisei River among the Evenk people who are renowned as hunters with honor. The Evenk never killed wildlife recklessly and in fact the word "killed" was anathema to the hunters of the yore. Hunting was a privilege bestowed on those select members of the community who provided for their dependents. The moment greed overtook the hunter and he "killed" his career as hunter got killed. They don't make hunters of yore these days.

Valentin spent a few years studying zoology and ecology in Moscow to acquire a deeper understanding of his forest environment. During his field studies, Valentin accidentally scared a female bear from her den, leaving behind three abandoned cubs. He took them back to his tent, keeping them there with him two nights. When the mother did not return, he packed up and left with the cubs in tow. That was the start of the brown bear's tryst with Valentin's destiny. (Elander, *et al* 2002).

He says, "We base our fostering on me being their instructor but under no circumstances their mother," Valentin goes on to explain, "It's about keeping a clear distance between us and the bears. We want to avoid any kind of dependency or even familiarity with human traits. They'd start to think people were their parents and would seek them out for the rest of their lives. And then you could guarantee there'd be no happy endings." (as cited by Elander *et al,* 2002).

This concept is diametrically opposite to the rehabilitation model of other wildlife species such as the African Elephant. Daphne Sheldrick, for instance espouses the mothering orphan elephant calves until they are ready to reintegrate with wild herds, and rightly so. Whereas it takes 6 to 7 years for Daphne to rehabilitate an elephant calf, Valentin takes 6 to 7 months to rehabilitate a bear cub. Elephants are a highly social species and have a longer life span, whereas bears are solitary and have a considerably shorter life span. This difference in behavioral and social organization provides evidence that both are right in their own way.

3. The Fine Print

Wildlife rehabilitators learn early on that the animals they work on should never be imprinted on people. But they also must remember that the imprinting of the mother's image is the major element of behavioral stereotype formation, a safety feature wired by nature into every animal. This feature is of special importance for a young animal ensuring the highest degree of safety, especially at an early period in its life. When a family migrates to a new place and the loss of a cub is highly probable (especially in a big family), the imprint of the mother provides secure contact between the cub and the female bear and urges the cub to follow her about.

Bears are not true hibernators as bats, small rodents and shrews that go comatose during this period. This phenomenon has been given names such as "dormancy," "heavy sleep," "carnivorean lethargy," and "seasonal ursine torpor."

No moving object, even a potentially dangerous one causes the reaction of avoidance in bear cubs (in other animals, too). Formation of main defensive reactions subsides when the cubs are 5 months old. At this age, they are capable of evading danger themselves by hiding in the thickets or bt climbing trees. At an age of about 1.5 years, the cubs' link with their mothers weakens considerably.

4. The sleep of life

Bears are not true hibernators as bats, small rodents and shrews that go comatose during this period. This phenomenon has been given names such as "dormancy," "heavy sleep," "carnivorean lethargy," and "seasonal ursine torpor." Nevertheless, hibernation is a good word for it. It is a state of dormancy and inactivity that is utilized by bears and various other animals to adapt to short winter food supplies. "Hibernation is not so much a response to extreme cold as to a seasonal shortage of food" notes Paul Schullery in The Bears of Yellowstone (as cited by Brown, 1993). "The bear's warm coat is as necessary to it in the den as it would be outside."

Cub characteristics at birth: (Brown, 1993)

A study of American black bear cub's characteristics at birth was conducted in Pennsylvania by research biologist Gary Alt.

	Average	Smallest	Largest
Weight	12.8 ounces	10.3	16.0
Total length	9.4 inches	8.2	11.2
Head length	2.8 inches	2.4	3.1
Ear length	0.4 inches	0.3	0.5
Nose width	0.4 inches	0.4	0.4
Tail length	0.4 inches	0.3	0.3
Hair length	0.1 inches	0.1	0.1
Neck girth	4.3inches	3.9	4.7
Chest girth	6.5 inches	5.9	7.2
Foot length (fore)	0.7 inches	0.7	0.8
Foot length (hind)	1.1 inches	0.9	1.3
Foot width (fore)	0.7 inches	0.6	0.8
Foot width (hind)	0.6 inches	0.6	0.7
Claw length (fore)	0.3 inches	0.2	0.3
Claw length (hind)	0.2 inches	0.2	0.2
Umbilical cord lengt	1.5 feet	0.6	5.7

While the brown bear may den as early as September in far northern regions, the Asiatic black bear does not hibernate over most of range (Elman, 1992). A brown bear sow with cubs might get killed while "at den" and her cubs may end up at the Pazhetnovs. A problem Valentin has also found is that bears seek the company of humans after their release. Conversely, a bear wakes up from hibernation with a fear of humans. Research has shown that its wild traits get activated after hibernation. Thus a problem bear would get a second chance in the Pazhetnov model and they tried eliciting a similar response from the Asiatic black bear without success.

If a 2 month-old bear cub weighing 6 kg tugs at your heartstrings for being the cuddliest of all young mammals, a one day old bear cub will not cease to amaze you. It will weigh about 16 ounces (1/720 of sow's weight), lightly furred, and is 9 inches long. It would require the best skills of a rehabilitator to be able to hand raise this orphan bear cub. It happens to be the fosuc of Valentin and Svetlana.

Cases at OBRC

One-third of the rescued bear cubs were in the age group of 61-90 days (2-3 months), while 30% were of the age group 31 to 60 days (1-2 months). The cubs of the age group 91 to 150 days (3-5 months) constituted 16% of the rescues. 11% of the cubs were newborn or below the age of 1 month. The OBRC rescued only 8% cubs aged up to one-year of age and a mere 2% of cubs above one-year of age (Fig 1). This is quite unlike in CBRC, India where the average age at rescue is about 8 months.

Handling, care and maintenance of cubs

When the cubs arrive at OBRC, they are thoroughly examined and the newborn are handled with special care. The cub is lifted in hand with its head toward you, your palm placed under its chest with care not to apply pressure to its chest or neck. Pay heed to the umbilicus and do not damage it when it is still raw and wet.

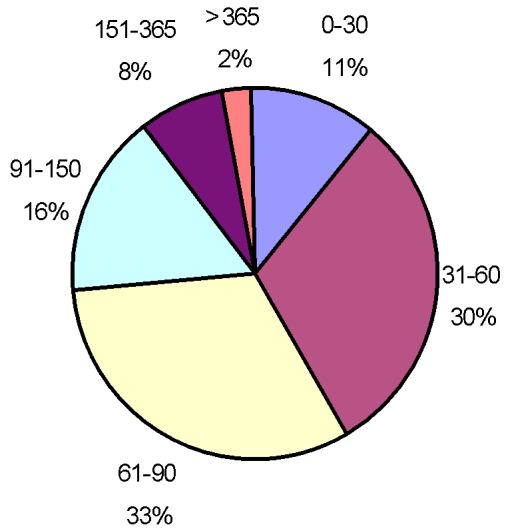


Fig 1 Age at rescue (days) (N=123)

Days	Features
7-10 days	Naked, hairless ears which are closed
17-20 days	Ears are opened
28-30 days	Eyes are opened, ears floppy
45-55 days	Ears get erect, cubs crawls quickly.
60 days	Standing on their feet
70 days	Start walking well/playing

Carefully clean away the dirt in the eyes, mouth and anal areas. If wounds are present, as is often the case in cubs rescued from hunting where dogs were used, treat the wounds with iodine or brilliant green solution and use antibiotics as appropriate. Weight of the newborn cubs is around 400 g. During the first 8 to 10 days of life, their weight increases to 610-680 g, and then increases gradually with an average of 15-25 g/day. At 3 months, the daily increase is about 50-70 g. A month old cub weighs 1-1.5 kg, rarely up to 2 kg.

The age of the cub within first 10-30 days of its life can be relatively well determined by its weight and appearance. This is crucial for its correct maintenance, feeding and nursing care.

Cubs are kept in a box from their birth to the age of two months. It should be placed in a heated room. This box is designed with grooves for the inner walls to allow change of the inner dimensions. Two to three cubs younger than one month can live together in one compartment of a cage. As they grow, the inner wall is removed. If more than three cubs are kept, they can be put two to each compartment. As they grow larger, they are moved to different cages.

A ready stock of diapers, tablecloths, napkins and cotton tampons for massages and toilet procedures should be in place. When handling the cubs, the person should wear a lab coat and gloves/mittens made of soft cloth. Buckets for the toilet procedures and room cleaning should also be readily available.

When keeping bear cubs younger than 40 days, the wire bottom of their cage should be covered by a layer of thick clothe with a plastic tablecloth covering it and a cloth diaper over the plastic. Cubs younger than 30 days require constant warming, as they are unable to choose a place with an optimal temperature by themselves. This is why their nest ought to be limited. A hot-water bottle should be placed either under the tablecloth with one edge free or put on the side of the nest and fence the cubs so that they are in a warm place. A good tool for warming the cubs is a special electric rubberized mat made for flower growers that maintains a constant temperature about 27 c. But this may not be freely available. It is dangerous to overheat the cubs. For cubs aged over 20 days, the hot-water bottle is placed only under half the box, while the other half would have only bedding as cubs are able to select a desired spot themselves.

As cubs are growing, the bedding on the wire bottom of their cage can be made of hay or straw. It is

The age of the cub within first 10-30 days of its life can be relatively well determined by its weight and appearance. This is crucial for its correct maintenance, feeding and nursing care

necessary to keep the bedding free of dust, since dust clogs the nasal passages of the cubs, where it dries forming scabs preventing normal breathing. This causes seemingly groundless aggressive fits. Feces that stick to the hair on the cub's forehead and paws dry out and can cause local fungal skin infection, which is difficult to cure. If infected, paint infected area with 10-15% iodine solution twice a day. Ensure that the iodine does not get into the cub's eyes or nostrils. Cubs older than 1.5 months are able to escape their cage, so the top lid of the box should be fitted with a reliable lock.

Instructions for handling bear cubs:

- Starting from day one, the rescued bear cubs should be handled with cloth mittens or gloves.
- Silence is maintained and no unnecessary visitors are allowed into the nursery.
- No visitor is allowed to touch the cubs.
- The handler of cubs should wear the same clothes (have a spare set) and should not where any strong perfumes or colognes.
- People working with the cubs in the early postnatal period should talk with each other in a low voice but never "talk to the cubs."

The visitors were then taken to the forest to see the bear enclosure consisting of two wooden log huts built within 12 hectares of forest area fenced with a chain-link and reinforced with a 2-strand power fence from inside. The hut is 2x3x4 m with 2 inner compartments each 2x3 m. It is a simple but well built log hut with gable roof and no windows. By the age of two months, the cubs move into this hut from the nursery hut near Valentin's house. Initially on arrivals to the forest enclosure, the cubs are locked up for the night but within few days when they have adjusted to this change of place, they are let free to forage outside day and night. The cubs are inspected daily at this stage during feeding time but again are not handled. Their food is offered in bowls kept in a stand and they are fed

'Smelling' a problem

Bear cubs are capable of orientation by smell from the early age, and it is quite possible that they might have an imprinting of certain olfactory signal. Later in life (in the juvenile or adolescent period), such a signal can trigger a neutral or positive reaction in the orientation-exploration behavior or can negate an avoidance reaction in the defensive behavior since the cubs will know the human smell, and this can reduce their survivability in the wild.

(Pazhetnov, 1990)

Duties of the trainees

1. Prepare feed as specified and demonstrated by the Pazhetnovs. This starts with warming the cow' s milk, and adding the porridge, buckwheat, eggs to it and stirring it into a homogenous mix. This is then filled into two cans and taken to the forest enclosure.
2. Wear prescribed hooded overall and trousers, either olive green or light blue with cotton gloves and gum boots while feeding.
3. Offer feed to the bear cubs and not handle them except to separate cubs fighting with each other for the food. In this case, they are physically lifted by holding the scruff of their neck and dropped at a free bowl with food.
4. Clear the area after feeding and wash the utensils and store them away.
5. Assist the Pazhetnovs with other duties like veterinary treatment and routine care such as deworming of the cubs.
6. Accompany Sergey on his daily rounds whenever needed.
7. Help in cleaning up the forest area by removing plastic and debris.
8. Keep notes on the duties and discuss with the Pazhetnovs from time to time.
9. Prepare for upcoming program at OBRC – such as housing for the next stage in the rehabilitation process.
10. Give a report to WTI/IFAW-Russia/Pazhetnovs, on the experience gained thereof.

'hands-off'. Once they have finished their feed, the bowl and stand are taken out. It hardly took 10 minutes for us to feed 11 bear cubs under our charge during the one month we trained at the OBRC.

5. Bear meals

The most important part of the cub's feeding is an early start. Do not try to feed the cubs immediately as they come into custody. Usually the cubs coming from a den are well fed and can easily endure 1-2 days without food. The newborn cubs have a well-expressed suck reflex. This allows feeding of even a one-day cub from a baby bottle. During the artificial feeding of the cubs, the front of their snout should be touched by the bottle to trigger the cub's sucking act through the tactile stimulation and the exhibited behavioral act, which is the reaction to a mother's nipple. After this, the cub can accept the bottle and suck. In the first 5-8 days after birth, the cubs readily take the bottle and suck intensively. However, older cubs that are taken from the wild, can push the bottle out by their tongue after the first sucking movements, bend their lips, and turn away from bottle. This means that cubs over 10 days old have ability to analyze taste and are used to the mother's milk. They refuse to suck milk with an unfamiliar taste.

The milk of a brown bear sow has 13-17% fat (Pazhetnov, 1990). Do not try formulating a milk replacer with such high percentage of fat, this can cause constipation and eventual death of the cubs. They should be fed with fresh (non-boiled) cow or goat milk warmed to 36-38*C. The best strategy is to use fresh cow milk from the same cow with 4 % or more fat or a baby formula mix. Good results have been obtained when the cubs, newborn to 1.5 months, were fed with baby formula mix or dry powdered milk with 2.5% fat. Use of foreign made baby formulas such as Nutrilon is not desirable since the cubs develop digestive disorders. Just remember to take 25% more of dry milk per volume of water than recommended mix. For instance, where instructions call for 12 g of the dry mix per 100 ml of water, you should take 15 g to reconstitute the milk. When the cubs reach 15-20 days of age, add a whole egg per liter of milk (Refer Annexure 1 for feed formula at OBRC).

A new rubber tip made of hard rubber which is used for cub feeding, should be washed with boiling water, dried and pierced by a common sewing needle heated by a match/candle. The hole should be pierced not exactly in the center of the tip but more to the side, so that the milk will not flow out of the bottle freely when it is inverted. If the hole is made in the center of the tip, or is too large, the milk will spurt directly into the throat of a cub and could choke it. Aspiration of milk into the lungs can kill a cub. During the first days of feeding you can use a small medicine vial as a milk bottle. At the beginning, it is important not to over feed the cubs, as it can result in diarrhea.

After feeding, massage the cub in your hand; take a cotton tampon with your other hand and carefully massage the lower part of the abdomen near the anal opening, pushing the tampon from navel to anus. Do not touch the umbilical area. The massage helps empty the cub's guts and bladder of their contents. The young cubs (before their eyes open) cannot easily defecate without massaging and could develop digestive problems. After defecation, a cub will sleep for 1.5-2 hours and will then start to move and cry. At this moment, the massaging procedure could be repeated, and after the cub has relieved itself, it is put

Take heed

For feeding bear cubs younger than 4 months old ensure that feeding bottles are always clean. All bottles should be washed with clean water, traces of fat should be removed with boiling water; the milk traces on the bottle walls can easily removed by adding large crystal salt and vigorous shaking of bottle. Bear cubs can suffer dyspeptic condition if their milk is contaminated by dirt.

Technique

When feeding a cub, sit on a small chair so that your knees will be straight. Put a soft cloth on your knees, take cubs in your hands, and place it on your knees with its head facing the opposite direction from you. Then, supporting the cub's snout with one hand, carefully but firmly insert the bottle tip in it mouth with the other hand. Patience is necessary for success.

back to the box. If the cub does not calm down, the situation should be assessed – Is it hungry? Is the box wet? If so, the condition of the box, bedding and the heating system should be carefully examined. If the cub gets diarrhea or constipation, the freshness of the milk being used should be examined. The quantity of milk should be reduced, and only fresh, non-boiled milk should be used at temperature 36-38oc. Massage should be performed carefully. A vet should examine the cub. If the examination does not reveal any maintenance or health problems, the cub can be fed.

Childhood (3-7 months)

The bear cubs go through a crucial development during this phase and learn skills that determine their survival in the wild. The cubs reaching 3 months of age must be isolated from the smells and sounds of the people and their habitation. The orphan cubs at this age exhibit a clear orientation toward a human and the sounds associated with the human. They can start begging. expressed as a series of monotonous, uniform sound signals. They actively seek a contact and if cubs are in a group they get excited and might even attack each other. This is the time to shift them to a special den house. This house should be attended only by the people who are feeding the cubs. The best thing is to let only one indiviudal feed them constantly. The cubs will remember this person's smell and will exhibit avoidance reaction to the smell of other people.

The den house is a wooden log hut with an interior measuring 3x4 meters iwith a closed wooden porch 2x3 meters in size. Floor to ceiling distance is 2 meters. Inside, the cub cages are fitted. The cages are a row of adjoining compartments separated by a partition, floor and roof made of welded mesh. The best material for such cages is a zinc-coated welded mesh with 10x10 or 15x15 mm mesh size. If the mesh is larger, the cubs can damage their claws or mouths as they try to escape from the cage, by biting and scratching. The back wall is made of boards or mesh. The front wall is a frame that has sliding or hanging doors for each compartment. These doors should have safety locks. It should be kept in mind that the growing cubs can destroy the wooden constrictions with their claws and teeth. Therefore, the wooden parts of a cage should be covered on the inside by mesh or tin. The wooden sliding or hanging doors do not have to be so protected, but they should be made thick and sturdy manner. A den house, with interior dimensions of 3x4 meters, can accomodate cages for from 10 to 12 bear cubs. The wire mesh wall between the compartments allows the cubs to communicate using the sound, visual and smell signals. The wire mesh floor in the cages allows urine to flow down. The cages should be elevated above the floor, so that the piles of scat that collect underneath can be easily cleaned. The cubs can be placed in the compartments by 1, 2 or 3 depending on their behavior and relation to each other, and should always be of the same age group-or else they will be disturbed.

