BI-MONTHLY OUTREACH JOURNAL OF NATIONAL TIGER CONSERVATION AUTHORITY
GOVERNMENT OF INDIA

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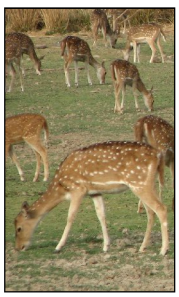
Volume 4 | Issue 2 | Jan-Feb | 2013

LANDMARKS

CHALLENGES

PERSPECTIVES



STATE-WISE TIGER MORTALITY (INCLUDING SEIZURE) FOR 2012

	INSIDE RESERVE	OUTSIDE RESERVE	TOTAL
Madhya Pradesh	7	8	15
Karnataka	8	6	14
Maharashtra	4	9	13
Uttarakhand	3	9	12
Tamil Nadu	4	4	8
Assam	4	2	6
Uttar Pradesh	1	5	6
Kerala	1	4	5
West Bengal	2	1	3
Arunachal Pradesh	0	1	1
Bihar	1	0	1
Chhattisgarh	0	1	1
Haryana	0	1	1
Odisha	1	0	1
Rajasthan	1	0	1
TOTAL	37	51	88

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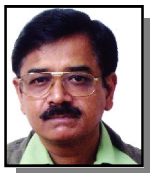
note from the editor



THE New Year started with a flurry of activities on the tiger front. Scientists and veterinary experts from the Wildlife Institute of India and field officials of Sariska successfully translocated two young tigresses from Ranthambhore, and Sariska now has nine tigers. The recovery strategy advised by the Wildlife Institute of India was followed and the reintroduced tigresses have readily adjusted in their new home. The day-to-day radio telemetry monitoring by an expert team and field staff is providing valuable insights on tiger behaviour and their spatio-temporal use pattern. The Minister of Environment and Forests made a field visit to Sariska during this month and took stock of the ongoing activities.

The tiger monitoring at reserve level using camera traps and related methods (Phase-IV) has been very encouraging. Most of the tiger reserves have a photo capture record of individual tigers with a knowledge of minimum tiger numbers in their area. The field staff has readily picked up the protocol. Readers may find the update from Melghat interesting.

The social dynamics of tiger and their resultant land tenure system make them move from their natal areas. Such movements result in their co-occurrence in human dominated areas resulting in serious conflicts. Our challenge at this juncture is to actively address such situations in the interest of tiger and local people. A Standard Operating Procedure has been refined and issued to deal with such emergencies, which is highlighted in this issue.

Bilaterals with neighbouring and other tiger range countries are very useful. The joint resolution signed with Nepal in February this year covers many aspects relating to the tiger which will strengthen the tiger cause along the borders.

The special piece from Dr. A.J.T. Johnsingh makes this issue more interesting!

Dr Rajesh Gopal
Member-Secretary, NTCA

Translocation TO SARISKA

On the request of the Rajasthan Forest Department and NTCA and as directed by DWII, a team of scientists — comprising Dr P K Malik, Dr K Sankar and Dr Parag Nigam from Wildlife Institute of India proceeded to Ranthambore on January 20, 2013 to carry out translocation of two sub-adult tigresses (cubs of T-5) to Sariska National Park. The field operation was carried out as a part of the WII-NTCA-Rajasthan Forest Dept collaborative project on re-introduction of tigers to Sariska National Park.

The team reached Sawai Madhopur, Rajasthan, on January 20, 2013, and detailed discussions were carried out at Amaghati Chowki, Sawai Madhopur range, Ranthambore Tiger Reserve on January 21, 2013 along with A S Brar, Addl Principal Chief Conservator of Forest & Chief Wildlife Warden, Rajasthan and Yogesh Kumar Sahoo, Deputy Field Director, Ranthambore National Park, Sudarshan Sharma, Research Officer, Keoladeo National Park, Bharatpur, Daulat Singh, Research Officer, Ranthambore Tiger Reserve taking into consideration the NTCA guidelines.

The plan of operation as provided by WII was discussed at length and the field-level planning and preparedness was checked by the team. Respective teams were also briefed. The operation was initiated on 22 January, 2013.

The team reached the site Amaghati Chowki, Sawai

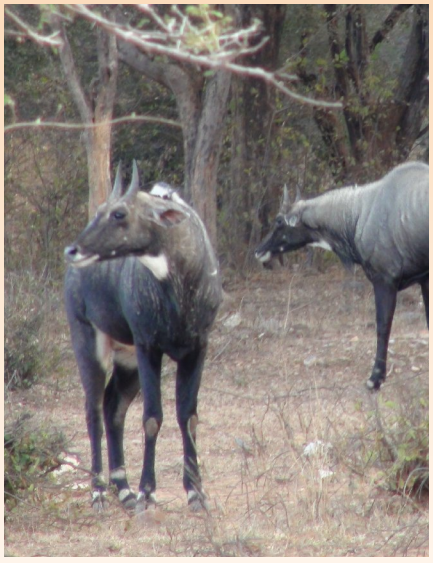
Minister visits Sariska for appraisal

Minister for Environment and Forests, Jayanthi Natarajan, visited the Sariska Tiger Reserve (Rajasthan) on January 20, 2013, for an appraisal of tiger monitoring, voluntary village relocation and habitat protection/ management initiatives under Project Tiger.