The release of the orphan cubs back to their natural habitat is timed to occur in July/August of each year when an abundance of food is available. The forests are teeming with wild fruit as rowanberry, cranberry, and grass is pleantiful.

6. Release

The release of the orphan cubs back to their natural habitat is timed to occur in July/August of each year when an abundance of food is available. The forests are teeming with wild fruit as rowanberry, cranberry, and grass is pleantiful. The cubs are usually around 6 to 7 months of age by the time of release and are able to fend for themselves at this stage of their life. But their foster parents, the Pazhetnovs, do not entirely wash their hands of the cubs and are very concerned for their welfare after the release. They practice both hard and soft releases for the cubs depending on the circumstances under which they were rescued.

All cubs are ear-tagged before release so that those observing the animals in the forest are aware that the bears have been released by OBRC. The forest officials particularly ensure the cubs' safety and on occasions have prevented the "Pazhetnov alumni" from getting hunted. On rare occasions, and sadly when a released bear is indeed hunted, the hunt inspector informs the Pazhetnovs of the killing and the ear tag is returned to them. But this has not happened in years and that gives hope to this beautiful animal, one whose fate seems to be in safe hands in the Russian Federation.

Age at release

Out of 80 bear cubs released, 57% were in the age group of 6 to 7 months, and 9% were below 6 months. Whereas 18% of the cubs were between 8 to 10 months of age, 6% constituted ages between 15 to 17 months (Fig 2). While rest of age groups is represented by few bear cubs, it is interesting to note that 3% of the cubs escaped at the age of 3 to 4 months (see Annexure 2 for release details). This happens when a bear cub goes into the forest and is not keen to come back into the enclosure. The Pazhetnovs follow the progress of this animal and do not impose themselves on the truant in any manner.

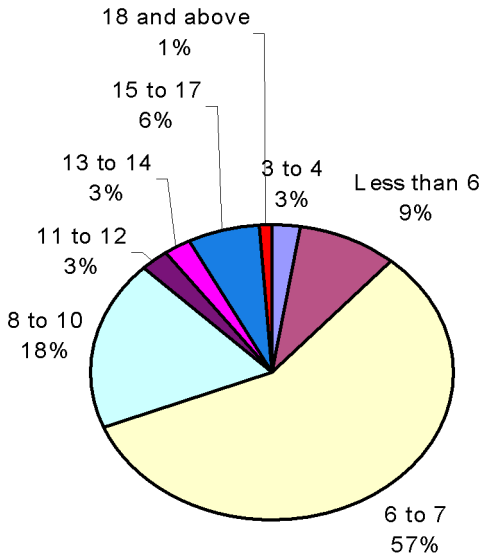


Fig 2. Age at release in months (N=80)

Considerations for release

1) If possible, the bear cubs are released near the place of their rescue.
2) They are sometimes released when some resource persons, usually researchers at nature reserves, volunteer to take care of their monitoring post release. The Pazhetnovs normally accede to such requests
3) The bear cubs are also released in areas where their numbers have plummeted. For instance, in 1999, there were no bears in Bryansky Les region (about 700 km from Chisty Les) and the Pazhetnovs have put back 17 bear cubs here to date. At the same time they also lobby for a ban on hunting in such regions.
4) The Pazhetnovs insist that 6 to 7 months is a good age for release. Fifty-seven perecent of the bears relased were this age.

Release procedure

Immobilization of bear cubs is done in preparation for transportation. For many years, the Pazhetnovs used SERNILAN (Phencyclidine hydrochloride) for this purpose at 100-150 mg per 10 kg body weight. This dose caused quick immobilization in some individuals, but others were less affected and could still walk. Sometimes an additional dose is needed to achieve the desired effect. Currently, a combination of XYLAZINE-KETAMIN is being used to good effect at a dose rate of 0.75 mg per Kg body weight at 1:1 ratio. Before placing an immobilized cub into a transportation cage, it should be examined, tagged, weighed, and (if necessary) a blood sample is taken.

Ear tagging

Before release, cubs are ear tagged for identification and reporting purposes.

Ear tags made of fluoroplast are used. Currently, special ear tags designed for cattle are used where information can be written with a special pencil. The hair is cut in the area where the tag will be placed and the skin is treated by alcohol or iodine solution. A tag is installed with the help of special tongs. The ear should be pierced in its lower one-third, a little behind the center. The tag has a number and address of the OBRC where the tag should be returned in case the cub dies. Tagging is best performed on immobilized cubs.

Cages for transportation of the cubs to the place of their release are made out of chain link mesh (1.5-2 mm thick wire) that is rolled into a tube. Its side is made by two pieces of the mesh that are securely fastened with a wire. Diameter of such a cage should be 50-60 cm, its height 1 m. The immobilized and ear-tagged cub is placed into the transport cage and the side of the cage is fastened with wire. The tips of the wire with thieir sharp cutting edges should not face inside the cubs to avoid wounding the cubs. At the place of their release, one side of the cage is opened.

The location where the cubs are released should be remote from human settlements. The cubs are often released in a protected zone of a natural reserve. It is important to release the cubs into a habitat with sufficient supply of natural food. In such a habitat, after they are released in July- August, the cubs will accumulate enough fat deposits to survive in hibernation over the winter. OBRC has released bear cubs in different locations since its inception (Fig 3).

The released cubs very rarely move further than five kilometers from the spot of their release. Usually they gradually explore the territory for the first two weeks and settle in the quietest places with maximal food supply. In fall, before moving to a den, the cubs visit neighboring territories. However, in spring (April-May) they usually return to places where they lived in the fall. Their footprints can be easily found on wet spring soil. Such footprints will be 7 to 9 cm wide for the front paws. Immediately after the cubs emerge from their den, they start growing, and the callus print of their front paws grows 1 cm wider by the end of May. If these observations are done in the habitats populated by wild bears, it should be remembered that in April-May the wild cubs are still found as a group together with their mother. This allows easier registration of the footprints of orphaned cubs that were released the previous year.

The cubs should be released into the wild by groups of two or three. Only in extreme cases, a release of a single cub is warranted. A group of cubs that have well bonded have a much survivability level through registration of potential danger signals and lowering the stress level in critical situations.

Out of 123 rescues handled until 2004, the OBRC rehabilitated and released 77% of the bear cubs handled. Ten percent of the bear cubs were killed by animals, of which some were hunted poached. Seven percent died of disease while 2% escaped. Four percent could not be rehabilitated and were handed over to lifetime care centers (Fig 4).

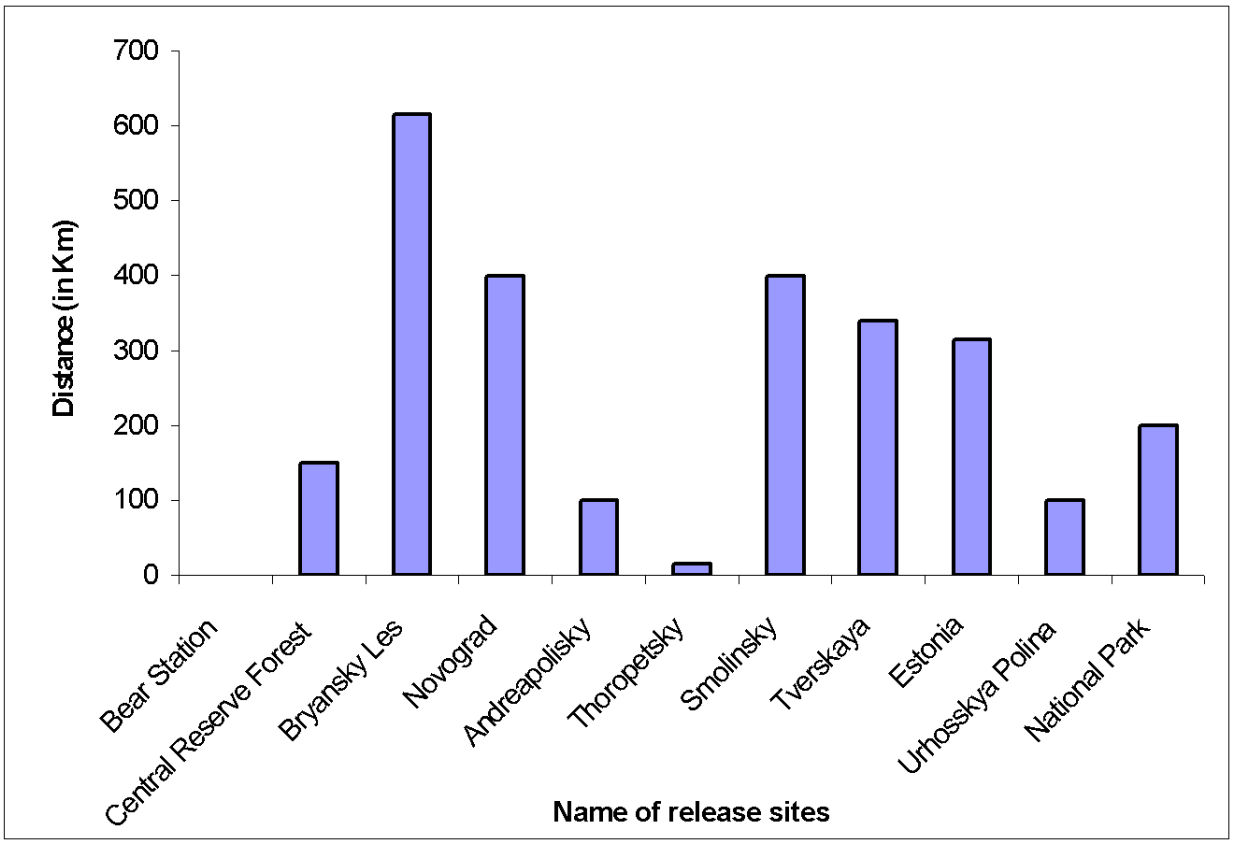


Fig 3 Distance of release sites from OBRC (N=80)

Release of radio-collared bears

On 12th April 2004, OBRC released three bears, two female bears were soft-released at the project site itself and the third, also a female, was hard-released at Novgorod, 150 km from the Center. The release could not be witnessed by the trainees as the bears were waking up from hibernation and had to be released without any delay.

Apart from the Pazhetnovs, two other resource persons were present on for for the immobilization of one bear Luboif. Sergey Ganusevich, Program Coordinator, IFAW-Russia and the other, Dr. Mikhail from the Moscow Zoo. Since this bear and her long time companion bear, Vierra, were always together, only one was radio collared.

All three bears were over one year in age at the time of release. They were held back the previous spring at OBRC as radio collars were procured rather late. Also, Valentin was ken to den them at OBRC for the winter and release them in spring with a post release monitoring plan.

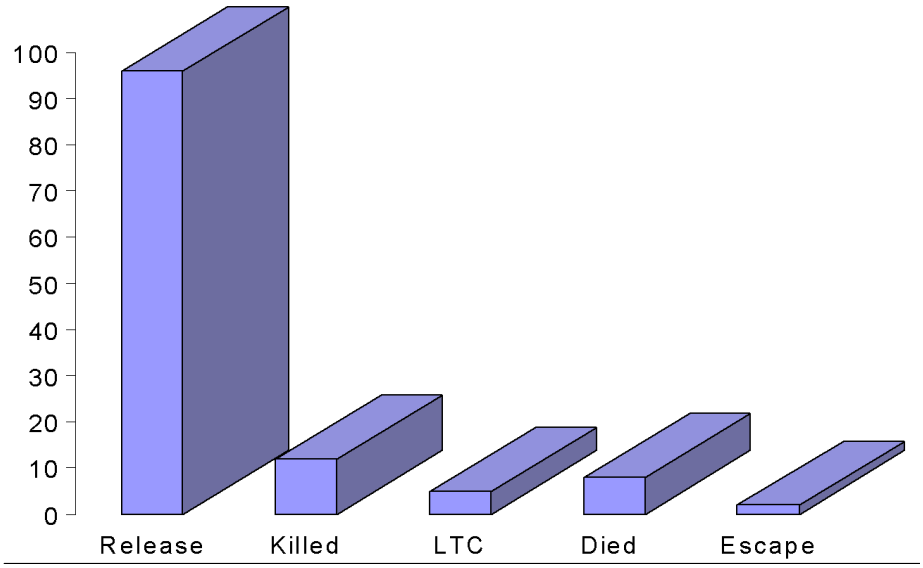


Fig 4 Outcome of rehabilitation efforts at OBRC (N-123)

The three bears, Vierra(Faith) Nadiezda (Hope) Luboif (Love) are crucial for OBRC in the new order of things as post release monitoring is imperative, both for the rehabilitators and the donors

7. Discussion

Black or Brown: Bear is NOT one

It would seem that most of the positive aspects of the Pazhetnov model in brown bear rehabilitation could be incorporated in the Asiatic black bear rehabilitation. And it could well be so, but for the inherent dissimilarities in the two species.

8. Feedback

It is easy to see why most rehabilitators regard the Pazhetnov model as one of the best in the world. Its founder is a venerable man, and his commitment is legendary. But the younger Pazhetnovs, Sergey and his son Valiya, have their jobs cut out for them. They face the taskmaster in twin sciences, namely wildlife rehabilitation and conservation medicine.

The weak link in the Pazhetnov armor is its protocol for release. Most of their releases are seemingly rushed and without proper plans of action for post release monitoring, the most vital ingredient on which hinges the fate of the exercise. It is good to see that this aspect has their undivided attention and it is not late as bear biologists are still honing their skills in this key area. In fact, with their expertise they can easily lead the way in the field of radio tracking of bears.

Another concern is the fact that 12% of their released bears were below 6 months of age. Some were 3 to 4 months, a period in a cub's life when its defensive behavior is yet to be fully formed. No doubt these were cubs that just took off from the enclosure and never returned. But such cases can hardly be classified as release, escape maybe. It is hardly justified that one would expect such bears to fend for themselves at such tender age.

No	Aspects	Brown Bear	Asiatic Black Bear
1	Habitat	Live in open habitat. Temperate forests (Taiga)	Use dense close canopy habitats. Subtropical forests.
2	Its Predator	No known predator, except the Siberian Tiger in far-east Russia.	Tiger is the predator.
3	Population estimates	206,500 worldwide, half of it in Russia.	Unknown, vulnerable in India.
4	Human density in the project location.	8 families live in the vicinity of Bubonitsa OBRC. Not more than 50 people in the village.	May be 800 families in the vicinity of CBRC –more than 5000 people in Seijosa –the smal town.
5	Reason for rescue	Legal/Illegal hunting.	Illegal hunting, cubs rescued as 'pets'.
6	Management	'Do-it-yourself' facility run by the Pazhetnovs with IFAW as main donor.	A team comprising of vet, biologist, animal keepers work at the facility with IFAW as main donor.
7	Age at Rescue	About two-thirds of rescues are below the age of 2 to 3 months.	The average age would be over one year.
8	Type of Release	Both Hard and Soft Release.	Only soft release.
9	Age at Release	63% of bear cubs released were of 6 to 7 months of age or below.	Only two released thus far. Average 2 years.
10	Post release monitoring	Just started monitoring after the release of over 120 bears and plan to do it for 3 months. Earlier radio tagged 9 bears with limited success. The open habitat makes it easier to monitor.	Started monitoring from the star and plan to do it for 9 months. The dense canopy habitat and hilly terrain makes it tougher to monitor.
11	Governmental Permission	Not many required, as it is a part of the central reserve.	Much permission is required.
12	Area of operation	Nationwide operation	Only state wide operation.

The other contentious issue is a lackadaisical approach to preventive medicine in matters such as regular deworming and vaccinations. Bears are host to parasitic infections due to helminthes and trichinella and only a regular schedule of worming can get rid of the problem. Lack of problem does not mean absence of parasitism. It could also be that the problem could surface after release.

Record keeping in the OBRC needs more detail. A work of such magnitude deserves the best of attention in this aspect. Only meticulous records can lead to proper statistical analysis and there is no science without statistical validation. Also, this would enable the Pazhetnovs to publish their work in a much more focused manner.

In a world of publish or perish, the Pahetnovs are a rare breed. They have not written anything for the sake of writing and all their works are in Russian making it difficult for those only reading English. It is imperative to get their publications translated in other world languages so that the rest of the world can appreciate the beauty of their work in bear rehabilitation.

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Annexure 1
Feed Formulation at OBRC

Month	Age	Feed	Quantity	Temp	Additive	Times	Note
Jan	1-5	Milk Water Dry milk	200 200 30	30-38		10 feeds, 2 hourly	Keep room temp 17-20 C
	5-10	Milk Water Dry milk	280 280 45	30-38		7 feeds, 3 hourly	
	10-20	Milk Water Dry milk Yolk	400 400 60 1/2	30-38	Honey 1-3 g	6 feeds, 4 hourly	Keep in heated boxes
	20-30	Milk Water Dry milk Yolk	500 500 75 1/2	30	Honey 1-3 g	5 feeds, 4 hourly	
Feb	30-45	Milk Water Dry milk Egg	1000 1000 150 1	30	Multivitamins	5feeds, 4 hourly	
	45- 60	Milk Water Dry Milk Egg	2000 2000 300 1	30	Multivitamins	5 feeds, 4 hourly	Keep in unheated Boxes.
March	60-90	Milk Water Dry Milk Semolina Sugar Oil Salt Egg	2000 2000 300 25 10 10 1 1	30	Multivitamins, Calcium	4 feeds	Keep in unheated House.
April	90-120	Milk Water Porridge Sugar Oil Salt Egg	1000 1500 500 10 10 1 1		Multivitamins,	3 feeds	Feed off bowl Bear cubs out during day, at night in the den house.
May	120-150	Milk Water Porridge Sugar Oil Silk Egg	1000 2000 500 10 50 2 1		Cottage cheese, vegetables	2 feeds	
June	150-180	Milk Water Oatmeal Sugar Oil Salt Egg	1000 3000 1000 10 50 2 1		Vegetables, Fruit	1 feed	Feeding in the evening time after 22 hours.
July & August	180-240	Water Oatmeal Sugar Oil Salt Egg	3000 1000 10 50 2 1			1 feed	Before release – feed for keeping cubs in enclosure.

Annexure 2

Data of bears released at OBRC

	Id. No	Sex	Date of Entry	Age at Entry	Place of Rescue	Date of Release	Outcome
1975							
1	None	M	25.3.75	3 m		15.6.77	Killed
2	None	M	25.3.75	3m		10.8.76	Lifetime center, Moscow
3	None	F	25.3.75	3m		10.8.76	Lifetime center, Moscow
1982							
4	None	M	9.5.82	4m		10.10.82	Killed
5	None	M	9.5.82	4m		10.10.82	Reported seen in 1983
1990							
6	None	F	14.1.90	3-5m	Nilidosky	18.5.90	Killed by wild male bear
7	None	F	14.1.90	3-5m	Nilidosky	18.5.90	Killed by wild male bear
8	None	M	14.1.90	3-5m	Nilidosky	18.5.90	Killed by wild male bear
9	None	F	18.6.90	6m	Jarkovsky	25.6.90	Released at OBRC
10	None	M	22.6.90	6m	Nilidosky	25.6.90	Released at OBRC
1993							
11	None	M	8.1.93	2-3m	Toropets		Released at OBRC
12	None	M	10.1.93	8-10m	Toropets		Released at OBRC
13	None	M	10.1.93	8-10m	Toropets		Died on eating toxic weed
14	None	M	10.1.93	8-10m	Toropets		Died 11.9.93
15	None	M	23.2.93	1-1.05m	Nilidova	15.8.93	Released at OBRC
16	None	F	23.2.93	1-1.05m	Nilidova	15.8.93	Released at OBRC
17	None	M	23.2.93	1-1.05m	Nilidova		Died on eating toxic weed
18	None	F	23.2.93	1-1.05m	Nilidova	20.11.93	Reported seen 1993-96
19	810	F	10.8.93	7m	Toropetsky		Reported seen 1993-94
20	868	M	10.8.93	7m	Toropetsky		Reported seen 1993-96
21	810/1	M	10.8.93	7m	Toropetsky		Reported seen 1993-94
1994							
22	None	F	16.6.94	10m	Kazansky Zoo	15.7.94	Released Central Reserve
23	None	M	16.6.94	10m	Kazansky Zoo	15.7.94	Released Central Reserve
1995							
24	996/2	F	23.2.95	10-12d	Maksatiha	15.4.96	Released at Bryansky Les
25	9	F	1.3.95	40-45d	Toropets		Killed by dog-5.8.95
26	828	F	3.3.95	40-45d	Toropets	27.7.95	Released Central Reserve
27	1	F	3.3.95	40-45	Oleanino	27.7.95	Released Central Reserve
28	901/4	M		40-45	Oleanino	15.4.96	Released Bryansky Les
29	902/3	M		40-45	Oleanino	15.4.96	Released Bryansky Les
30	897/7	F	5.3.95	40-45	Udomlia	27.7.95	Released Central Reserve
31	899/5	F	5.3.95	40-45	Udomlia	27.7.95	Released Central Reserve

	Id. No	Sex	Date of Entry	Age at Entry	Place of Rescue	Date of Release	Outcome
32	829/10	M	5.3.95	40-45	Udomlia	27.8.95	Released Central Reserve
33	826	F	23.3.95	60-65	Nilidova	27.8.95	Released Central Reserve
34	None	M	23.3.95	60-65	Nilidova		Killed by dog-10.7.95
35	827	M	23.3.95	60-65	Nilidova	27.8.95	Released Central Reserve
1996							
36	None	F	15.3.96	90-95	Toropetsky	25.8.96	Released OBRC
37	None	F	15.3.96	90-95	Silizarosky	25.8.96	Escaped
38	3	M	22.3.96	90-95	Zharkovsky	14.7.96	Released Bryansky Les
39	4	M	22.3.96	90-95	Zharkovsky	14.7.96	Released Bryansky Les
40	6	F	22.3.96	90-95	Zharkovsky	14.7.96	Released Bryansky Les
41	None	F		90-95	Toroptsky	24.9.96	Radio collared, Rel C R.
1997							
42	3/1	M	26.3.97	55-60	Kzansky Zoo	4.7.96	Radio collared, Rel C R.
43	7	F	26.3.97	55-60	Kazansky Zoo	13.7.97	Released Bryansky Les
44	8	F	26.3.97	55-60	Kazansky Zoo	13.7.97	Released Bryansky Les
45	None	F	20.5.97	120-150	Udomlia		Released-OBRC
46	None	F	20.5.97	120-150	Udomlia		Released-OBRC
47	9	F	10.6.97	150	Kastronia	13.7.97	Released-Bryansky Les
1998							
48	None	F	21.1.98	10-12	Maksatiha	7.7.98	Killed by wild wolves
49	None	M	21.1.98	10-12	Maksatiha	7.7.98	Killed by wild wolves
50	None	F	21.1.98	10-12	Maksatiha	7.7.98	Killed by wild wolves
51	54	F	21.1.98	10-12	Maksatiha	13.4.99	Released-OBRC
52	11	F	26.3.98	65-70	Toropetsky	23.7.98	Released-Bryansky Les
53	10	M	26.3.98	65-70	Toropetsky	23.7.98	Released-Bryansky Les
54	11/2	F	4.4.98	60-65		16.7.98	Released- CR
55	None	F	5.4.98	60-65	Zapodinaya	25.10.98	Released- CR
56	1	F	8.4.98	85-90	Estonia Zoo	21.7.98	Estonia
57	2	F	8.4.98	85-90	Estonia Zoo	21.7.98	Estonia
58	3/2	F	8.4.98	85-90	Estonia Zoo	21.7.98	Estonia
59	56	F	10.4.98	85-90	Bilgorod Zoo	1.9.98	District Andreapolsky
60	57	F	10.4.98	85-90	Bilgorod Zoo	1.9.98	District Andreapolsky
61	55	M	16.4.98	90-95	Skovskya		Released OBRC
62	None	F	16.4.98	90-95	Skovskya		Released Bear Sation
63	10	F	16.4.98	90-95	Skovskya	25.10.98	Urhoskya Polina
64	None	M	20.4.98	70-75	Andriapol	10. 7.98	Released OBRC
65	None	F	20.4.98	70-75	Andriapol	7. 7.98	Killed by wolves
66	None	F	20.4.98	70-75	Andriapol	7. 7.98	Killed by wolves
67	None	F	20.4.98	70-75	Andriapol		Released OBRC

	Id. No	Sex	Date of Entry	Age at Entry	Place of Rescue	Date of Release	Outcome
1999							
68	59	F	10.2.99	40-45	Toropetsy	27.7.99	Released- CR
69	60	F	10.2.99	40-45	Toropetsy	27.7.99	Released- CR
70	None	M	28.2.99	35-40	Andriapol	6.7.99	Released OBRC
71	None	M	28.2.99	35-40	Andriapol	6.7.99	Released OBRC
72	57	M	3.4.99	80-85	Belgorod Zoo	10.8.99	Released Tverskaya
73	56	M	3.4.99	80-85	Belgorod Zoo	10.8.99	Released Tverskaya
74	None	M	9.4.99	90-95	Borovichy	15.7.00	Released Tverskaya
75	None	M	16.4.99	90-95	Maksatiha	15.7.00	Escaped, seen 00,01
2000							
76	None	M	5.2.00	30-35		10.4.01	Released OBRC
77	None	M	5.2.00	30-35		10.4.01	Do
78	67	F	20.2.00	1.5yr		26.4.00	Released Bryansky Les
79	68	F	6.4.00	1.5yr		26.4.01	Do
80	None	M	27.12.00	10-12d			Died: 5.3.01
2001							
81	70	F	18.2.01	40-45			Released OBRC
82	69	F	18.2.01	40-45			Do
83	None	F	28.2.01	60-65			Released OBRC
84	None	F	28.2.01	60-65			Do
85	14	M	14.3.01	70-75		8.4.02	Released Bryansky Les
86	15	M	14.3.01	70-75		8.4.02	Do
87	None	F	14.3.01	70-75			Radio-collared, BS
2002							
88	115	F	3.2.02	30-35		4.10.02	District Andreapolsky
89	110	M	3.2.02	30-35		4.10.02	Lifetime Care
90	116	F	5.2.02	30-35		4.10.02	Dist Andrapolsky
91	108	F	5.2.02	30-35		29.7.02	Dist Thoropets
92	101	M	5.2.02	30-35		4.8.02	Dist Andreapolosky
93	112	M	13.2.02	40-45		29.7.02	Released Thorpetsky
94	109	M	13.2.02	40-45		29.7.02	Released Thoropetsky
95	102	M	13.2.02	40-45			Released OBRC
96	103	F	18.2.02	45-50		4.8.02	Dist Andreapolsky
97	101	M	18.2.02	45-50		26.4.03	Released OBRC
98	114	F	22.2.04	60-65		8.10.02	Rel N P
99	117	M	22.2.04	60-65		8.10.02	Do
100	106	M	25.2.02	60-65		26.7.02	Released Novgarod
101	105	M	25.2.02	60-65		28.7.02	District Thoropetsky
102	104	M	6.3.02	70-75		26.7.02	Released Novgarod

	Id. No	Sex	Date of Entry	Age at Entry	Place of Rescue	Date of Release	Outcome
103	113	M	6.3.02	70-75			Released OBRC
104	100	F	6.3.02	70-75		20.4.03	Released Novgarod
105	107	M	15.3.02	80-85		29.7.02	Released Thoropetsky
2003							
106	None	M	13.1.03	2days		3.2.03	Died of pneumonia
107	None	M	13.1.03	2days		18.3.03	Died of pneumonia
108	123	F	1.2.03	30-35		18.7.03	Released Smolinsky
109	122	M	1.2.03	30-35		18.7.03	Released Smolinsky
110	128	M	1.2.03	30-35		25.8.03	Released OBRC
111	None	F	16.2.03	35-40		7.3.03	Died of pneumonia
112	124	M	16.2.03	35-40		20.7.03	Released Novgarod
113	127	F	21.2.03	40-45		10.8.03	Released Novgarod
114	126	F	21.2.03	40-45		10.8.03	Released Novgarod
115	125	M	21.2.03	40-45		20.7.03	Released Novgarod
116	121	M	16.4.03	3m		11.7.03	Released Smolinsky
117	120	M	16.4.03	3m		11.7.03	Released Smolinsky
2004							
118	140	F	30.1.04	17		12.4.05	Released Novgrad
119	131	F	30.1.04	17		23.08.04	Lifetime care center
120	132	F	30.1.04	17		23.08.04	Lifetime care center
121	611	F	29.2.04	20		10.04.05	Radio collared, BS
121		F	29.2.04	20		10.04.05	Released B S
122	None	M	29.2.04	20			Died, Pneumonia, 30.2
123	130	M	13.4.04	1.5yr		14.4.04	Released, Tverskay Oblast
2005 (On going)							
124	Not yet	F	17.1.05	10	Novgarod		Under Rehabilitation Process
125	Not yet	F	17.1.05	10	Novgarod		Under Rehabilitation Process
126	Not yet	F	17.1.05	10	Novgarod		Under Rehabilitation Process
127	Not yet	F	7.2.05	15	Tverskaya		Under Rehabilitation Process
128	Not yet	F	7.2.05	15	Tverskaya		Under Rehabilitation Process
129	Not yet	M	15.2.05	6	Novgarod		Under Rehabilitation Process
130	Not yet	M	15.2.05	6	Novgarod		Under Rehabilitation Process
131	Not yet	M	15.2.05	6	Novgarod		Under Rehabilitation

	Id. No	Sex	Date of Entry	Age at Entry	Place of Rescue	Date of Release	Outcome
131	Not yet	M	15.2.05	6	Novgarod		Under Rehabilitation Process
132	Not yet	M	15.2.05	6	Novgarod		Under Rehabilitation Process
133	Not yet	F	15.2.05	6	Novgarod		Under Rehabilitation Process
134	Not yet	F	15.2.05	6	Novgarod		Under Rehabilitation Process
135	Not yet	M	25.2.05	30	Novgarod		Under Rehabilitation Process
136	Not yet	M	25.2.05	30	Novgarod		Under Rehabilitation Process

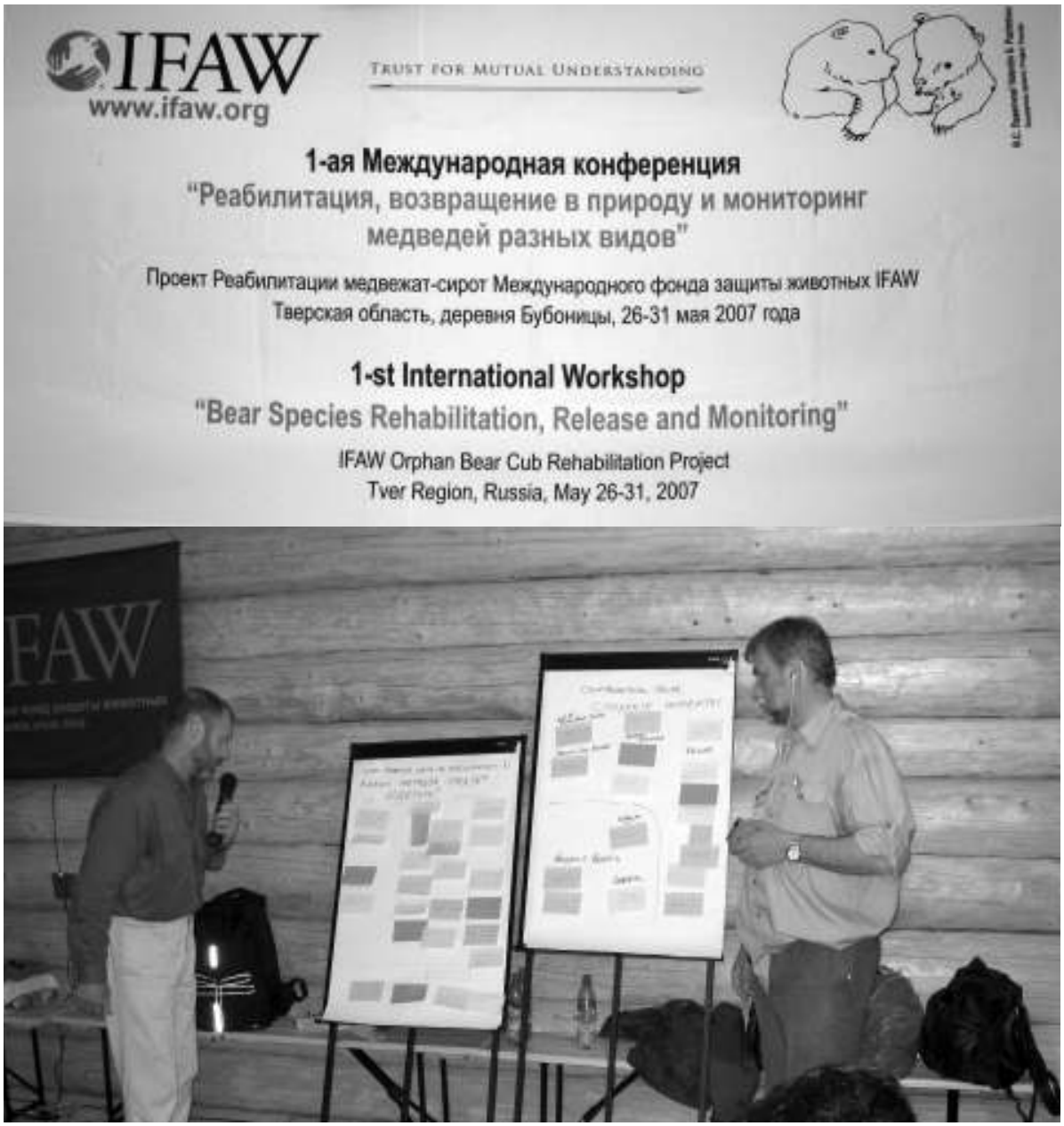
Appendix V

Report on the International Workshop on

BEAR SPECIES REHABILITATION, RELEASE AND MONITORING

(13th April 05 to 15th May 05)

Orphan Bear Cub Rehabilitation Project Bubonitsy, Tver Region, Russia



N. V. K. Ashraf
Wildlife Trust of India
New Delhi, India
August, 2007

Supported and organized by

International Fund for Animal Welfare (IFAW)
Trust for Mutual Understanding (TMU)

Local host
Orphan Bear Rehabilitation Project (OBRP), Russia

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Acknowledgements

The workshop brought together practically all important bear rehabilitators of the world in one forum and the credit for organizing such an important event goes to the International Fund for Animal Welfare (IFAW) and the supporter Trust for Mutual Understanding (TMU). The Orphan Bear Rehabilitation Project (OBRP) in Bubonisty, spearheaded by the Pazhetnovs (Valentin and Sergey) played the local hosts. Since this was the first ever event of such magnitude held in this part of Tver Region, the Pazhetnovs were delighted to take care of the guests from all around the world.

The staff at IFAW-Russia took care of all the logistics involved in organizing the workshop. Two names need special mention, Mila Danilova and Karina Agaronyan, both of whom were actively involved in making this event a success.

The workshop presented only bits and pieces of information on the rehabilitation protocols followed in different facilities and it was therefore important to engage in detailed discussion with all the rehabilitators in person to elicit the a complete picture on the methods employed by them. This report wouldn't have been possible without the active contribution of the following participants. Most of them responded to my queries by email and were only too glad to share their experiences.

Angelika Langen, *Northern Lights Rehabilitation Society, Canada*

Benjamin Kilham, *Kilham Black Bear Rehabilitation Center, USA*

Dave Jackson, *Andean Bear Project, Ecuador*

Edwards Kruglov, *Wildlife Rehabilitation "Outes", Khabarovsk, Russia*

Gabriella Fredriksson, *Sun bear conservation project, Indonesia*

John Beecham, *Survival of Rehabilitated Black bears in Central Ontario, Canada*

Kira Skirpova, *Bear Release Centre, Ussurisky Nature Reserve, Russia*

Leonardo Bereczky, *Vier Pfoten International Bear Rehab Centre, Romania*

Mila Danilova, *IFAW, Russia*

Sergey Pazhetnov, *Orphan Bear cub Rehabilitation Project, Russia*

Valentin Pazhetnov, *Orphan Bear cub Rehabilitation Project, Russia*

Ashraf NVK/WTI

1. Introduction

The first international workshop on "Bear Species Rehabilitation, Release and Monitoring" was held in Russia in Tver Region at the Orphan Bear Rehabilitation Project (OBRP) in Bubonitsy, Tver Region, Russia. An attempt had been made in the past to hold a similar workshop on bear rehabilitation in Rhenen, Netherlands in 2000. The International Bear Association (IBA) was one of the joint organizers of that workshop on "The Evaluation of Bear Rehabilitation Projects from a Conservationist's Point of View: Creating Linkage between Different Fields of Interests". However, according to the participants who attended the present workshop in Russia, most of them could not attend that workshop in Netherlands. Nonetheless, the proceedings of that workshop, published five years later, also contained many articles from rehabilitators who did not attend the workshop (Kolter and van Dijk, 2005).