The minister was accompanied by the member secretary and senior officials of the National Tiger Conservation Authority, Chief Wildlife Warden, Rajasthan, senior scientist from the Wildlife Institute of India and Field Director, Sariska Tiger Reserve.

During the field visit, the Minister took note of the day-to-day monitoring of reintroduced tigers using radio telemetry, besides regular monitoring by the field staff towards habitat/ wildlife protection, status of voluntary relocation of villagers in the core/critical tiger habitat and reintroduction of tigers.

The Minister appreciated the efforts of field officials while emphasizing strengthening protection and providing inviolate habitat for tigers.



Recently, the M-STrIPES field monitoring protocol has been launched in Sariska by the NTCA. A research study has also been undertaken for evaluation of physiological stress and reproductive potential in reintroduced tigers, in collaboration with WII.

Madhopur range, Ranthambore Tiger Reserve during early hours of the morning. It was informed by the patrolling team that both the identified tigresses (orphaned cubs of T-5) named Bina 1 and Bina 2 made a kill during early hours and were hiding in the Prosophis juliflora thicket.

After making necessary preparations for darting the animals, the team proceeded to the kill site on a Gypsy. As none of the animals appeared initially, the darting vehicle was placed behind a thicket with clear vision on the kill. The animal (Bina 1) appeared from the thicket at about 0720 hrs. The animal was darted from a distance of 15m using a mixture of Medetomidine and ketamine employing Dan Inject equipment model JM at 0723 hrs. Though the animal showed signs of sedation; anaesthesia safe for handling was not achieved even after 20 minutes. Animal reacted to disturbance as manifested by ear twitching and sudden reaction. Supplemental dose of 200 mg of ketamine and 2 mg of medetomidine was remotely delivered at 0746 hrs.

After ensuring adequate sedation safe for handling, the animal was approached, positioned and blindfolded. The physiological parameters were checked and after ensuring stabilization, the animal was fitted with Telonics VHF/GPS/ARGOS radio-collar.

Body measurements, animal weight and biological samples were taken following which the animal was crated in the transport container. The age was estimated at 2 years and the animal weighed 122 kg. The crate was loaded onto a mini truck and minimal disturbance was ensured till the initiation of journey. The animal was revived from sedation using reversal drugs.

Though search for the second animal was made for almost two hours subsequently, no signs (direct/ indirect) of it were noticed. The team decided to move the already crated animal to Sariska by road. The physiological parameters of the animal were monitored and found within normal range and the journey from Ranthambore to Sariska took 6 hrs. The container was offloaded adjacent to the enclosure at Naya Pani in Sariska.

The tigress was released by Bina Kak, Minister of Environment & Forests of Rajasthan in the presence of A.S. Brar, P.S. Somasekhar, CCF (WL), Rajasthan, R.S. Shekhawat, Field Director, Sariska Tiger Reserve and other government officials.

> The two tigresses from Ranthambore were moved to Sariska within a day of each other. They were released in the reserve by Rajasthan's environment and forests minister Bina Kak in the presence of senior forest officials

Soon after release, the animal made a kill of wild pig inside the enclosure. The animal was left undisturbed and was intensively monitored by a team comprising WII researchers and forest officials of Sariska Tiger Reserve. The tigress in Sariska Tiger Reserve has been given a local ID of ST9.

The team following release of the tigress proceeded to Ranthambore in the evening.

The next day, ie January 23, the team assembled at the site in the early morning hours. The tigress had made a kill in the morning and a patrolling team reported that it was sighted near a spring.

The darting team rushed to the site. The animal was immobilized using a mixture of medetomidine and ketamine at 0804 hrs. The animal was approached after 20 minutes and was found in perfect plane of anaesthesia safe for handling. The animal was shifted onto a stretcher and brought out after clearing vegetation into the open area. The animal was fitted with a Telonics VHF/GPS/ARGOS radio-collar and body measurements, animal weight and biological samples were taken. The animal was of similar age as the earlier animal but weighed 133 kg.

The animal was crated in the transport container and antidote for medetomidine was given. Animal revived within 6 minutes of antidote administration. The road journey was initiated and the journey from Ranthambore to Sariska took 6 hrs. The animal was intensively monitored inside the container during the entire journey. The transport container was offloaded adjacent to the enclosure II at Sariska. The animal was released into the enclosure in Sariska at 1536 hrs by Madam Kak. The tigress in Sariska Tiger Reserve has been given a local ID of ST10.

The monitoring team reported that the animal soon after release in the enclosure made a kill of a male Sambar (Rusa unicolor) inside the enclosure. The animal was left undisturbed and was intensively monitored by team comprising WII Researchers and forest officials of Sariska Tiger Reserve.

Both the animals were intensively monitored inside the enclosure till January 28, 2013 following which the gates of the enclosure were opened. The animal (ST9) moved out of the enclosure at 1730 hrs and ST10 at 1930 hrs.

Both animals are being intensively monitored by the Rajasthan Forest Department and WII at Sariska.

Phase IV monitoring report from Melghat

N S Dungariyal

Melghat means 'meeting of the Ghats'. It is located in northern part of Amravati district of Maharashtra. One of the nine tiger reserves initially set up by the government of India in 1973, Melghat Tiger Reserve has great diversity of topography, climatic conditions, soil conditions and flora and fauna. Melghat is a large tract of unending hills and ravines scarred by jagged cliffs and steep climbs. The Tapti river and the Gawilgadh and Narnala ridges of the Satpura Range form the boundaries of the reserve.

Melghat is one of the most interior and backward areas of the country. The main inhabitants are the Korku tribe & other scheduled tribes. These tribes since ages depend on the Melghat forests for their livelihood. The forest provides them with food, shelter, water, medicine and almost all their daily needs.

Resettlement of villages is currently going on. Till now, nine villages have been relocated from the core area of MTR. Resettlement is a complex and challenging issue and will act as an important milestone in the conservation of the tiger and its prey base. A total of 24 villages remain in the critical tiger habitat with 4,269 families to be relocated in the future. There are 118 villages still in the buffer areas of MTR, inside and outside.

Phase IV of the All India Tiger Estimation exercise has begun the process of intensive, annual monitoring of important 'source' populations of tigers.

In brief, the Phase-IV protocol of NTCA contains six components:
(a) Maintaining daily patrol log
(b) Carrying out beat-wise monitoring of sign encounters twice a year
(c) Recording from PIP
(d) Obtaining minimum tiger number using camera traps
(e) Obtaining tiger numbers using camera traps (40-60 days closure period)
(f) Obtaining minimum tiger numbers through DNA analysis

Under Phase-IV monitoring, emphasis is on use of camera traps for obtaining minimum tiger numbers or preferably, tiger population size estimation and using line transect sampling for estimating prey densities.

IMPLEMENTATION

■ Maintaining daily patrolling log in patrolling camp/chowki registers | All beats and protection camps have got Daily Patrolling Registers with specific formats for filling information while on patrolling duty.

In each beat, every week, at least 2-3 special patrol takes place involving forest officers from range & division headquarters.

■ Carrying out the 8-day protocol of Phase-I twice a year | This exercise was undertaken during February 10, 2012 to February 17, 2012 (8 days). Four days were given for recording herbivore & vegetation data and four days were given for surveying the beat for carnivore signs.

Special forms in local language (Marathi) were specially prepared and printed by MTR administration. These forms are use to record herbivore detection infor-

mation, carnivore sign survey, vegetation and related data.

Two-kilometre line transects in every beat surveyed with 3-4 replicates. Observations were noted in prescribed forms.

- Recording data from "pressure impression pads" (PIP). All beats have a network of PIPs along the trails and dust-roads which are monitored daily for pugmark and information is filled in prescribed format.

Every beat has got at least 4-5 PIPs specially prepared for observing and recording information regarding movements of major carnivores & herbivores.

GPS coordinates have been recorded for all PIPs and information is regularly sent to the Division Headquarters.

- Obtaining the minimum number of tigers in the tiger reserve | From the pictures taken from all camera traps, all tiger images were analysed on computer and after studying their stripe pattern, minimum number of tigers have been estimated.
- Obtaining tiger population size for the reserve using spatially-explicit capture recapture framework and obtaining prey population size using line transect sampling.

Herbivore observation details were analysed with the help of distance 6.0 software and prey density per square kilometre is calculated.

While recording the herbivore observation details, in the absence of Range Finders, direct perpendicular distance is taken for each observation and not the radial distance.

Specific survey designs for camera trapping are not used. Camera traps were installed and operated by field staff in their respective beats at suitable locations. Many tigers didn't get enough recapture. Analysis of such data in Mark Capture-Recapture framework was not possible. Since the entire reserve was surveyed by camera traps, overall minimum figure of tigers is calculated.

SCHEDULE OF WORK

- Training of field staff | Training was organized in the month of January 2012 regarding handling and operation of camera traps, memory chips, GPS devices and transect survey method.
- Distance sampling of herbivores | February 10, 2012 to February 17, 2012 (8 days). Two-kilometre line transects in every beat surveyed with 3-4 replicates. Observations were noted in prescribed forms.

Special forms in local language (Marathi) were specially prepared and printed by MTR administration. These forms are used to record herbivore detection information, carnivore sign survey, vegetation & related data. Range finders were not purchased because of insufficient funds received from NTCA.

- Camera trapping for tiger & co-predators | Since MTR has a large and difficult terrain, it was not possible to cover the entire reserve with 300 camera traps at a time. So camera-trapping was conducted in two stages.