The present workshop attracted 42 participants from different parts of the world, working on five species of bears, namely the European brown, American black, Asiatic black, Andean spectacled and the Malayan sun bear. The names and addresses of the participants have been given at the end of this report in section seven. The largest contingent of participants were from Russia (15), followed by USA (8), Canada (5), UK (3), Asian (7) and other countries (4).

There was one presentation each on the rehabilitation of sun bear, polar bear and spectacled bear, whereas the European brown bear, American black bear and the Asiatic black bear dominated the proceedings with three or more presentations each. With two special working groups separately discussing polar bear and giant panda rehabilitation issues, the sloth bear in the end was the only species not covered in the workshop.

2. Aims and objectives

The aim of the workshop was to enable all participants share and contribute their knowledge, experience and expertise on the critical components of bear rehabilitation, so that the best practices in bear rehabilitation could be documented and made available to all rehabilitators. Such an information sharing would enhance the survival of released bears and minimize the risk of released bears coming into conflict with people. The workshop would also benefit the welfare of bears in care, and the people living in the environment into which they are released and which they share into the future.

It was also expected that the proceedings would provide a set of critical components recognized by the participants to be essential for successful rehabilitation of bears and also take note of the differences in techniques between successful projects, which in turn could be due to species or regional differences.

3. Program

The aim of the workshop was to enable all participants share and contribute their knowledge, experience and expertise on the critical components of bear rehabilitation, so that the best practices in bear rehabilitation could be documented and made available to all rehabilitators. Such an information sharing would enhance the survival of released bears and minimize the risk of released bears coming into conflict with people. The workshop would also benefit the welfare of bears in care, and the people living in the environment into which they are released and which they share into the future.

It was also expected that the proceedings would provide a set of critical components recognized by the participants to be essential for successful rehabilitation of bears and also take note of the differences in techniques between successful projects, which in turn could be due to species or regional differences.

Monday May 28, 2007

9:00 – 10:00	**Opening Session**
	Greetings • AJ Cady, Director, AICD, IFAW • Valentin S. Pazhetnov, OBRP Founder Introductions of Participants
10:00 – 13:00	**Session 1. Criteria for accepting orphan bear cubs into rehabilitation programs. Facilitators John Beecham, Alexander Malev**
10:00	Criteria for accepting Asiatic Black Bear cubs into rehabilitation, *Kira Skripova*
10:20	Criteria for accepting Brown Bear cubs into rehabilitation, *Valentin Pazhetnov*
10:40	Criteria for accepting Polar Bear cubs into rehabilitation, *Alison Hood*
11:00 – 11:30	*Coffee break*
11:30	Work in groups, technique 1
12:30	Reports of the working groups
13:00 – 14:00	*Lunch*

14:00 – 19:00	**Session 2. Care and Rehabilitation – Critical Components. Facilitators Anand Ramanathan, Mila Danilova**
14:00	Critical components of care and rehabilitation of Brown Bears cubs, *Sergey Pazhetnov*
14:20	Bear rehabilitation technique for the tropics: A case study of Asiatic black bears (Ursus thibetanus) in Northeast India, *Ashraf NVK*
14:40	Care & rehabilitation of American Black Bears: Critical components, *Angelica Langen*
15:00	Sun bear rehabilitation efforts, *Gabriella Fredriksson*
15:20	Work in groups, technique 2
16:00 – 16:30	*Coffee break*
17:00	Wrap-up Session 2
18:00	Joe Hamr's 2 year research project monitoring the movements, denning behavior and survival of 61 cubs released in Ontario. *John Beecham*
19:00	*Dinner*
20:00 –22:00	Discussions

Tuesday May 29, 2007

09:00 – 12:00	**Session 3. Criteria for making decisions about the suitability of bears for release. Facilitators Curt Clumpner, Karina Agaronyan**
9:00	Suitability of rehabilitated Brown Bears for release, *Valentin Pazhetnov* and *Valentin Pazhetnov, Jr.*
9:20	Limitations for releasing of rehabilitated bears, *Djuro Huber*
9:40	Monitoring released Asiatic black bears, Sergey Pizuik
10:00	Work in groups, technique 1
11:00 – 11:30	*Coffee break*
11:30	Report of working groups
13:00 – 14:00	*Lunch*
14:00 – 19:00	**Session 4. Release and Post-release monitoring. Facilitators John Knight, Nikita Ovsyanikov**
14:00	Criteria for the Suitability of the Release Sites, Bears Optimum Habitat and Improving Post-release Survival Success, *Dave Jackson*
14:20	Post release monitoring - special methods and particularities, *Leonardo Bereczky*
14:40	Release strategies used by various bear rehabilitation programs, and monitoring results, *John Beecham*
15:00	Work in groups, technique 2
16:00 – 16:30	*Coffee break*
17:00	Reports of the working groups
19:00	*Dinner*

21:00	Lecture on behavior of black bears, cubs raised loose in the wild and Squirty, a cub that Ben raised and released and has followed for 12 years in the wild. *Benjamin Kilham*

Wednesday May 30, 2007

09:00 – 13:00	**Session 4. Public outreach and education to stop the bear hunt. Facilitators Victor Watkins, Kira Skripova**
9:00 & 9.25	Two separate presentations on brown bear, By *Elena Sitnikova* and *Peep Mannil*
9:30	Wolf rehabilitation in Northern Russia, *Vladimir Bologov*
9:45	Public education: encouraging people to change their ways to live with wildlife, *Angelika Langen*
10:00	Conservation threats and issues at stake in SE Asia, *Gabriella Fredriksson*
10:15	Bear Welfare Issues in Russia, *Mila Danilova*
10:30	Work in groups, technique 1
11:00 –11:30	*Coffee break*
11:30	Reports of the working groups
13:00 – 14:00	*Lunch*
14:30 – 19:00	**Wrap-up and evaluation. Reporters Ian Robinson, John Beecham, Sergey Pazhetnov**
16:00 – 16:30	*Coffee break*
19:00 – 22:00	*Outdoor Barbecue*

4. Summary of the proceedings

The workshop was held at the newly built interpretation and education centre of OBRP (Orphan Bear cub Rehabilitation Project). Though the official language of the workshop was English, there was a parallel simultaneous translation of all presentations and deliberations from English to Russian and vice versa.

The participants were divided into five working groups consisting of seven or eight persons in each group. Each working group had a facilitator and a reporter already identified. In order to facilitate discussion between Russian and English speakers within the working group, the organizers ensured that each working group had at least one person who can understand both Russian and English well.

The organizers managed to conduct the workshop without much ado in spite of the lack of basic amenities in Bubonitsy. Though there was no official trip arranged for the participants to see the OBRP facility, interested participants visited the facility in the mornings. The organizers might have avoided the tour to discourage visitors from thronging the facility where contact is being minimized with the bear cubs.

The workshop began with an opening session on the 28th and ended with a wrap-up and evaluation session on the 30th. In between there were five sessions dealing with the different stages of bear rehabilitation:

Session 1. Criteria for accepting orphan bear cubs into rehabilitation programs
Session 2. Care and Rehabilitation – Critical Components
Session 3. Criteria for making decisions about the suitability of bears for release
Session 4. Release and Post-release monitoring
Session 5. Public outreach and education to stop the bear hunt

Every session began with three to five presentations on the subject and ended with a group discussion and plenary. The viewpoints of different working groups were summarized and presented in the plenary towards the end of every session.

Since the participants were expected to speak only on the topic of the session, say cub selection criteria or post-release monitoring, most of the presentations began or ended abruptly. The presentations were

therefore not comprehensive on any particular rehab facility or project. This was unavoidable when the sessions are organized, rightly so, under the different components or stages of rehabilitation, namely acceptance of cubs, rehabilitation principles, suitability of release and post-release monitoring. Many of those who gave the presentations were later contacted in person and over email to elicit information on their entire rehabilitation protocol and the statistics of success and failures. These details have been summed up and presented in the next section on "Summary of all major bear rehabilitation projects".

At the end of the second day, all participants were requested to jot down on specified chart papers their comments on the following issues of bear rehabilitation:

(i) Species difference
(ii) Regional difference
(iii) Controversial issues
(iv) Things to avoid
(v) Best practices

On the third day, each working group was asked to collectively comment on the following questions.

1. Identify different welfare and conservation reasons for rehabilitation in different species and/or regions.
2. How effective is rehabilitation in addressing the welfare challenges of bears?
3. How does your rehab activity benefit bear conservation?
4. In what way would you like to change perceptions of bear rehabilitation with public, government and scientists?
5. In what way would you like to change policy, regulation and enforcement?

The working groups' comments on these issues and questions were collected, pasted on the chart paper and presented during the plenary. Participants agreed that there are regional and species differences, with rehabbers following divergent rehabilitation protocols for the same species, sometimes even when they come from the same region. But regional differences appeared to be more pronounced than species difference. These issues will become clear in section six where the different workshop sessions have been taken up for a detailed discussion. The most important point repeatedly mentioned under controversial issues is oft heard criticism that rehab is more of a welfare activity that an act of conservation requirement. There were suggestions from many quarters to link rehabilitation programs to a holistic conservation program with rehabilitation being a component of the same. Many of the working group members reasoned out that lack of proper post-release monitoring and the lack of sufficient scientific publications in peer reviewed journals on the rehabilitation successes and failures as one of the reasons for the indifference towards bear rehabilitation. As for as the issue of best rehab practices is concerned, everyone agreed that no one rehab method could be

considered the best and recommended for all because of regional and species differences. However, they all agreed that some general broad framework of guidelines could be formulated that would be binding on rehabilitators to follow irrespective of the species they deal with or the region they work in.

5. Summary of all major rehabilitation projects

More than 20 presentations were made during the three days of the workshop, but not all of them have been summed up here. Often there were more than one presentation on different aspects of the same rehab project (e.g. Orphan Bear cub Rehabilitation Project-OBRP, Russia), but these have not been presented in this section separately. Sometimes not a single presentation was made on certain rehab projects like the Aspen Valley Rehab Centre, Canada and Rehabilitation 'Outes' near Chabarovk, Far East Russia, even though the concerned project personnel were present at the workshop.

The project near Chabarovk, Russia is one of the four ongoing bear rehabilitation programs in Russia. Though three of them were represented during this workshop (the other two being OBRP, Bubonitsy, Tver Region and Centre for Rehabilitation of orphan bear cubs, Ussurisky Reserve, Far East Russia), the rehabilitation protocol followed at Chabarovk never got mentioned. Efforts have been made in this section to include the rehabilitation protocol followed in some of these rehabilitation facilities as well. Thus the salient features of the entire rehabilitation method have been summed up here, facility-wise and not necessarily presentation-wise.

5.1. Bear Rehabilitation in Europe

Though there were three presentations on bear rehabilitation in Europe, surprisingly only two of them actually dealt with any concrete rehabilitation project. These two were the Vier Pfoten International supported brown bear rehabilitation project in Romania and the IFAW supported orphan bear cub rehabilitation project in Northern Russia. The other presentation on brown bear in Croatia by Professor Djuro Huber of University of Zagreb was more on bear-human conflict. He requested all rehabilitators to focus their attention on solving the issue of problem bears instead of releasing more bears into such areas as it may prove to be counterproductive.

1. Bear rehabilitation in Hargita County, Romania


Ashraf NVK/WTI

Introduction

Supported by Vier Pfoten International, the brown bear rehabilitation project in Romania has everything that is required of a rehabilitation program. The rehab protocol is based on the sound understanding of the biology of the species and the local conditions prevailing in Romania.

The most important component missing in many rehabilitation projects, that is post-release monitoring, is an integral part of this rehab program. In many ways, the protocol followed here resembles the one that was earlier followed at CBRC, India.

1	Species	Brown bear (*Ursus arctos arctos*)
2	Name of the project	Orphan Bear Rehabilitation Center
3	Address	Harghita County-Romania, Hasmas Mountains, near the Hasmas - Cheile Bicatvlvi National Park,
4	Point person(s)	Leonardo Bereczky, Wildlife Management Engineer, Project Coordinator.
5	Staff strength	5
6	Project began in the year	2004
7	Bears handled per year	About 7
8	Rehabilitation method	Released at the age of two years coinciding with the time when the cubs leave the mother in the wild. *Ex-situ* acclimatization during the rehab period in captivity by moving the bears to bigger enclosures every time. The bears are sometimes taken out of the enclosure for habituation outside the enclosure, but all *ex-situ*. They follow the rehabilitator. The release depends basically on the development (physical and behavioral) of the bear cub. Accordingly, sometimes the bears are released before they reach two years age, i.e. before the second hibernation, though this is not a rule. No instances of homing have been recorded because brown bears establish a home range after they are two years of age. Moreover, brown bears basically are not territorial animals. They have flexible home ranges as a function of food availability. They also have to come together each year for mating, hibernation and for fishing in areas where salmons ascend streams for spawning. The state of a 1 ½ to 2 two year old bear, whether released or not, is similar to that of wild bears of the same age group. Earlier technique of releasing them at 7 months of age resulted in predation by lynx, wolf and other bears.
9	Age of release	About 2 years. The corner stone is the second hibernation. The bear can be released before or after the second hibernation, but around this.
10	Release type	Hard release
11	Bears released so far	10
12	Post-release monitoring	VHF collars are tracked using a powered hand-glider since the terrain is a difficult one.
13	Number survived for 4-6 months after release	Even when released at the age of two, one got killed by predators after 45 days of its release.
14	Notes	Sponsored by Vier Pfoten International

2. Bear rehabilitation in Hargita County, Romania

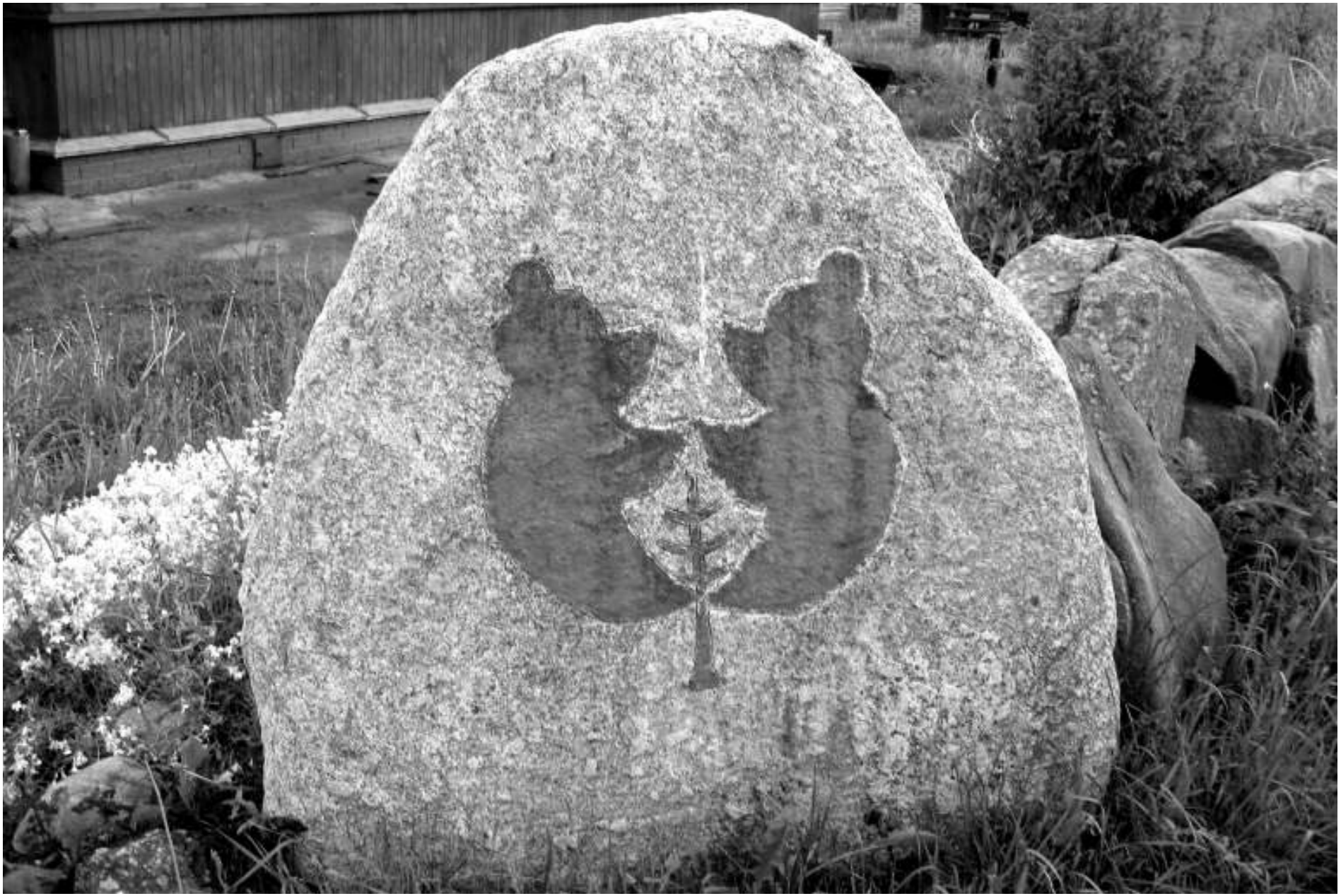

Ashraf NVKWTI

Introduction

There were three presentations from OBRP, Bubonitsy, Tver Region: the first on the criteria of accepting bear cubs, the second one on the critical components on bear rehabilitation and the last one on suitability of cubs for release. The presentations were made by Valentin Pazhetnov, Sergey Pazhetnov and Valentin Pazhetnov - Jr.

Supported by IFAW, the OBRP is one of the well known bear rehabilitation projects in the world. The program is run by the family of Pazhetnovs, who seem to be the only occupants of Bubonitsy village.