Stage-1 | Approximately 1,000 sq km (Akot Wildlife Division & part of Gugamal Wildlife Division). March 10, 2012 - 9 April 2012 (30 days)

Stage-2 | Approximately 1000 sq km (Sipna Wildlife Division & part of Gugamal Wildlife Division) April 11, 2012 - May 10, 2012 (30 days). 150 sets of camera traps sets (300 nos.) deployed.

- Analysis and report making | All tiger photos were analysed on the basis of unique stripe pattern. Distance sampling data was analyzed using distance 6.0 software. This was done in the moths of June & July 2012.

CAMERA TRAPPING IN FIELD

- MTR purchased 300 camera traps and related items like battery and memory chips.
- Since MTR has a large area which is also interspersed with steep hills, deep valleys with minimum road infrastructure, carrying out camera trapping covering whole MTR is huge and difficult task.
- In Sipna Wildlife Division, a part of the division was surveyed by NGO Wildlife Research & Conservation Society, Pune.
- But MTR administration in very limited timeframe gave sufficient training to field staff (many of whom never handled such equipment) regarding camera trap operation, daily monitoring, downloading of important photos as well as reporting to range or division headquarters.
- In every beat, at least two sets of camera traps used to sufficiently cover the area. Field staff monitor the cameras daily, look for the tiger signs in surrounding areas. They used to change camera positions to maximize the probability of tiger photo capture. For every camera, there were two memory chips (when one is sent for downloading, another used to be in camera collecting pictures.)
- In every range or nearby major office headquarters, where there is electricity and a computer, memory chips were collected, downloaded and sent back to corresponding field staff.
- All cameras were run for a period of 30 days.
- Camera trapping was carried out in two stages to cover the entire tiger reserve.
- Total trap-nights were 9,000.
- Total tiger photos captured were 444.
- Almost all major mammals along with some bird species got captured in cameras.

However, there were some glitches regarding functioning of camera traps and logistics. Eventually, the hard work of MTR administration and field staff

Rupesh

paid off by capturing a number of tigers and many other species which will help MTR in future wildlife management activities in different areas.

Getting reliable estimates of major carnivores like tigers and herbivores in vast forest areas of any tiger reserve, leave alone Melghat, was never an easy task. But recent scientific and technical advancement in the field of wildlife research made this task a little easier and more reliable.

In the past, as part of a countrywide tiger estimation exercise, a sample area of MTR was surveyed twice (2008 and 2010) by trained wildlife researchers from WII, Dehradun.

PHASE-IV monitoring protocol developed by NTCA and WII for intensive monitoring of tiger populations involves carrying out camera trapping and line transect survey across whole area of tiger reserve by respective tiger reserve administration.

In case of Melghat, which has rugged hilly terrain with an area more than 2000 sq km, carrying out Phase-IV monitoring with the help of field personnel who never handled scientific instruments was very difficult task.

In spite of insufficient funds received from the National Tiger Conservation Authority, MTR administration during very short span of time gave sufficient training to field staff and carried out the exercise successfully.

The Melghat Tiger Reserve administration needs 350 pairs of camera traps (700 nos.) to sufficiently cover the whole reserve in one stage.

Currently, MTR has only 150 pairs of camera traps (300 nos.).

The most positive outcome of the exercise was that field-level staff operated camera traps and got used to modern devices like GPS. The field staff monitored the camera traps daily.

When they got the first tiger pictures, they worked with more enthusiasm to get more.

For this, they surveyed the area around the camera traps daily and changed the positions of cameras to increase the probability of getting more tiger pictures.

The camera trapping exercise generated a lot of pictures of a variety of animals such as leopard, ratel, sloth bear etc. These photos have given a lot of joy and useful information not only to field staff but also to nature lovers, researchers and tourists who visit the tiger reserve.

The experience gathered during this season of PHASE-IV monitoring will help MTR administration to carry out the next season of PHASE-IV monitoring with more accuracy and more reliable estimates.

Trans-boundary cooperation in conservation

The governments of Nepal and India, while expressing concern over the increasing threats to biodiversity caused by various factors and realizing the urgent need for an effective strategy to address the problem confronting the biodiversity conservation and ecological security in the trans-boundary region specially with a focus on tiger, rhinoceros and elephant conservation hereby resolve to

- Formalize draft MoU between Nepal and India
- Expedite the rpocess of getting approvals
- Initiate creation of rescue centre at Chitwan by government of Nepal
- Formalize the MoU
- Initiate ground implementation
- Organize regular trans-boundary meetings and exchange visits of officials of both countries

Central and field level coordination and monitoring committees to be formalized

India to explore mechanisms to smoothen trans-boundary meeting procedures for government officials at field level

- Initiate collaborative research and monitoring on gharial and dolphin (as well as rhino and elephant)

Organize expert group meeting to identify key threats and issues

Prepare joint strategy for identified tiger recovery sites in

S P Yadav

trans-boundary areas

Identify and agree on two priority sites for joint tiger recovery (Banke-Suhelwa; Valmiki-Chitwan)

- Prepare a preliminary tiger recovery plan for each site
- Strengthen restoration and management programs of wildlife corridors and connectivity in trans-boundary areas
- Conduct Terai Arc Landscape (tAL) level tiger population estimation simultaneously