2	Name of the project	Orphan Bear cub Rehabilitation Project
3	Address	Bubonitsy, Tver Region, North-Western Russia
4	Point person(s)	Valentin Pazhetnov & Sergey Pazhetnov
5	Project began in the year....	1982
6	Bears handled per year	8-12 (this year 13)
7	Staff strength	Pazhetnov and family. Three (primary), One (volunteer)
8	Rehabilitation method 	The Pazhetnovs stick to one of the most hands-off approaches followed in bear rehabilitation. The only time of any noteworthy contact between handlers and cubs is during the hand-raising period. The cubs are bottle fed when very young but quickly moved to a forest pen at the age of three months. They begin taking milk and porridge from bowls at this age. The cubs are left on their own in a large pre-release orientation yard which has two wooden huts. They are released before winter, giving them few months time to prepare themselves for hibernation. The caretaker wearing the special uniform enters this yard only to feed them, twice a day. By the time the cubs are five moths of age, they are fed only once a day (Pazhetnov and Pazhetnov, 2005).
9	Release type	Mostly hard release. Till December 2004, nearly one third of every release has been soft release. Soft release happens at the rehabilitation site itself.
10	Release age	Released at the age of 7 or 8 months.
11	Number of bears released so far	111 out of 144 admitted. (21 died in care. 5 were handed over to lifetime care)
12	Post-release monitoring	Ten of 111 released animals were radio-collared. Rest were only plastic tagged. The radio-collared animals could be monitored only for 3 months or so, as they could not get the signals consistently. They all survived this period of radio-tracking. Survival data in the remaining cases obtained largely based on feedback obtained from public. In this way, reports of 32 of these 111 released animals could be ascertained.
13	Number survived for at least 4-6 months after release	According to Valentin Pazhetnov, about 30% of the cubs fail to make it to adulthood in the wild. Therefore it is acceptable if 30% of the released bears fail to establish in the wild.
14	Notes	The OBRP, supported by IFAW, is one of the well known bear rehabilitation centres in the world. Though the project officially began in 1982, there were a few attempts to release the bears in the mid seventies.

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OBRP at Bubonitsy

The Pazhetnovs' follow a strict regime of 'bare minimum contact' with the bears. Once the cubs are hand-raised, they are quickly moved on to a concentrate diet (porridge). The bear cubs are housed in a large pre-release orientation yard (> 5,000 square meters) having a chainlink fence reinforced with four lines of live wires as the barrier. The entire length along the entry side has been screened by netting to minimize visual contact with caretakers. The facility, located about 500 meters away from Valentin Pazhetnov's residence, in many ways resembles the pre-release orientation yard at CBRC in Seijosa, Arunachal Pradesh, India. The only difference being the near absence of human settlements in Bubonitsy. Bubonitsy is a small village with very few human settlements.

At the time of inspection in June 2007, the pre-release area had 13 cubs, between three to five months of age. Seven of them were females and six were males. They were fed twice a day with ad-libitum concentrate mix (porridge made of milk, cereal, sweetener and additives). It is obvious that the cubs were weaned off milk at an early stage.

The cubs were being looked after by Daniel, a volunteer from UK, under the supervision of Valentin Pazhetnov. Two more volunteers have reportedly joined the rehab program this year.

According to Valentin Pazhetnove, the cubs will be released in July-August within 100 square kilometer range of Tver Region. In the past, many bear cubs were soft released by letting the bears go out of the orientation area.

5.2. Bear rehabilitation in North America

Two species of bears namely the American black bear (*Ursus americanus*) and the brown bear (*Ursus arctos*) inhabit the North American continent. North America perhaps has the maximum number of bear rehabilitation projects than any part of the world. There were three major presentations from this region, and all of them were on the American black bear. This species appears to be the most commonly rehabilitated bear in the world. The largest number of publications on bear rehabilitation, translocation and reintroduction has been on the American black bear.

3. Survival of rehabilitated black bears in Ontario, Canada

Introduction

John Beecham, well known as a biologist in the field of bear rehabilitation, was one of the key resource persons for the workshop. He was the author of the recently published monograph on the guidelines for rehabilitation and release of orphan bear cubs. Beecham had to give this presentation in the absence of the primary investigator Joe Hamr who could not attend the workshop.

Joe Hamr, during his two year research project, monitored the movements, denning behavior and survival of 60 orphaned American black bear cubs released in Ontario.

1	Species	American black bear (*Ursus americanus*)
2	Name of the project	Survival and Behavior of Orphaned and Rehabilitated Black bears in Central Ontario, Canada
3	Address	Ontario, Canada
4	Project person – Name(s)	Dr. Joseph Hamr (jxhamr@cambrianc.on.ca)
5	Total staff strength	Primary: Dr. Hamr Support: Matthew Binks, graduate student
6	Project began in the year....	2002 - 2004
7	No of Bears handled per year	60 orphaned cubs collared and released as yearlings; 12 wild yearlings also collared as control group to compare survival rates.
8	Rehabilitation method	All cubs were collared and released in May or July 2002
9	Release type	Hard release
10	Age at release	Yearlings (approximately 17–19 mos. of age)
11	Number of bears released so far	60 orphaned cubs (20 each from 3 different facilities)
12	Post-release monitoring	Radio-collared and released bears raised with bare minimum contact, limited contact and unlimited contact. The study found no significant difference in the survival of bears after release.
13	Number survived for at least 4-6 months after release	In 2002-2003, three bears were shot as nuisance bears; six shot during fall hunting season; total number of bears shot due to nuisance in 2002-2004 - five; 10 shot in hunting seasons; four road killed; 1 killed by predator
14	Notes	The project is supported by the World Society for the Protection of Animals (WSPA).

4. Kilham rehabilitation center, NH, USA

Introduction

Ben's presentation was not scheduled under any of the designated sessions. It was scheduled for the evening after dinner since it was comprehensive and included some video clippings as well. Ben and his associate "walked the bears" in the forest, but unlike the methods followed in Borneo and India, he continued to associate with some of his bears even after they became independent; the reason being for studying their behavioral development.

Ben's presentation showed the amazing range of options available to the rehabilitator to observe bear behaviour at close quarters while taking the bears for daily walks in the forest.

1	Species	American black bear (*Ursus americanus*)
2	Name of the project	Kilham Black Bear Rehabilitation Center
3	Address	Ben Kilham, 172 Grafton Turnpike, Lyme, NH 03768 New Hampshire, USA
4	Point person(s)	Benjamin KILHAM, *Director*
5	Staff strength	Kilham family. Husband, wife and sister
6	Project began in the year...	1992
7	Bears handled per year	3-4
8	Rehabilitation method	Bear cubs are classified based on their condition and experience with mother outside the den. Soft release by walking, in case of bear cubs with little experience of mother outside den. Hard release (sometimes walked *ex-situ*) in the case of bears admitted at 5-9 months of age. Rehab methods of the bears surviving 8 years or more

Bear	**Sex**	**Admin age**	**Rehab method**	**Age of release**
LG2	F	11 months	Cage raised	
(No further contact. Trapped and telemetry collar age 6)				
SQ	F	7 weeks	Kilham * (walked)	
(18 mos. 9 documented life, close contact)				
Cls.	F	7 weeks	Kilham (walked)	18 mos.
(No further contact, trapped & telemetry collar age 9. Sister of SQ)				
Ted	M	5 mos.	Kilham (walked)	12 mos
(No further contact)				

* As described in "Among the Bears" by Kilham and Gray 2002, H Holt, NY.
All of these bears have more than 15 human residences in their home range.

9	Release type	Soft and hard release.
10	Age at release	In hard release: at least 11 months In soft release: Supplemental food till 11 months if food is not available.
11	Number of bears released so far	52

12	Post-release monitoring 	They have released 40 cubs from the facility and four have died before release. Of these 22 have been released with tags or telemetry collars. All the four of the longest living bears have been tracked with telemetry and sighting reports; eight other cubs have worn telemetry collars until the time of their deaths. • One female killed at age 6 had one set of 2 cubs ,1 male and 1 female. • One female killed at age 9 had three sets of cubs, totaling 7 cubs. • One female age 10 still alive, had four sets of cubs. • One female age 10 still alive, had five sets of cubs total 11; 1 male and 8 female, 2 unknown at this time . One of her offspring age 7 has had two sets of cubs totaling 5: all female.
13	Number survived for at least 4-6 months after release	1) Six bears unreported (possibly still out there). 2) Five survived three months after release. All killed in hunting season. 3) Two survived 3-6 months after release. All killed in hunting season. 4) Two survived 6-12 months after release. All killed in hunting season. 5) Three survived 1-4 years after release. One shot at bird feeder. The rest killed in hunting season. 6) Four survived 8 years after release. Three of those still alive. One killed in hunting season. None of these animals had to be destroyed or removed from the wild with in a year of their release.
14	Notes	Ben, during his presentation, mentioned how bears use vomero-nasal organ to identify palatable species of plants and how moose droppings are eaten by bear cubs to inoculate their gut with bacteria for digesting cellulose.

5. Northern lights rehabilitation center, BC, Canada

Introduction

Angelika's presentation was on the care and rehabilitation of American black bears (*Ursus americanus*) at Northern Lights Rehabilitation Centre in Canada. It was one of the three major presentations on American black bear. The presentation's focus was largely on the husbandry practices being followed at the centre.

Angelika has been involved with bear rehab for nearly 20 years and it is only befitting that the centre has recently been honoured with the license for rehabilitating Grizzlies (*Ursus arctos*) as well.

1	Species	American black bear (*Ursus americanus americanus*) (now also licensed for Grizzly *Ursus arctos horribilis*)
2	Name of the project	Northern Lights Rehabilitation Society
3	Address	17366 Telkwa High Rd, Smithers, VOJ 2N7 British Columbia, Canada
4	Point person(s)	Angelika Langen, Owner/Operator
5	Staff strength	Two (Angelika and her husband)
6	Project began in the year	1990
7	Bears handled per year	10-15. Orphaned for many reasons. All cubs are born between Jan-Feb months.
8	Rehabilitation method 	The bears are nursed and cared at the centre till they are fattened enough for release. The enclosures are furnished with behavioural enrichment devices to keep the bears occupied. The bears are not acclimatized to living in natural forested environment before release. No natural food collected from the forest is apparently given. The cubs are received anywhere from January to the following year in March and released in May & June. Cubs that attain sufficient weight before denning season will hibernate. Those received later and undernourished are fed through the winter.
9	Release type	Hard release
10	Age at release	17 – 18 month of age
11	Number of bears released so far	Received 122, released 107, 14 died, 1 is currently under care
12	Post-release monitoring	All released cubs have been earmarked and tattooed. Lack of funds the main reason why radio-collars are not used. Information on post-release survival is obtained through informal sightings and hunting records.
13	Number survived for 4-6 months after release	Six
14	Notes	None of the released cubs have become nuisance bears.

5.3. Bear rehabilitation in Asia

Only the American black bear and spectacled bear do not have their distribution range in Asia. Of the six species that inhabit the Asian continent, only the sloth bear and giant panda did not figure in the presentations on rehabilitation. Asiatic black bear was the most commonly dealt species, with ongoing rehabilitation programs for the purpose of reintroduction and restocking in Russia, India, Thailand and South Korea. There was one presentation on sun bear rehabilitation in Indonesia.

6. Bear rehabilitation in Ussuri Reserve, Far East Russia

Introduction

Kira Skirpova works as the Senior Researcher at the Russian Academy of Sciences in the Russian Far East. She spoke on the criteria for accepting Asiatic Black Bear cubs for rehabilitation in Ussurisky Nature Reserve. The bear release centre in Ussurisky is one of the four bear rehabilitation projects in Russia.

The Asiatic black bear recovery program in South Korea receives bears for their augmentation program from Ussurisky bear rehabilitation project.

1	Species	Asiatic Black Bear (*Ursus thibetanus ussuricus*)
2	Name of the project	Rehabilitations Centre for orphaned bear cubs in the Ussuri Nature Reserve
3	Address	Ussuri Nature Reserve of Far East Branch Russian Academy of Sciences. 1, Nekrasova Str., Ussuriisk, Primorski Kr., Russia, 692519 Russian Federation
4	Point person(s)	Kira Skripova
5	Staff strength	Direct: 2, Indirect: 1
6	Project began in the year....	1999
7	Bears handled per year	About 8 (11 bears in 2007). Data about bear cubs accepted in 2007

No of bears	Sex	Age on arrival to the Centre	Basic results by the now
11	5 • ♀ 6 • ♂	1.5 – 4.5 months	1 • ♀ killed by a tiger at the age of 5.5 months 3 • ♂ killed by an adult black bear when 4.5 months

8	Rehabilitation method	The rehab technique involves raising bear cubs independent of people. The growing cub should have the fear of its potential enemies, namely people, pets, predators and should be capable of finding food and shelter on its own. Rehab is done in two phases: Hospital and House-den. The cubs are held at the hospital until they are 4 4½ months where they are looked after by two caretakers. The cubs are then ear tagged and radio-collared before they are moved to the House den. They are radio-tracked thereafter.

9	Release type	Hard/Soft release. Release at the end of summer or the beginning of fall in groups of 2-3 individuals. When released at 4-5 months, supplementary feeding is done till 9 months after release. Bear cubs are capable of finding a den independently. Sometimes hibernating cubs are moved to natural dens in early spring, but only when summer or fall release is not possible. Yearling cubs are hard released without supplementary feeding.
10	Release age	7-8 months of age or when they are 12 to 15 months old
11	Number of bears released so far	30 from 1999 to 2005.

Year	No of bears	Sex ♀	Age on arrival	Successful fostering	Unsuccessful cases ♀
1999	6	5♂, 1♀	2 - 4 months	5	1• transferred to the park
2001	1	1• ♀	2,5 months	1	- ♂
2002	10	6♂, 4• ♀	2 - 3 months	8	1♀ died of trauma; 1 • killed by tiger at the age of 1.5 years
2003	3	1♂, 2♀	2 months	2	1• killed by a tiger at 7 months age
2004	7	4♂, 3♀	2 - 2,5 months	7	- ♂
2005	9	5♂, 4• ♀	2-2,5 months	7	1 •-died from bronchopneumonia; 1• killed by a tiger 8 months age
Total	36	22♂, 14•		30	6

12	Post-release monitoring	Radio-tracking. In radiotracking three types of equipments were used: - gauge-indicator (Chemical indicator), produced by Tyvek ® ouch with STERRAD®, - collar (Telonics, Mesa, Arizona); - ear tags ATS M 3610 (USA). Bears are also tagged. Out of 47 individuals rehabbed at the Center, 42 have been ear tagged (24♀•; 18♂•), 33 have been radio-tracked using one of these equipments.
13	Number survived for 4-6 months after release	-
14	Notes	

7. Wildlife Rehabilitation "Outes', Khabarovsk, Far East Russia

Introduction

Edward Kruglov was scheduled to make an informal presentation on his bear rehabilitation project, but could not do so due to other commitments. This project from Russian Far East happened to be the only facility dealing with two species of bears, namely the Asiatic black bear and brown bear. The information presented here is following a detailed discussion with him on the rehab method followed there. The project has released more number of bears than the Pazhetnovs' facility in Bubonitsy. They follow different release protocols for Asiatic black bear and brown bear.

1	Species	Asiatic black bear (*Ursus thibetanus ussuricus*)
2	Name of the project	Khabarovsk Regional Fund for Biodiversity Conservation and Wildlife Rehabilitation "Outes"
3	Address	150 km from Khabarovsk. Sikato Ali mountains, Far East Russia
4	Point person(s)	Edward Kruglov
5	Staff strength	Primary: 2, Indirect support from 15
6	Project began in the year....	1995
7	Bears handled per year	10 (average)
8	Rehabilitation method	80% of the bears handled are black bears, the rest brown bears (*Ursus arctos lasiotus*). Contrasting techniques followed for rehabilitating brown and Asiatic black bears. The difference is at the age at release. While brown bears are released when young very much like the way Pazhetnovs' do, Asiatic black bears are released when they are 1½ years of age. According to Kruglov, the release age of black bears coincide with the age when bear cubs leave their mother in the wild. Strangely, however, the same reasoning is not applied to the brown bear. The release site is often at least 60 km from the centre.
9	Release type	Hard release
10	Release age	About 18 months for Asiatic black bears and 7-8 months for brown bears
11	Number of bears released so far	128 (only 5 handed over to the zoo for lifetime care so far)
12	Post-release monitoring	No radio-collaring done so far. Tiger and wolf are native to the release site.
13	Number survived for 4-6 months after release	Not known. But twice they had to retrieve bears creating problem in villages.
14	Notes	

8. Sun bear rehabilitation in Borneo, Indonesia

Introduction

Gabriella Fredriksson is a conservation biologist, studying the ecology of sun bear in Indonesia. The 'walk the bear' program initiated by WTI in Arunachal Pradesh is based on her success with rehabilitation of sun bears in Borneo. Gabriella made two presentations, the first one about rehabilitation of sun bear cubs and second one on the conservation threats and issues at stake in Indonesia. Gabriella had earlier published her sun bear rehab experiences in the monograph on the rehabilitation and release of bears, published in 2005 by the Köln Zoological Garden, Germany.