All partners working on tiger estimation to hold technical meeting by April 2013

Publish joint status report for 2013 tiger estimation

Share best practices on conservation and livelihood improvement activities of local communities around habitats

Exchange visits for key stakeholders (including community representatives) to share lessons

- Support mutual exchange of scientific advancements relating to innovative wildlife research, scientific studies, assessment and monitoring including source-sink population

Continue education and capacity-building of frontline officals

Annual scientific exchange meeting to be organized (explore possibility of linking with WII ARS)

- Strengthen joint actions on curbing poaching, illegal wildlife trade and forest products smuggling

Expedite redressal of issues of seized material of Red Sanders

- Develop joint human-wildlife conflict mitigation strategy

Explore possibility of implementing interim relief scheme (for livestock, human injury and death) developed in India to Nepal in coordination with WWF

Organize a meeting on human-wildlife conflict mitigation to agree on protocols and mechanisms for different types of conflict at trans-boundary level

Review and formalize existing elephant conflict mitigation plan and develop mechanisms for implementing this (including resources)

Sharing methods on dealing with “rogue” elephants. A joint resolution to this effect, as an outcome of the 6th consultative meeting between Nepal and India, was signed at New Delhi on 18 February 2013.

SOP on straying, dispersing tigers in human dominated landscape

Udaishringi

Based on inputs from field officers, experts vis-a-vis advisories issued by Project Tiger/NTCA, a standard operating procedure has been developed to meet the present challenges of tiger-human conflict.

- At the outset, constitute a Committee immediately for technical guidance and monitoring on day to day basis, as under:-

i. A nominee of the Chief Wildlife Warden
ii. A nominee of the National Tiger Conservation Authority
iii. A veterinarian
iv. Local NGO representative
v. A representative of the local Panchayat
vi. Field Director/ Protected Area Manager/ DFO I/C -Chairman

- Since it may not be always possible for experts from the Wildlife Institute of India to provide assistance, it is advised that some outside experts may be involved in the ongoing monitoring.
- Establish identity of the tiger by comparing camera trap photographs with National Repository of Camera Trap Photographs of Tigers (NRCTPT) / Reserve level photo database and find out the source area of the animal.
- Collect recent cattle / livestock depredation or human injury / fatal encounter data, if any, in the area. If it is an area historically prone to such incidences, detailed research work has to be carried out in order to assess the reasons for the frequent tiger emergencies in the area.
- In case of confirmed livestock depredation / human injury /fatal encounters or frequent straying of tiger near human settlements, set traps (automatic closure) with appropriate luring while avoiding disturbance, to trap the animal.
- Set up camera traps near kill site to confirm / establish the ID of the animal.
- Ensure unobtrusive guarding of the kill to allow feeding of the carcass (if not close to a human settlement) besides safeguarding from poisoning (for revenge killing).
- Create 'pressure impression pads (PIPs)' in the area to ascertain the daily movement of the animal, while plotting the same on a map (4"=1 mile scale or 1:50,000 scale).
- Proactively involve District

Collector / DM and SSP / SP of the area to maintain law and order in the area, besides avoiding crowding by local mobs. Acquaint them with human-tiger conflict issues and guidelines of the NTCA to deal with the situation.

- In all instances of wild carnivores like tiger / leopard straying into a human dominated landscape, the district authorities need to ensure law and order by imposing section 144 of the Cr.Pc. This is essential to avoid agitation/ excited local people surrounding the animal spot which hampers capture operation, leading to serious injuries on people and staff. It is also necessary that police and local administration be involved at an early stage. Effective coordination with them is critical to control mobs which as has been seen in several instances, worsen the situation and lead to avoidable fatalities/ tragedies.
- Take help of the district level officials to alert the villages in the vicinity of the area having the spatial presence of the tiger.

(l) If successive trapping efforts fail, chemical immobilization of the wild carnivore should be done by an expert team having a veterinarian, as per the protocol at Annexure-I.

- In case, the tranquilised tiger is found to be healthy in prime or young age without any incapacitation (loss of canine, injury, broken paw etc.), as confirmed / certified by the Committee as constituted at para (1), then it may be released after radio collaring in a suitable habitat with adequate prey base, away from the territory of a resident male tiger (if any) or human settlements, under intimation to the National Tiger Conservation Authority. (Under no circumstances an injured / incapacitated tiger should be released back, and the same needs to be sent to a recognized zoo).
- Under no circumstances, a tiger should be eliminated by invoking the Wildlife (Protection) Act, 1972, if it is not habituated for causing human death. The guidelines for dealing with 'man-eaters' are annexed for compliance/guidance in this regard (Annexure-II).
- In case of a healthy tiger/encumbered tigress occupying a sugar cane field or similar habitat, attempt should be made first to attract it to nearby forest area, while avoiding disturbance. If such operations fail, the animal should be captured through immobilization for release in low density area of a nearby tiger reserve/protected area after radio collaring.
- An authorized spokesperson of the Forest Department, should periodically update the media (if required) to prevent dissemination of distorted information relating to the operation / incidents. Sensalization or distorted information can lead to further damage.
- In case monitoring using camera traps (Phase-IV) is ongoing in the area, the minimum tiger numbers based on individual tiger captures, should not be given undue publicity without due cross checking with the National Tiger Conservation Authority.
- The Chief Wildlife Warden has to take the final decision on whether a tiger has to be released back in the wild or transferred to a zoo.
- It is important to have properly designed suitable cages and transport mechanism which cause least stress to the captured carnivore.