1	Species	Sun bear (*Helarctos malayanus*)
2	Name of the project	Sun bear conservation project
3	Address	PANECO-YEL-SOCP, P.O. Box 270, Balikpapan 76110, Kalimantan Timur, , Indonesia
4	Point person(s)	*Gabriella Fredriksson, Conservation Biologist*
5	Staff strength	Primary: 4, Supportive: 2
6	Project began in the year	1997
7	Bears handled per year	Five in 1997 and three in 1998.
8	Rehabilitation method 	The Indonesian authorities have been releasing confiscated bears into protected forests of Borneo. Five such bears were radio-tracked to determine their fate after release. Since none of these bears established themselves in the forest, a different approach was followed while dealing with the next three bears. This time a gradual approach that would facilitate the integration of the bears to the forests was followed. The bears were walked through the forest during the day and kept in a cage at night, where they received additional food supplies. The cubs after a period of time (about 6 months) refused to enter the cage anymore. They were equipped with radio-collars that time. The frequency of these bears coming to the cage for supplementary food also came down. A total of four people walked the bears during this period.
9	Release type	Hard release (first five), assisted soft release (the last three).
10	Release age	First five bears released: 2 2½ to 5 years. Last three: 3-7 months when arrived and 1-1½ years when 'released'
11	Number of bears released so far	Eight. The first five were experimental and the last three was part of the sun bear research program.
12	Post-release monitoring	The first five were radio-implanted and the last three radio-collared. Low frequency (30 MHz) radio transmitters were implanted but this turned to be a poor choice due to its restricted range (less than 300 meters). One month after release, three were found dead, killed by people living in fringe areas. The fourth was caught in a village after three weeks. The last one could not be traced. However, two of the three bears released subsequently using a soft release program survived for more than two years. The third one, a male, was brought back to captivity when he was seen following strangers as well. When released later, he was killed by illegal loggers.
13	Number survived for 4-6 months after release	All the three soft-released bears and none of the first five hard-released bears.
14	Notes	Gabriella attributes the following reasons for the last three bears to have fared better than the first five released bears (Fredriksson, 2005): 1. Longer acclimatization period 2. Less overall time in captivity 3. Younger age at release 4. Integrating into an established research project

9. Centre for Bear Rehabilitation & Conservation, Arunachal Pradesh, India

Introduction

Ashraf's presentation was on the soft-release technique employed to rehabilitate Asiatic black bears in India. He considered a soft release program with gradual in-situ acclimatization as the right approach to develop and perfect the survival skills of hand-raised cubs.

The bear rehab centre was established by the Wildlife Trust of India (WTI) and IFAW to rehabilitate Asiatic black bear cubs in Arunachal Pradesh, India. It is located in a tropical forest environment dominated by semi-evergreen forests.

1	Species	Asiatic black bear (*Ursus thibetanus thibetanus*)
2	Name of the project	Centre for Bear Rehabilitation & Conservation (CBRC)
3	Address	Pakke Tiger Reserve, Seijosa, Arunachal Pradesh, India
4	Point person(s)	Tamo Dadda: Asst. Field Officer NVK Ashraf: Principal Investigator
7	Staff strength	1 officer, 3 caretakers, 1 driver.
5	Project began in the year	2002
6	Bears handled per year	2 to 5 (15 bears admitted so far)
8	Rehabilitation method  Tamo Dadda/WTI	The project began with a rehab technique that would facilitate a relatively hands-off approach. The bears, received at the age of about six months, would spend two years in captivity in large enclosures that would allow them to have some access to natural forests and food collected from the forests. Bears were then taken to the chosen release sites and hard-released. Following their failure to establish in the wild, the rehab protocol was changed and a soft-release method of gradual acclimatization at the release site was followed. Two bear cubs (a male and female) were moved to the release site and taken for daily walks to a designated 'rehab' area by a rehabilitator. The bears were initially confined to an enclosure in the evenings, and later left on their own to sleep on trees outside. They were radio-collared this time. By the time they were a year old, the rehabilitator would 'drop' them in the 'rehab' area and collect them in the evening. Sooner, the bears would walk without the company of the rehabilitator and return to the point area on their own. The number of days they come back to the point area has been decreasing steadily.
9	Release type	Three hard releases, two soft releases.
10	Release age	2-3 years while hard-released and yearlings (1 year 3 months) when soft released by walking.
11	Number of bears released so far	Five. The first three were hard-released, two at a distance of 14 km from rehab site and the other more than 50 km from rehab site. All were females. The last two bears, a male and a female, were soft-released after four to five months of habituation at the release site.
12	Post-release monitoring  Tamo Dadda/WTI	All the five bears were radio-tracked using VHF collars. Tracking the first two bears in a hilly terrain proved to be a difficult exercise as the bears kept moving long distances after release. All the three bears hard-released failed to establish in the wild; they were killed either by people or by a predator. The two bear cubs soft-released subsequently have not only managed to avoid predation but also established site fidelity to the designated area which may or may not become part of their home range.
13	Number survived for at least 4-6 months after release	Two out of five.
14	Notes	It remains to be seen how the two bears respond to strangers and rehabilitator when approached at a later stage. Recent update from the field indicate that while the female moves away when approached, the male actually chased the rehabilitator when he tried to approach him after 25 days of absence in the field.

10. Other bear reintroduction and restocking programs in Asia

Introduction

Asiatic black bear recovery project in South Korea: The Asiatic black bear numbers in South Korea has been estimated to have come down to a record low of 5 to 20 individuals (Park, 2001). The government of South Korea with the help of conservationists is now attempting to recover their numbers by augmenting the population with bears rescued at the rehabilitation project Ussuri Nature Reserve, Far East Russia. Chief veterinarian Dong Hyuk Jung and Team Leader Lee Bae Keun from the Species Restoration Centre in South Korea participated in the workshop. In 2004 - 2005, 12 bear cubs have been transferred to Jirisan National Park for reintroduction in the Republic of Korea (Kira Skripova, *pers.com.*).

Introduction

Thailand awaits the return of Asiatic black bear: Asiatic black bears are scheduled to return to the forests of Thailand after they became locally extinct. The Renfrew Thai Society for the Conservation of Wild Animals (TSCWA) has taken up this landmark project of re-establishing a new Asiatic black bear population. According to Andrew Criswell, the society's Director of Research, the project aims to reintroduce bears that are in captivity in different facilities in Thailand. Since they are adults, the challenge lies in relocating them gradually from their present captive environment to the wild.

5.4. Bear rehabilitation in South America

South America is home to only one species of bear, the spectacled bear (*Tremarctos ornatus*). Like in India and Indonesia, scientific bear rehabilitation is a recent development in the Latin American countries. Rehabilitation of spectacled bears has been reported from at least two countries, Peru (Peyton and Plenge, 2005) and Ecuador. There was one participant from Ecuador whose contribution proved to be immensely useful while comparing with the techniques WTI followed for rehabilitating Asiatic black bears in a similar tropical environment.

11. Andean Bear Project, Ecuador

Introduction

Dave Jackson spoke on the criteria for choosing the release sites for Andean spectacled bear in Ecuador. He considered site selection as one of the most important factors that determines the success of released bears.

Though spectacled bears inhabit the mountainous parts of South America, they do not hibernate as food is available throughout the year. When young, they have to deal with predators like Jaguars. In many ways, the situation is similar to that of Asiatic black bears in India.

2	Name of the project	Andean Bear Project (ABP)
3	Address	Fundación Espíritu del Bosque , Yanahurco Reserve, Intag region, Imbabura province, Ecuador
4	Point person(s)	Armando Castellanos, Head biologist. Dave Jackson, Project coordinator. Leonardo Arias, Project vet. Alberto Tabango & Gustavo Tapia, Field Assts.
5	Staff strength	Primary: 3 Support: 2
6	Project began in the year	1995
7	Bears handled per year	< 10
8	Rehabilitation method  	All the bears are acclimatized to natural forests *ex-situ* in large enclosures. The release site chosen was remote (90 km from the Quito centre) and had only one house in the vicinity. A pre-release acclimatization enclosure exists here. The enclosure they were in was 3/4 of an acre. The male escaped and had to be housed in a 15x15 m cage for six months. The bears while in captivity were provided food from the wild (Bromeliads, palm hearts, bamboo shoots, berries, wild figs, avocado, worms and insects). In the rehabilitation phase, the amount of unnatural food decreased proportionally as the amount of natural food increased.
9	Release type	Hard. Though the bears were kept in an enclosure for few weeks at the release site, Dave still considers it hard release.
10	Age at release	Hard-released at the age of about two years (1½ to 3 years).
11	Number of bears released so far	Eight in total. Three releases in the last two years have been systematically done. Two of these bears have been successfully rehabilitated.
12	Post-release monitoring  	All bears radio-collared (VHF) and tracked using light aircraft since terrain is hilly and rugged. One has so far lived 20 months and raised one cub. The other one a male has survived 11 months so far. The bears were released at the same site, but moved away in different directions and occupied different areas. The female moved 5-7 km and the male 20 km from the release site. The third bear, also a male, returned to the house near the acclimatization enclosure and was foraging for garbage and becoming a nuisance with no fear of humans. For his own well-being he was returned to captivity.
13	Number survived for at least 4-6 months after release	In the past 2 years, two out of three bears have survived for at least 4-6 months.
14	Notes	Like CBRC in India, ABP also had some problems with old releases (1995-98) when all their five released bears ended up in villages. They were 2-3 years of age at release. The reason for failure is attributed to the poor choice of release site (many settlements) and parasitism. The rehabilitation method followed here in every detail resembles closely to the rehab and release method once followed at CBRC, India for the release of the first three bears. i.e. similar staff composition, *ex-situ* acclimatization before hard release, habituation to food items collected from the wild, and post-release monitoring after radio-collaring.

6. Discussion on the sessions

6.1. Criteria for accepting bears

The first technical session was on the criteria for accepting bear cubs for rehabilitation. The three presentations in this session were on the Asiatic black bear by Kira Skripova, European brown bear by Valentin Pazhetnov and on the polar bear by Alison Hood. The presentations were followed by a detailed discussion on the subject by different working groups

Most of the rehabilitators received bears when young, especially during the suckling stage. In countries where hunting is legalized and restricted to a particular season, bear cubs of roughly equal age are admitted to rehab centres. The cubs at OBRP in Russia are typically less than 2-3 months of age upon arrival. Therefore incidents of habituated cubs ending up in rehabilitation centres of US, Russia, Canada and European countries is rare. It is only in the tropics where illegal hunting takes place throughout the year that older cubs are confiscated from people for rehabilitation. The three sun bear cubs chosen for rehabilitation in Borneo were three to seven months of age when brought in (Fredriksson, 2005). To cite another example, nine of the 15 Asiatic black bear cubs received at the Centre for Bear Rehabilitation and Conservation (CBRC) in Arunachal Pradesh, India were five to nine months of age on arrival.

Rehabilitators, who plan to hard-release bears when young, need to receive cubs that are not imprinted or habituated to people to any degree. When their objective is to release bear cubs at seven or eight months of age, they have only three to five months time left to work with them. On the contrary, gradual release programs and projects that release bears when they are above 1½ years of age, can afford to receive slightly older cubs as there is more than a year at hand to rectify evidence of imprinting or habituation to people.

The age of arrival of bear cubs also has an effect on the type of rehabilitation and release methods being followed. Ben Kilham classified American black bear cubs based on their condition and prior experience of living with their mothers outside the den (Kilham, *pers.com.*). Bears admitted to the facility at the age of 5-9 months were hard-released (as they would have learnt the survival skills while being with the mother), while cubs with little or no experience of mother outside the den were soft released after habituating them to the release site by walking them. On the other hand, confiscated bear cubs of 5-9 months of age cannot be considered for hard-release as they would have become behaviorally disadvantaged to try any rehabilitation method.

Asiatic black-bear cubs Seppa and Seppi in the hands of Nath, CBRC India (left) and spectacled-bear cubs Leonardo and Gabrielle in the hands of Armando at Andean Bear Project, Ecuador.

6.2. Care and rehabilitation: Critical components

This session was devoted to presentations on the rehabilitation methods, especially hand-raising, feeding, housing, behavioral enrichment and teaching survival skills. There were four presentations in this important session, one each on European brown bear, Asiatic black bear, American black bear and Malayan sun bear. Sergey Pazhetnov, NVK Ashraf, Angelika Langen and Gabriella Fredriksson spoke on these species.

6.2.1. Hand-raising bear cubs

All rehabilitators agreed that some level of imprinting does take place when bears are constantly nursed during the milk dependent stage. Those who intend to release the bears when young (at the age of 7-8 months) prefer to wean the cubs early so that they will have at least three to four months time to free them from any level of imprinting developed while hand-raising. At the Idaho black bear rehab, Inc., American black bear cubs are known to wean themselves between five and six months of age (Maughan, 2004). At CBRC, India, Asiatic black bears are bottle-fed for up to five months, oftentimes without subjecting them to bowl-feeding with the milk formula. They are straightaway moved to a milk based concentrate feed. At OBRP, Russia, brown bear cubs are moved to the free-ranging rehab facility as soon as they learn to take milk from feeding bowls.

There was some discussion on paw-sucking behaviour observed in bear cubs of all species. John Beecham, who has done some research on this subject, informed that bear cubs in the wild suckle for a long period of time. In captivity, however, they receive the required quantity of milk in quick time, and therefore resort to paw-sucking and ear-sucking (of other bear cubs) as a means to satisfy their behavioral need. Paw-sucking appear to be more pronounced in bear cubs that are quickly moved over to bowl feeding (*pers. obs.* in sloth bear cubs). Though paw sucking and ear sucking are not considered a vice or stereotypy, Beecham (2006) recommends the use of nipples with smaller openings while bottle-feeding the bears. This would decrease the flow of milk which in turn increases the suckling time to meet their behavioural needs.

There was not much discussion on the choice of milk formula for bears. Bears are generally hardy species and are quite adaptable to commercially available

Ashraf NVK/WTI

Asiatic black bear cub at CBRC, Arunachal Pradesh

Brown bear cubs bowl-fed at OBRP, Russia (left), Asiatic bear cubs bottle-fed at CBRC, India (right).

human milk formulas or even cow milk. However, survival of neonates is not the only criteria to judge the suitability of milk formula. Oftedal (1980), who classified mammalian milk into six categories based on percentage dry matter composition of protein, fat and sugar, placed bear milk in the category of milk with very high dry matter content (Table below). Bear milk is low in sugar but high in fat and protein. Surely the composition of commercially available baby milk formulas and cow's milk differ considerably from bear milk composition. It is therefore essential for bear rehabilitation centres to prepare the appropriate milk formulas for hand-raising bear cubs.

Table: Oftedol's classification of mammals based on the milk composition

Milk Category	Mammalian families	Dry matter %	Composition of Dry Matter		
			Fat %	Protein %	Sugar %
I	Equines, Rhinos	LOW (8-12)	Very Low (12-15)	Low (15-20)	Very High (60-75)
II	Primates (man)	Medium (12-16)	Medium (25-35)		High (50-60)
III	Elephants, Cloven footed (except deer)	Medium (12-23)	Medium (12-23)	Medium (30-45)	Medium (20-37)
IV	Rodents, Deer, Carnivores (Fissip)	High (18-31)	Med/High (32-50)	High (28-42)	Low (10-25)
V	Hares, Bears, Beaver	Very High (30-40)	High (40-50)	High (25-45)	Very Low (5-10)
VI	Seals, Sea lions	Extreme (50-65)	Very High (70-80)	Low (10-20)	Negligible (0-2)

Post-weaning diet of concentrates for spectacled bear at ABP, Ecuador (left) and for brown bear at OBRP, Russia (right).

6.2.2. Feeding bears after weaning

The most common diet given at the time of weaning is the standard porridge comprising a cereal mix cooked in milk and little bit of sugar. Fruits and vegetables are also given to bears, especially in rehab facilities that retain bears until they are 1½ to 2½ years of age. Hardly any centre resorted to feeding animals with fruits and nuts collected from the wild. Few rehab projects provided their bears access to natural forest by housing them in large free-ranging enclosures specially designed to provide the bears some foraging opportunities. In tropical forests like in India and Ecuador where fruiting season is extended over most of the year, the bears were fed with fruits, tubers, twigs and leaves collected from the forest. In Ecuador, for instance, spectacled bears were specifically fed with bromeliads, palm hearts, bamboo shoots, berries, wild figs, avocado, worms and insects collected from the forests. (Dave Jackson, ABP, *pers.com.*). In a soft release program like "walking the bear", bear cubs get unlimited opportunity to explore the wilderness and learn foraging skill from the time they are 3 to 5 months of age.

One of the most crucial issues discussed during the workshop was about avoiding personnel contact with bears while the caretaker enters to feed the bears. However, this does not appear to be a major problem as long as the caretakers are restricted to one or two personnel. At OBRP in Russia, the caretaker wears the standard uniform and enters the free ranging yard to feed the bears. Often, the bears are unaware of the personnel's entry as they are either deep inside the large enclosure or sleeping inside the wood houses. The feeding troughs are simple corrugated asbestos sheets placed on the ground.

In a soft release program like "walking the bear", bear cubs get unlimited opportunity to explore the wilderness and learn foraging skill from the time they are 3 to 5 months of age.

6.2.3. Behavioural enrichment

Since bears are intelligent animals that need complex environments to satisfy their diverse behavioral requirements, prolonged captivity can lead to the development of stereotypy. As reintroduction or augmentation programs using captive-reared animals are perceived to be less successful than those involving wild-reared conspecifics, any undesirable behavioral persistence in captive bears will be considered the reason for such failures. In the wild, where behaviour must be adaptive and flexible to meet fluctuating conditions, such behavioural deficiencies could help account for reduced survivorship of reintroduced subjects (Vickery and Mason, 2003).

Behavioral enrichment is critical in rehabilitation facilities that hold the bears in enclosures for more than a year before release. This is more so in rehab facilities located in urban environments, where bears have limited or no access to large enclosures built in the natural habitats. The Idaho black bear rehab facility in the US and the Northern Lights Rehabilitation Centre in Canada are good examples for this. The question of behavioural enrichment

Behavioral enrichment artifacts are part of rehab centres located in cities (left). No artifacts are needed when large enclosures are built in natural habitats (centre) and when bears are walked in the forest (right).

does not arise in rehabilitation methods like "walking the bears" as the bears have free access to the habitat (photos left).

6.2.4. Rehabilitation techniques

The workshop witnessed a diversity of rehab techniques being employed by different participants with varying success. A rehab technique seems to be defined by the combination of these factors: (i) the age of cubs at release, (ii) where and how long acclimatization or learning survival skills takes place and (iii) how the bears are released. In other words, the technique a rehabilitator employs is a result of a combination of the following considerations:

1. What age the rehabbers consider ideal for the bears to establish and fend for themselves in the wild
2. What degree/duration of contact with the bears is considered detrimental to the survival of released bears
3. What level of acclimatization to natural habitat is considered essential for the bears' survival after release
4. What facilities and resources the rehabbers have at their disposal to realize these considerations

All these four factors put together determine the intensity of husbandry inputs provided, the kind of enclosure preferred and how the bears are released (hard, soft or gradual). Accordingly methods of rehabilitating bears could be grouped into the following three categories:

1. Hard release, either before the bear cubs turn a year old or when they are between 1½ to 2½ years of age. Released either in hibernating dens or in most cases before/after hibernating season.
2. Gradual release after acclimatizing the bears to the release site by walking them. This happens usually between 1 and 1½ years of age.
3. Soft release after acclimatizing the bears to the release site by holding them captive for sometime. This is done anytime between 7 months to 30 months of age.