PROTOCOL ON IMMOBILIZATION AND RESTRAINT OF TIGERS

General Consideration

Behavior: Tigers in conflict or those strayed into human habitation differ considerably in behavior as compared to those in native/ natural habitats. The animals may be stressed, shy, elusive, secretive and even unpredictable thereby posing challenge in capture. These animals may even pose safety threats for human involved in capture as well as to general public. Utmost care needs to be taken to ensure safety of humans when attempts for capture are made.

Capture options: Tigers can be captured employing physical and chemical restraint methods or combination of both. The physiological and emotional status of the animal; length of the procedure; the environmental conditions; terrain/ escape cover; equipment availability; drug appropriateness and availability and most importantly the safety of the operator/team needs to be considered prior to making a choice of procedure. Both the procedures have their benefits and limitations however the present guidelines would focus primarily on the chemical restraint procedures.

CHEMICAL RESTRAINT | Chemical immobilization has become an important tool in wildlife management over the last few decades.

Advancement and development in this field has resulted in use of newer and safer drugs for immobilization, and efficient and reliable systems of drug delivery.

CHEMICAL IMMOBILIZATION | Involves use of drugs to restrict animal's movement by inducing a state of insensibility and preventing deliberate and coherent mobility. The technique is well suited for tigers in conflict as it allows capture of select individual, enables selection of time of capture and causes minimal stress to the animal. Chemical restraint drugs alter certain CNS functions without compromising the vital functions and produce a state of anaesthesia which immo-

bilizes the animal to the extent that provides considerable safety both for human and animal.

IMMOBILIZATION EQUIPMENT | Due to difficulty of directly approaching and handling wild animals, it is necessary to have safe and effective methods by which drugs can be administered. Projected darts have proved to be effective and safe option for delivering drugs to wild animals. The dart is projected through an equipment and discharges the medicaments intramuscularly upon impact. The darts are available in different sizes, however are specific to the type of equipment used to propel them. Different power projection systems have been used for projecting the darts however for tigers; the system that employs compressed gas/CO2 to propel the dart should be selected. Light weight plastic darts of 3-5ml capacity should be used for remote injection using air powered/CO2 tele-injection projector. Needle length is critical while darting tigers. The outside diameter of the needle should be 1.5-2 mm and length of 38- 40 mm.

IMMOBILIZATION DRUGS | Though there are varieties of drugs that have been used for capturing tigers, a combination of alpha-2 adrenergic agonists (sedatives) and dissociatives have proved to be effective for immobilizing tigers.Alpha-2 adrenergic agonists/ Sedatives: These drugs are CNS depressants with good sedative, muscle relaxant, and analgesic properties. These drugs need to be used with caution in animals as they produce initial hypertension followed by severe hypotension, bradycardia, hyperglycemia and glucosuria, disrupts thermoregulation and may lead to regurgitation/ vomiting in carnivores. These drugs however have the advantage of being non-controlled, inexpensive and reversible. The drugs have been extensively used in felids in combination with dissociatives. A mixture of Xylazine and Ketamine in a proportion of 1.25 :1 known as Hellabrunn mixture has been effectively used in tigers and other carnivores.

Another new Alpha-2 agonists Medetomidine in combination with ketamine has proved to be effective and specific sedative in large carnivores as it induces rapid drug induction and has specific antidote for reversal. These Alpha-2 adrenergic agonists can be negated by antidote. Examples: Xylazine, Detomidine, Medetomidine. Antidotes include Yohimbine hydrochloride, Atipamezole hydrochloride, Tolazoline hydrochloride.

> Tigers in conflict provide limited opportunities for darting and therefore personnel experienced in effective darting as well as with knowledge of anatomical peculiarities are needed to sedate, transfer and revive the animal

DISSOCIATIVES | These include the psychotomimetic drugs that are cyclohexamine derivatives. The drugs act by separating the conscious mind from sensory and motor or control mechanism in the brain (dissociative) producing, rapid analgesia and a trance-like state (psychosis) which may be as a result of over stimulation of the CNS. The animal appears unaware of human presence. They have the advantage of being rapidly absorbed following IM, IV administration, have good safety margin and cause little depression of the respiratory and circulatory system. Pronounced muscle rigidity, hyperthermia, hyper salivation, convulsion and rough recovery are common side effects. These effects can be considerably reduced by combining these drugs with a tranquilizer or sedatives. Their effect cannot be reversed and the animal has to be monitored for long till complete recovery takes place. These drugs lack specific antidote. Examples: phencyclidine, ketamine hydrochloride, tiletamine hydrochloride

The choice of drug for immobilization may include the Hellabrunn mixture (HBM) (Xylazine -Ketamine mixture in ratio of 1.25:1) in appropriate doses. The dosage can be decided on the spot, taking into consideration the animal's health and condition, level of excitement, physiological status, sex, time of the day, and ambient temperature besides other habitat parameters. Medetomidine in combination with ketamine has proved to be effective for capturing tigers in conflict as it provides short and rapid induction thereby ensuring minimal movement of animal following darting.