Though most of the rehabilitators who attended the workshop stuck to one of these rehab techniques, some of them employed more than one. Edwards Kruglov of Wildlife Rehabilitation "Outes", Far East Russia, follows different release ages for different species. Benjamin Kilham of Kilham Rehabilitation Centre, USA released American black bears at the age of 11 months, but sometimes hard-released and sometimes gradually by walking them in the forest very much the same way sun bears and Asiatic black bears were rehabilitated in Indonesia and India. Kruglov releases Asiatic black bears at 18 months of age coinciding with the time when bear cubs leave their mothers in the wild. However, he does not follow the same logic while releasing the brown bear cubs.

The cubs are released at seven or eight months of age, similar to the age of release followed at OBRP in Bubonitsy, Russia.

6.2.5. Contact with humans during rehabilitation period

Some rehabilitators minimize human contact with the bears as much as possible, while others presume the role of foster parents and maintain constant contact with the bears until they are gradually let free.

Bear cubs have to be bottle-fed when young and sometimes cared for more than a year in captivity. All hand-raised cubs get imprinted to the handler and naturally tend to follow them wherever they go. The probability of cubs getting imprinted on the caretaker is rather high until the age of five months (Pazhetnov and Pazhetnov, 2005). Habituation comes later when the bears are continued to be cared for and fed by the individual after weaning. Imprinting and habituations are therefore different though some level of imprinting in the beginning when the cubs are young seems to be essential for any level of habituation to follow. This is one of the reasons why wild caught cubs are often considered unsuitable for gradual release programs by walking the bears.

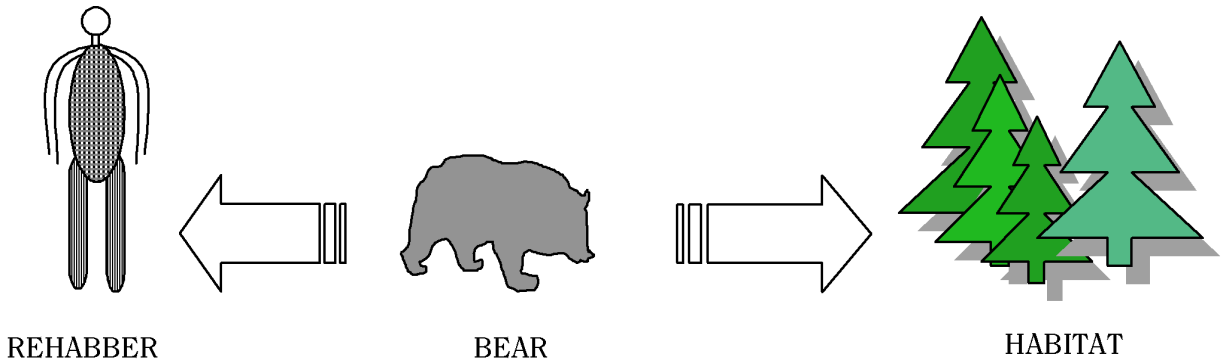
Keeping bears in small enclosures means frequent entry in and out for feeding the bears. The degree of habituation can range from tolerating the presence of the caretaker in the enclosure to seeking out and attempting to interact with the caretaker during feeding and cleaning activities

Bear cubs have to be bottle-fed when young and sometimes cared for more than a year in captivity. All hand-raised cubs get imprinted to the handler and naturally tend to follow them wherever they go.

(Beecham, 2006). Early weaning and negligible human contact are the characteristics of rehab centres in Bubonitsy and Ussurisky in Russia as they release the bears when they are only seven or eight months old. However, in 'walk the bear' programs meant for gradual release, it is essential that bear cubs get imprinted to one or two caretakers to facilitate gradual acclimatization to the habitat, with the caretaker assuming the role of a foster mother. Habituation that takes place subsequently is acclimatization to the release site and learning of survival skills like foraging strategies and predator avoidance. Since supplementary food is already in place in the enclosure before they come back after the walk, the bears do not associate the food with human presence. As Sally Maughan (2004) says, the cubs identify the enclosure in the same way as a cub playing near its sleeping mother.

Huber (2005) points out that the peculiar attributes of the bears like their intelligence, individualism and opportunism carry the seed of habituation. At the same time, however, the fact that bears are not social animals leading a solitary life makes them ideal candidates for rehabilitation (Maughan, 2004). When released, they stay

Asiatic black bears being 'walked' in Pakke Tiger Reserve in Arunachal Pradesh.



together only when they are cubs. None of the Asiatic black bears released together at CBRC, India have stayed together for long. The two three year olds moved away from each other soon after release (WTI, *unpubl.*) and the two yearlings stopped associating themselves within a month after being let alone in the forest (Tamo, CBRC, *pers.com.*).

Cubs that have opportunities to interact with conspecifics show a tendency to become less dependent on their human caretakers as they approach dispersal age (Beecham, 2006). Even a moderate degree of habituation to the caretakers could be rectified by habituating the bears to wilderness. Critics talk about imprinting and habituation and problems and prospects of getting rid of these undesirable qualities, but rarely do they appreciate what natural habitats can do to pull the bear away from human dependence. One way of diverting the attention of bears from the caretaker is to habituate the bears to natural habitats till they are capable of fending for themselves.

Rehabilitators have seen bears becoming very wary of humans, including individuals responsible for caring them, within a short time (10-24 days) after they are released (Beecham, 2006). For instance, in Pakke Tiger Reserve where two Asiatic black bears are being rehabilitated, the bears behaved indifferently to the rehabilitator who returned after a month long absence (Tamo Dadda, CBRC, *pers.com.*).

Rehabilitation guidelines or protocols in general lay emphasis that bears not afraid of human presence should not be released as they would end up being nuisance bears by straying into villages. This view was supported by the experience of some of the rehabilitators who made presentations on the sun bear, spectacled bear and Asiatic black bear. However, rehabbers at the Andean Bear Project have shown that this particular problem could be overcome if bears are released in remote areas with no human settlements. It is relevant to discuss here the presentation made by John Beecham in the absence of Joe Hamr who could not attend the workshop. Joe, during his two year research project, monitored the movements,

In Pakke Tiger Reserve where two Asiatic black bears are being rehabilitated, the bears behaved indifferently to the rehabilitator who returned after a month long absence

denning behavior and survival of 60 orphaned American black bear cubs released in Ontario. All the bears were radio-tracked to study their post-release movements and survival. The study also radio-collared 12 yearlings of wild bears as a control group. The 17-19 month bear cubs were obtained from three different rehab facilities (20 cubs each) who had maintained them with different levels of contact with humans. The bears had been cared for in one facility with minimum contact, with limited contact in another and with no particular restrictions in bear-caretaker contact in the third one. The bears were sourced from the following rehab centres (Beecham, *pers.com.*)

1) Lakeland Lodge: where the bears were exposed to the most human contact (different people than just the caretakers) and a diet that consisted of human foods.
2) Aspen Valley: Wildlife Rehab Center - Intermediate facility in terms of human contact (just caretakers, but more than 1 or 2 caretakers). Mostly natural foods supplemented with dry dog food.
3) Bear With Us: Wildlife Rehab Center - Least human contact (1-2 caretakers only) with diet similar to that followed in Aspen Valley.

The study surprisingly found no significant difference in the survival of released bear cubs across all categories including the control group of wild bear cubs. The key issues to note here is not that the bears have come from different backgrounds, but the fact that they were all of the same age-class and were released in the same habitat type. There was probably no significant difference in the level of interaction between caretakers and bears between facilities "Aspen Valley" and "Bear With Us", but no husbandry protocol of any sort seem to have been followed at "Lakeland Lodge".

If habituated adult or subadult bears are released in areas where there are human settlements, they will in all likelihood move towards the settlements for food and security

If habituated adult or subadult bears are released in areas where there are human settlements, they will in all likelihood move towards the settlements for food and security. In that sense, the "Lakeland" bears taken in for the release program could be considered similar to bears that end up in rehab centres in Asia after confiscation from public. Fredriksson (2005) mentioned how five of the confiscated bears that were released in the forests of Kalimantan in Indonesia moved towards villages, eventually some of them getting killed. Dave Jackson of Andean Bear Project in Ecuador also reported a similar fate to five spectacled bears released as subadults (aged 2½ to 3 years of age). Their next release was by and large successful once they chose a release site with practically no human settlements. In all probability, the release site in Ontario also had little or no human settlements and thus no difference in survival rate of bears between the groups.

6.3. Suitability of bears for release

Like the criteria for selecting bears for rehabilitation, the suitability of bears for release after rehabilitation was also discussed in a separate session during the workshop. Interestingly, in a hard release program the suitability of cubs is determined before release into the wild and in gradual release programs like 'walking the bears' unsuitable bears are withdrawn from acclimatization process in the wild. While rehabilitating sun bears in Borneo, Fredriksson (2005) had to withdraw one of her three cubs as it showed a tendency to follow other people. At CBRC-India, a hard-released bear cub that entered into a village had to be captured and brought to captivity. However, both these bears got killed by people when they were released for the second time. The lesson from these incidents is that all the bears, because of their individual differences, may not behave the same way though being subjected to the same rehabilitation protocol. Given an opportunity, bears found to stray into human habitations after release, should be taken to captivity for lifetime care.

There were three presentations in this session. Valentine Pazhetnov and Valentin Pazhetnov (Jr.) spoke on the suitability of rehabilitated brown bears for release; Sergey Pizuik spoke on the monitoring of released Asiatic black bears and Djuro Huber on the limitations of releasing rehabilitated bears. Huber's presentation was based on his experience from Croatia, where bears have turned out to be nuisance bears. Huber had earlier published an article "Why not to reintroduce "rehabilitated" brown bears to the wild?" in the compendium of articles published in the "Rehabilitation and Release of Bears" which was the outcome of a workshop held at Ouwehand Zoo, Rhenen, Netherlands in the year 2000 (Huber, 2005). However, published data on rehabilitation of bears suggest that only few hand-raised bears resort to nuisance behaviour once they have established their independence in the wild (Stringham *et al*, 2003; Maughan, 2004).

Releases of rehabilitated bears are invariably restocking or supplementation programs and rarely is rehabilitated bears used for the purpose of conservation reintroduction. Releases carried out for the purpose of augmentation exposes the wild population to factors such as behavioral abnormalities, disease and genetic pollution (Soorae, 2005). All these factors have to be taken into consideration before releasing bears into an existing population, as they can cause irreparable damage to the resident population. However, these factors especially the issue of genetic pollution is often overlooked since rehabilitation success is judged by the survivability of the released bears and not by the impact the introduced bear can cause in the target population. One genetically different or diseased bear surviving to socialize with wild bears should be viewed disastrous than the death of hundred bears after release.

From the number of bears released by rehabbers as opposed to the number of arrivals in different rehab projects, it is obvious that almost all the bears admitted for rehabilitation are released. In two rehab projects in Russia, for which data is available, only less than five percent of the bears admitted to their rehab facilities were not returned to the wild. On the contrary, at CBRC-India, four of the 12 bears admitted were considered not suitable for release.

6.3.1. Survival skills

Since the success of the rehab program is determined by the survival of the released bears, it is imperative to determine whether the bears have horned up their foraging skills, learnt to avoid humans and predators, and whether they are capable of establishing home ranges without coming into conflict with resident bears. A lot of these skills are learned through experience over a considerable length of time, especially in highly evolved mammals like bears (Soorae, 2005).

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Ability to forage natural food in the forest is an important survival skill. Shown here are Asiatic black bears feeding on bamboo shoots, termites, stolen hog deer kill and fruits at CBRC, India.

Huber (2005) mentions that it is impossible, or extremely unlikely, to hand-raise orphaned wild or captive-born bears in the way that will develop all skills necessary for their life in nature and to behave properly in relation to man and to other bears. No rehabilitator worth his salt would deny this statement.

For a rehabilitated bear to behave normally towards its conspecifics in the wild and vice versa, it is essential to provide constant opportunities to gradually interact with them since young age. Fredriksson (2005) attributed lack of such a familiarization with the habitat and the conspecifics as one of the reasons why five adult sun bears that were hard-released ended up in fringe areas of the park.

6.3.2. Age at release

One of the important points of consideration in rehabilitation is the age of release. Many rehabilitators consider that the optimum period for release of bears should coincide with the time of natural family break-up in the wild (Beecham, 2006). The following table shows the release age of bears at the rehabilitation projects represented during the workshop.

Only three of the rehabilitators who attended the workshop followed the practice of releasing the bears when very young. i.e. at the age of seven to eight months. They were Valentin Pazhetnov and Edward Kruglov with brown bear, and Kira Skirpova with Asiatic black bear. The assumption in such early release is that the bear cubs, with

Table: Release age of different species of bears in different facilities

No	Rehab facility	Age at release	Release type
Asiatic black bear			
1	Ussurisky Reserve, Russia	6 - 7 months	Hard
		12-15 months	Hard
2	Rehab "Outes', Khabarovk, Russia	1½ months	Hard
3	CBRC, India	13 months	Gradual (walked)
American black bear			
4	Orphan bear rehab, Ontario, Canada	17 – 19 months	Hard (in dens)
5	N. Lights Rehab Centre, BC, Canada	17-18	Hard
6	Kilham bear rehab centre, NH, USA	At least 11 months	Hard
		About 11 months	Gradual (walked)
Brown bear			
7	OBRP, Tver Region, Russia	7 – 8 months	Hard
		7 – 8 months	Soft (Enclosure)
8	Cheile Bicatvlvi NP, Romania	About 2 years	Hard
9	Rehab "Outes', Khabarovk, Russia	7 – 8 months	Hard
Other species			
10	Sun bear project, Kalimantan, Indonesia	1 to 1½ years	Gradual (walked)
11	Andean Bear project, Intag, Ecuador	1½ to 3 years	Hard

little or no habituation to humans, would be able to avoid humans and slowly go on to fend for themselves for two to three months before they enter into hibernation. In fact studies have shown that brown bear cubs attain self-sufficiency when they are six to seven months of age (Loyal and LeRoux, 1973) and are then capable of finding sufficient food to gain enough fat reserves before hibernation. However, the fact that family bond is not broken even after reaching this self sufficiency goes on to show that the mother is able to provide protection and teach cubs specific behaviour skills necessary for survival in the wild (van Dijk, 2005). Releasing brown bear cubs at the age of six or seven months would therefore argue well from the point of self-sufficiency, but not from the point of survival skills like protection from predators. At least two bear rehabilitation projects, involving brown bears and Asiatic black bears, reported predation of some of their released seven-month old cubs by wolves, lynx, bears and even tigers. Between 1990 and 2001, eleven of the 81 bear cubs released by Pazhetnovs in Bubonitsy, Russia were killed by bears, wolf and stray dogs (Pazhetnov and Pazhetnov, 2005). However their data is based on the carcasses recovered, feedbacks obtained on the survival of released bears, and not based on radio-tracking. Since little or no radio-tracking studies have been carried out in these brown bear release programs, it is impossible to comment on the survival and successful establishment of young bear cubs in the wild.

Leonardo, who rehabilitates brown bears in Romania, had to stop releasing bears at 7 months of age as it resulted in predation by lynx, wolf and other bears. He now releases bears only when the cubs are aged two years and above. Predation of released bears by tigers and leopards has been reported following the release of young Asiatic black bear cubs in Ussurisky Nature Reserve in Russia and Pakke Tiger Reserve in India. Kira Skirpova from Ussurisky Reserve reports that three of their 30 released bear cubs were found predated by tigers. Four of the 11 bear cubs released this year in 2007 have already succumbed to predation, one by tiger and three by adult bears (Kira Skripova, *pers.com.*). Unlike Kruglov who releases Asiatic black bears at the age of 1½ years, she releases them, either when they are about six to nine months or when the cubs are 12-15 months of age. When bears are released at the age of 5-6 months, supplementary feeding is provided for three months at the release site. In that sense it is a kind of soft release.

Two of the major criticisms against orphan bear cub rehabilitation are that cubs need to be taught survival skills by their mothers and that these bears will not be assimilated into the wild populations because of behavioural deficiencies (Beecham, 2006)

To summarize, all the three Asiatic black bear rehab projects represented at this workshop followed different rehab and release methods. At one centre, the cubs are hard-released when they are hardly eight months of age, at the other not before the cubs turn 1½ years of age and at the third facility, the cubs are released as yearlings after gradual acclimatization to the release site. In a gradual release program like 'walking the bears', the release would correspond to the age or stage when the rehabilitator feels confident of leaving the bears on their own without any assistance for further acclimatization. It appears that more than regional and species differences, local preferences to a particular rehab technique determine the choice of release age.

6.3.3. Imparting skills for survival in the wild

Two of the major criticisms against orphan bear cub rehabilitation are that cubs need to be taught survival skills by their mothers and that these bears will not be assimilated into the wild populations because of behavioural deficiencies (Beecham, 2006).

Two essential requirements for the survival of released bears in the wild seem to be foraging skills and protection from predators. However, all rehabilitators have experienced that many of the survival skills, especially foraging skills, are innate in bears and they instinctively begin to exhibit these skills as soon as they are exposed to wilderness (see photos below). The three sun bears during the rehabilitation period in Borneo quickly learnt the foraging skills and within six months of acclimatization to the forests, they consumed a large variety of the same foods that were observed to be eaten by wild bears of the same area (Fredriksson, 2005).

Hard releasing older bears with no foraging skills can result in bears ending up in villages and getting killed. This is bound to happen if the release site is saturated with resident bears and has human presence in the form of trespassing and settlements. Sudden appearance of released bears into a population of bears already resident at the release site can lead to social intolerance (van Dijk, 2005; Fredriksson, 2005). Releasing young bears within a year of age in areas where predators abound can lead to their predation as well. Therefore releasing bears at their dispersal age (1½ to 2 years) after some period (3 to 5 months) of *in-situ* acclimatization at release sites with no human trespassing (at least for a month or two after release) and no human settlements appear to be the best option for successful establishment of released bears. However in an assisted gradual release program like 'walking the bears', the release can happen even earlier since site fidelity would have been established before they attain break-up age of 1½ or 2 years. In this exercise, however, there is some possibility of the bears following or tolerating the presence of non-project personnel as well. Fredriksson (2005) mentions about one of her three sun bear cubs following others and this she attributed to the cub being hand-raised from a very early age of one to two months. However, this may not be the case with all hand-raised bears as shown in the case of Asiatic black bears at CBRC, India. The bear cubs were hardly two months of age when admitted for hand-raising. The sun bear incident could very well be a case of difference in individual personality of the bear which also plays an important role in the success of rehabilitation (Maughan, 2004). Even though all bear cubs are treated the same way during the rehab process, some bears may fail to behave the same way the majority would. At the Andean Bear Project in Ecuador, one of the three bears released during the second phase, had to be returned to captivity as he was found foraging near a house at the acclimatization site.