APPROACH TO TARGET ANIMAL

A four wheel field vehicle or trained captive elephants may be used to approach the animal taking due care of human safety and an overriding degree of patience. In a terrain where the vehicle cannot be used, possibility of darting the animal from a machan (raised platforms) may also be considered. Tigers in conflict provide limited opportunities for darting and therefore require adequate experience by personnel in effective darting as well as knowledge of anatomical peculiarities. Hindquarters

should be preferred for teleinjection however depending on the opportunities; other suitable areas can also be explored.

INDUCTION PHASE | The time interval between injection (darting) and the point when the animal is rendered immobile is induction period. The total time for the completion of induction may vary from 10-15 minutes. A close observation should be kept by the team for any movement of the animal however the team should ensure minimal disturbance during induction.

HANDLING AND CARE OF THE IMMOBILIZED ANIMAL | The animal should be approached quietly and following steps should be followed:

- Removal of dart
- Blindfolding to protect the cornea from direct sunlight, dust and injury.
- Ensuring proper animal positioning (sternal or lateral recumbancy) to maintain patent airways and ensure normal breathing and circulation.
- Assessing the status of animal, the degree of muscle relaxation and the rate and depth of respiration. Assessment of anesthesia should be done using following methods:
- Monitor tissue perfusion: Anesthetic drugs frequently depress the contractile force of the heart and vasodilation results in decreased tissue perfusion. Evaluation of tissue perfusion should be done by observation, auscultation, palpation and capillary refill time.
- Monitor gas exchange: Respiratory rates are highly variable during anesthesia.
- Quality of respiration should be evaluated by observing animal's chest movement.
- Monitor level of CNS depression by assessing the muscle tone-jaw tone and eye reflexes.
- Monitor vital signs such as respiration, heart rate and body temperature.
- Examine animal for any wound or injuries (including status of canines and claws).
- Estimate animal body weight and if possible take bodily measurements.

Udaishringi

SHIFTING OF THE ANIMAL TO STRETCHER | The animal should be shifted to a stretcher and placed in lateral or sternal recumbancy. Animal should then be shifted to a transport container.

REVERSAL OF ANESTHESIA | Specific Alfa-2 antagonists (Yohimbine HCl , Atipamezole HCl) should be used to reverse the anaesthesia.

Supplemental Information

- Preparedness: All equipment for crating the animal, radio collars and accessories, emergency medicaments, biological sampling accessories, transport containers and any other essentials should be in place before the animal is darted.
- Data recording: A complete immobilization record, particularly including each drug given, amount given, time of administration and physiological parameters should be maintained during the procedure. These details should be recorded in the datasheet in the format provided. It would be appropriate to ensure human safety considerations to meet any eventuality at all the time.
- Assessing depth of anaesthesia: It should take about 15 minutes for the drug induction to happen. Prior to approaching the animal, the depth of anaesthesia should be assessed by either tapping on the tail or ears with the help of long pole and if the animal does not react, it should be approached. The depth of anaesthesia should be optimum if the jaws can be opened and the tongue exteriorized with little or no resistance. Other indicators would include responses to stimulation of body, feet, cornea, ears and tongue. The physiological parameters should be assessed and should include assessment of temperature, respiration, pulse and color of mucous membrane including condition of pharynx, gingiva and teeth. In case of emergency (depressed respiration or cardiac arrhythmias or depression) the animal should be revived.

Emergency drug including cardiac and respiratory stimulants should be kept handy at all times. The physiological parame-

ters should be assessed and should include assessment of temperature, respiration, pulse and color of mucous membrane including condition of pharynx, gingiva and teeth.

- Managing emergencies: Emergency drugs and equipment would be available during the entire operation. Adequate supplies of emergency drugs should be ensured at all times.
- Composition of team: Capturing large felids poses a challenge and therefore requires a skilled team comprising wildlife managers, biologists, trained veterinarians and most preferably an individual specializing in animal anaesthesia.

GUIDELINES FOR DECLARATION OF BIG CATS AS 'MANEATERS'

Both tiger as well as leopard are known to cause habituated loss of human life (man-eaters). Such confirmed 'man-eaters' should be eliminated as per the statutory provisions provided in section 11 of the Wildlife (Protection) Act, 1972.