6.3.4. Behavioral considerations

There is no doubt that some degree of habituation to the caretaker sets in while the bears are in captivity. Cubs and yearling bears are said to have greater chance of survival because older bears get habituated to human presence and get conditioned to human foods (Anonymous, 2005). The PAWS manual on rehabilitation mentions that bears unafraid of humans should be reassessed before release back to the wild (PAWS, 2001).

Therefore, imprinting and the subsequent habituation are two things to be taken into consideration while working with bears meant for early release. In such cases, one of the basic thumb rules while feeding cubs under rehabilitation is to see that it is not associated with human presence.

There is no doubt that some degree of habituation to the caretaker sets in while the bears are in captivity. Cubs and yearling bears are said to have greater chance of survival because older bears get habituated to human presence and get conditioned to human foods

Sloth bear cubs and Asiatic black bear cubs busy doing what they do in the wild: Digging the soil looking for invertebrates (left) and feeding on shoots and fruits (right). (At the rehab projects in Bihar and Arunachal Pradesh, India)

This is what has been followed strictly at OBRP, Bubonitsy, Russia.

While fear of humans, including the caretaker, is essential before hard-releasing bears, this criterion will not hold true for bears released after gradual acclimatization to the release site by walking them. In walk the bear programs, the bears get imprinted to one or two individuals in the beginning which helps in making them follow the caretaker to designated locations in the forest. The animals get habituated to follow the caretakers but this soon transforms into mere tolerance to the presence of the caretaker. Later they have been found to avoid even the caretaker when contact with released bears was discontinued after their release (Tamo Dadda, CBRC, *pers.com*.).

It is pertinent to mention here Joe Hamr's study monitoring the movements, denning behavior and survival of 60 orphaned American black bear cubs, raised with different levels of contact, released in Ontario. No clear correlation could be found in the rehab success of these bears with minimum and significant level of habituation to the caretakers (Beecham, 2006). On the contrary, bears released in Indonesia and Ecuador failed to establish in the wild as they moved towards human habitats and in the process got killed. Three factors could be identified for the difference in success rates between these releases. While the release with American black bears was using yearlings aged about 1½ years of age, most of the bears released in Indonesia and Ecuador were above 2½ years of age. Secondly, while bears were hard-released in these tropical countries, the American black bears were released in winter during denning season, thus restricting their movements after release. And lastly, though there is no information available on the density of human settlements at these release sites, it is possible that there were very few human habitations, if any, at the release site in Ontario.

Though there is every possibility that bears with stereotypic behaviors will be disadvantaged to adapt themselves to the wild (Beecham, 2006), soft release programs like 'walking the bears' provide an ideal platform to monitor the behavioral changes that happen over a period of time. Since abnormal behavioral persistence in bears is associated with prolonged restriction in less complex environments with limited opportunities to exhibit natural behaviour, prolonged access to a free ranging situation during such gradual acclimatization can be a remedy to rectify behavioural inadequacies.

6.3.5. Disease considerations:

The threats of transmission of pathogens along with the translocation of host species are being increasingly recognized (Cunningham, 1996). Though there was not much discussion on this issue, disease was considered an important factor to be taken into consideration before release. Bears are generally hardy animals and since there are no taxonomic equivalents to bears in the world of domestic animals (apart from dogs and cats which are distantly related), there are not many diseases that can be considered transmissible from domestic animals to bears.

There are some basic guidelines available to us on the quarantine and health screening protocols of mammals prior to release (e.g. Woodford, 2002), but they are often prepared in the context of wild

While fear of humans, including the caretaker, is essential before hard-releasing bears, this criterion will not hold true for bears released after gradual acclimatization to the release site by walking them

to wild translocations. Among zoonotic diseases, tuberculosis is the most important disease to be considered while planning release operations involving captive reared animals. Though the possibility of five months old cubs getting the disease is remote, they still have to be screened for this disease. All bears while young are prone to ecto and endoparasitism. Bears in general are prone to mange, especially when kept in cramped up enclosures in groups for a long period of time. Frequent fecal examination and deworming using appropriate anthelmintic are crucial till they are a year old.

As mentioned earlier, in the case of disease considerations, bears meant for hard release have to be withheld from release, while in the case a soft release program like 'walk the bear', the candidates have to be withdrawn from the wild to captivity. This would mean that bears have to be screened for disease even after subjecting them to *in-situ* acclimatization.

6.3.6. Genetic pollution

The issue of bears of different genetic make-up getting mixed up due to indiscriminate release programs (see Agoramoorthy, and Hsu, 2007; Soorae, 2005) was also touched upon during the workshop. The IUCN guidelines on the placement of confiscated animals reiterate that the animal's genetic make-up is important to minimize risks of hybridization with animals at the site of release (IUCN, 2002). According to the IUCN reintroduction guidelines, the source population should ideally be closely related genetically to the original native stock and show similar ecological characteristics to the original sub-population (IUCN, 1998). The inadvertent mixing of genetic material from locally adapted population may also lead to outbreeding depression (Marshall and Spalton, 2000; Templeton, 1986).

Even within subspecies level, the genetic constitution of certain population of animals has been shown to be unique when compared to conspecifics living in other areas (Paetkau *et al*, 1998; Flagstad *et al*, 2000). Therefore, it is not enough to assume that it is safe to release bears as long as bears meant for release are the same species or subspecies of the wild bears at release site. Geographical separation by natural barriers like mountain ranges and rivers have to be taken into consideration before release. It has been shown in the case of American brown bears that the genetic distance between areas is a function of the distance and nature of intervening landscape (Paetkau *et al*, 1998).

In situations where the cub's provenance is unknown, genetic testing of the cub and the recipient bear population is the only safe, ethical approach for releasing the bears (Beecham, 2006). If this is not practicable, lifetime care is the only option for such bears of unknown genetic origin.

6.4. Release and monitoring

6.4.1. Site selection

One of the important considerations before release is the selection of an appropriate release site. There was no special session or presentation assigned for discussing this topic, but was touched upon intermittently during the various presentations. At CBRC, India, a specific site selection protocol is being used which takes into consideration the following factors:

1. If the site is within the distribution range of the species/subspecies/population
2. If there is adequate cover, food and water available
3. If the vegetation type of the area is descriptive of the habitat type of the animal
4. If the altitude & terrain conforms to the species' distribution limit and habitat
5. To what extent is human settlements and trespassing reported
6. If the site is accessible for post-release monitoring
7. Whether the density of resident bears in the area is high or low
8. If there are any reports of hunting of wildlife in the area
9. If there are any reports of wildlife diseases of relevance to the bears
10. The level of threat from predators like tigers & leopards to released bears
11. The level of awareness created amongst the locals about the release plans

Of all these mentioned above, three factors seem to be crucial from the point of successful establishment of released bears in the wild: Absence of human settlements or trespassing, low density of wild bears and the availability of abundant food. Bear rehabilitators have emphasized that the bears be released in areas where they do not encounter humans for at least a month after release, and where wild bear densities are low so that they are not challenged by them (see Maughan, 2004; Fredriksson, 2005; Beecham, 2006). A remote location with least human disturbance can solve many of the problems that could be anticipated after release. Rehabilitators at the Andean Bear Project solved the problem of their released bears becoming nuisance bears by simply choosing a site which practically had no human settlements.

6.4.2. Site fidelity and release type

Hard releases of subadult American black bears and brown bears have been reportedly more successful than hard releases of adults (Rogers, 1988; Miller and Ballard, 1982). Subadult and adult

Asiatic black bear being taken for hard-release along Kameng river, Arunachal, India

bears released into new areas literally become strangers to the land they are supposed to inhabit and establish. Bears at this age, whether wild caught or rehabilitated, are known to wander long distances, either because of homing instinct (Riley *et al,* 1994; Rogers, 1986) or due to competition from resident bears (Fredriksson, 2005) or both. The tendency to home after translocation has also been reported in other species of carnivores and soft releasing has been suggested as a method to decrease homing behaviour and increase release-site fidelity (Bradley *et al,* 2005). Factors that may influence homing include age, sex, presence of cubs with the mother, food availability at release site, translocation distance from capture site, and geographical barriers between capture and release sites (Clark *et al,* 2002). Different methods have been employed to create site fidelity at the site of release. There appears to be three methods followed in the case of bears to establish site fidelity or restrict their movements after release:

(i) Denning: In areas where bears are known to hibernate in winter, bears are drug-immobilized and released in dens (natural or artificial). This method offers the bear additional time to adjust to their new surroundings and lessens the risk of running into people (Maughan, 2004). The three to four month period of dormancy is also expected to remove whatever imprinting and habituation that the bears had developed while in captivity. Strangely many of the rehabilitators who work in temperate countries do not resort to this technique in spite of the conditions favouring them. Only John Beecham's presentation on release of rehabilitated bears in Ontario mentioned about this method being employed as a rule. It also became evident that it is mostly in the case of the American black bears that this type of release is being commonly employed.

Factors that may influence homing include age, sex, presence of cubs with the mother, food availability at release site, translocation distance from capture site, and geographical barriers between capture and release sites

(ii) Holding in cages: One way of creating site fidelity is by holding the bears in an enclosure built at the release site. The Pazhetnovs release some of their bears this way by simply letting the bear cubs go out of their enclosure. They do not go and establish a new enclosure at a different place since their rehab facility is built in the forests of Bubonitsy village which has hardly any human settlement. At the Andean Bear Project in Ecuador, the bears are held in a cage for few weeks, but the process is still designated a hard release. At the moment, it is not known what should be the size of the enclosure, at what age the bear should be moved to the release site and how long should the bears be held captive to create site fidelity to consider it a soft release.

(iii) Walking the bears: Another way of creating site fidelity is by habituating the bears to the

Even those who hard-release bears are of the opinion that given a choice they would also take bears for daily incursions in the woods in their rehab facilities

release site by walking them in the forests for a period of four to six months or even more. Three of the 10 rehabilitators who made presentations during the workshop practiced such a gradual release by walking the bears. The distinct advantage of this method is that bears develop their survival skills like predator avoidance and foraging strategies during the process. Even those who hard-release bears are of the opinion that given a choice they would also take bears for daily incursions in the woods in their rehab facilities (Maughan, 2004). But that does not guarantee site fidelity since it has not been carried out at the actual site of release.

The most common releases are therefore 'hard releases' without denning and the rarest appears to be 'soft release, after holding the bears for some time in an enclosure at the release site. Some of those who adopted gradual release method have also rehabilitated bears successfully through hard release, but the results have not been the same with other rehabilitators. Thus, there cannot be a sweeping recommendation for adopting a particular release method for all bears in all regions.

6.4.3. Timing of release

A lot has been written and discussed about the ideal time for release of bears. The common emphasis is to release them when food is abundant. However this cannot be a sweeping recommendation for all circumstances since bears are also released when food is least abundant. The time when bears are released in hibernating dens coincide with the time food is practically absent. In wild to wild translocations involving American black bears, winter-release has been found to have distinct advantage over summer-release as it limited post-release movements and increased their survival (Eastridge and Clark, 2001).

In the tropics, especially in rainforest areas, food is available for most part of the year. Releases coinciding with fruiting season could be considered the ideal period, but in a soft release program like 'walking the bears' release can happen at any time of the year. The season would also depend on the species and region in question. When compared to resources like fruiting trees that may be scattered in patches and are often seasonal, insects are not only evenly distributed but also available throughout the year (Ratnayeke, 2007). Species like sloth bears are more adapted to feed on insects (myrmecophagous) and it would be appropriate to release rehabilitated sloth bears at a time when soil is loose enough to permit digging and extract invertebrates.

The timing of releases in relation to the start of bear hunting season can have negative effects on the survival of bears (Clark *et a*l, 2002). Since hunting of bears is legal in many European and American countries, it is essential for rehabilitators in these countries to release bear cubs outside the hunting season. This however does not guarantee that the bears would survive the hunting in the forthcoming season. Many of the rehabilitators who attended the workshop reported the loss of released bears due to hunting. Kilham reports that four of the 52 bears released since 1992 were killed in hunting season within 12 months of release, and three more bears thereafter. As of now, the information available to us is inadequate to conclude whether rehabilitated bears are more prone to get killed than wild bears.

6.4.4. Monitoring released bears

Monitoring released bears is essential to know the success of any rehab exercise. No doubt radio-telemetry is a costly exercise, but this has to be done at least till the rehabilitation technique is perfected and the protocol is proved to be foolproof.

Radio-tracking besides providing information on the status of released bears, also provides valuable data on their dispersal and ranging patterns. Seven of the 11 rehabilitation projects presented in this report carried out radio tracking of released bears. Some of the rehabilitation success stories have come about after a prior experience of failures learnt from radio-tracking. Four of these seven project personnel, working on four different species in different conditions, mentioned about the value of telemetry in improving or modifying the rehab technique.

Many of the rehabilitators who attended the workshop reported the loss of released bears due to hunting. Kilham reports that four of the 52 bears released since 1992 were killed in hunting season within 12 months of release, and three more bears thereafter

(i) **Asiatic black bear:** Radio-tracking helped rehabilitators in India to learn that hard-released subadult bears can wander long distances and that younger bears can fall prey to predators like leopards when hard-released into unfamiliar habitats (CBRC data, *unpub*.).

(ii) **Brown bear:** In Romania, with radio-telemetry the rehabilitators could learn that releasing bear cubs at seven months of age can lead to predation by lynx, wolf and other bears (Leonardo, *pers.com*.).

(iii) **Sun bear:** In Borneo, radio-tracking helped Fredriksson (2005) to learn that confiscated adult sun bears end up in villages and get killed when released in environments not familiar to them.

(iv) **Spectacled bear:** Similarly in Ecuador, researchers radio-collared five spectacled bears before release and found out that they all moved into human habitations shortly after release (Dave, *pers.com*.).

All these centres were in a position to learn from their first releases, and modify the rehabilitation method to suit their local situations. They had all radio-collared their bears and were therefore in a position to document what happened, analyze everything and address those issues. Strangely, though the reasons for failures were not much different (i.e. straying, predation and getting killed), the method of resolving the issue was not always the same.

Since bear habitats also comprise hilly terrains, rehabbers reported difficulty in tracking bears especially when they are hard released. Hard released subadult and adult bears are known to move long distances before they settle down to establish a home range of their own. On an average, released American bears have been known to move 35 kilometers from the release site, the maximum dispersal distance recorded being over 400 km (Beecham, 2006). In Ecuador and Romania, biologists employed the services of gliders and aircrafts to radio-track spectacled bears and brown bears.

Many rehabilitators cited funding constraint as the major reason for not resorting to radio-tracking of their released bears. Most of those who presented during the workshop employed VHF collars since GPS collars are expensive.

Since rehabilitators considered radio-collaring itself a drain on their resources, tracking the bears for more than a year was considered a luxury by many

How long should the released bears be monitored to consider it a success? This question was raised by some participants in the workshop. There appears to be three levels of monitoring:

1. Looking at short term survival of bears (six months to one year from release)
2. Looking at long term survival (up to 2 years after release)
3. Monitor to know whether released bears have contributed to the wild population

Most of those who radio-collared bears for monitoring, looked at the short term survival of released bears. Since rehabilitators considered radio-collaring itself a drain on their resources, tracking the bears for more than a year was considered a luxury by many. Clark *et al* (2002) mentioned that future studies evaluating orphaned bear releases should focus on long-term survival, reproductive contribution to local population, and the influence of rehabilitation methods on the survival of bears after release. In a rehabilitation program handling ten bears every year, it may not be feasible to monitor all bears for their reproductive contribution to the resident population of bears. As Beecham (2006) mentions, because bears do not reproduce until they are at least 3 or 4 years old, it is often impracticable to monitor their productivity except in a research environment. At least two of the bear rehabilitation projects presented during the workshop reported on the successful breeding of released females. Ben Kilham reported about a 10 year old female which is still alive, having raised five sets of cubs. Even one of her offspring aged

Radio-collaring of an Asiatic black bear at the Centre for Bear Rehabilitation & Conservation, India and a spectacled bear at the Andean Bear Project, Ecuador.

seven has already raised five cubs. Dave Jackson mentioned that one female spectacled bear released by Andean Bear Project personnel in Ecuador has raised two litters so far.

6.5. Public outreach and education

There were three relevant presentations in this session, one each by Angelika Langen, Gabriella Fredriksson and Mila Danilova. Angelika spoke on encouraging people to change their ways to live with wildlife, Gabriella on the conservation threats and issues at stake in Southeast Asia, and Mila on bear welfare issues in Russia.

There was some discussion on the bear hunt which is legal in many countries. In developing countries, hunting is illegal but poaching and subsistence hunting are rampant in some regions. Huber had earlier reiterated the need to address the cause of bear cub displacements instead of focusing only on rehabilitation. The working group members recognized the need for imparting education and initiating awareness campaigns among people simultaneously with rehabilitation activities.

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OTHER WTI PUBLICATIONS

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Asiatic black bear *(Ursus thibetanus)* is threatened due to hunting and habitat loss throughout its distribution range in Asia. One of the consequences of legal and illegal hunting of adult bears is the displacement of cubs in large numbers. The popular way of addressing the issue of an appropriate placement option for orphaned bear cubs in many temperate countries has been by rehabilitating them to the wild. The Asiatic black bear rehabilitation project initiated jointly by the Wildlife Trust of India and the Department of Environment and Forests, Arunachal Pradesh in partnership with the International Fund for Animal Welfare in 2003 was the first instance of bear rehabilitation being taken up in India. This conservation action report documents in detail the project's objectives, the protocols followed and the lessons learnt from the successful rehabilitation of bear cubs.

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10 Years in Service of Nature

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