Tiger as well as leopard are categorized under Schedule I of the Wildlife (Protection) Act, 1972, with highest statutory protection against hunting under section 9 (1) of the said Act. Hence, such species can be killed if they become dangerous to human life or are so disabled/diseased beyond recovery. Under section 11 (1) (a) of the Wildlife (Protection) Act, 1972, the Chief Wildlife Warden of a State alone has the authority to permit hunting of such animals becoming dangerous to human life or disabled or diseased beyond recovery.

However, as per the statutory requirement, the Chief Wildlife Warden of the State has to state in writing the reasons for permitting elimination before hunting the animal.

There are several reasons for a big wild cat like tiger or a leopard to get habituated as a 'man-eater', viz disability due to old age, incapacitation due to serious injury or loss/breakage of its canines etc. However, there may be several exceptions, and hence specific reasons have to be ascertained on a case to case basis.

The tiger bearing forests and areas nearby prone to livestock depredation, besides having human settlements alongwith their rights and concessions in such areas, are generally prone to 'man-eaters'.

Besides, loss of habitat connectivity in close proximity to a tiger source area owing to various land uses also foster straying of tiger near human settlements, eventually ending up as a 'man-eater'.

SUGGESTED STEPS ON LOSS OF HUMAN LIFE DUE TO TIGER / LEOPARD

Constitute a team for technical guidance and monitoring on day to day basis, as below:

- A nominee of the Chief Wildlife Warden
- A nominee of the National Tiger Conservation Authority
- A veterinarian
- Local NGO representative
- A representative of the local Panchayat
- Field Director/Protected Area Manager/DFO I/C - Chairman
- Set up camera traps near kill sites, besides creating pug impression pads to monitor the day to day spatial movement of the wild carnivore.
- Inform the district officials (collector/DM/SP) for duly alerting the local people to refrain temporally from the area where human death(s) has/have been reported, besides ensuring tranquility in the area from mobs/crowds of local people.
- Obtain/establish the ID of the aberrant animal causing loss of human life, through the committee constituted for the purpose, through camera trappings or direct sightings or pug impressions if camera trappings could not be done, besides collecting pieces of hair / scats of the carnivore (if available) for DNA profiling.
- A differentiation should be made between 'human kill' due to chance encounters and 'habituated man-eaters'. As most of our forests outside protected areas are right burdened, the probability of chance encounters is very high.

Further, tigers often use agriculture/sugar cane field and similar cover along river courses while feeding on livestock or blue bull, which may also cause lethal encounters with human beings. Such animals should not be declared as 'man-eaters'. However, confirmed habituated tiger/leopard which 'stalk' human beings and feed on the dead body are likely to be 'man-eaters'.

The declaration of an aberrant tiger/leopard as a man-eater requires considerable examination based on field evidences. At times, the human beings killed due to chance of encounters may also be eaten by the animal (especially an encumbered tigress in low prey base area). However, such happenings are not sufficient for classifying a tiger/leopard as a 'man-eater', which can best be established only after confirming the habituation of the aberrant animal for deliberate stalking of human beings, while avoiding its natural prey.

Under no circumstances, merely an animal resorting to cattle depredation should be declared as a 'man-eater', despite the fact it may venture close to human settlements. To avoid untoward incidents in such situations, the efforts to trap the animal (chemical immobilization/use of traps) should alone be resorted to. Set up trap cages (automatic closure) in areas most frequented by the carnivore (with appropriate luring) for trapping.

In case successive trapping

operation fails set up an expert team for chemical immobilization of the aberrant animal as per the annexed protocol.

The option of capturing the aberrant animal either through traps or chemical immobilization should be invariably resorted to as the first option. The wild carnivore thus captured, should be sent to a nearest recognized zoo and NOT released in the wild.

Elimination of a tiger/leopard as a 'man-eater' should be the last option, after exhausting the option of capturing the animal live as detailed in the SOP.

The Chief Wildlife Warden of the State after the above due diligence should record in writing the reasons for declaring the tiger/leopard as a 'man-eater'.

After 'declaring' the man-eater, its elimination should be done bya departmental personnel having the desired proficiency, while providing the fire arm with the appropriate bore size (not below .375 magnum). In case, such expertise is not available within the Department, an expert may be co-opted from the other State Governments or outside with due authorization.

No award / reward should be announced for destruction of 'man-eaters'.

PROCEDURE TO BE FOLLOWED IN TIGER STRAYING INCIDENTS/ AREAS PRONE FOR SUCH INCIDENTS: PREVENTIVE/ PROACTIVE MEASURES

(a) Identify the crisis spots / districts in the State.
(b) Conduct science based research and analysis to arrive at reasons for frequent straying of tigers in such areas.
(c) Prepare a google map indicating forest patches, territory of the tigers, nearby habitation and corridors.
(d) Form monitoring teams consisting of locals with wireless communication on 24X7 basis besides rapid response team.
(e) Establish an early warning system.
(f) Issue alert to all nearby villages to take utmost caution.
(g) Monitor the cattle kill and immediately pay ex-gratia / compensation in the case of eventuality.
(h) Use electronic surveillance to monitor the movement of the tigers during the night.
(i) Water holes, cattle kill, transmission lines should be regularly monitored.
(j) Put in place Rapid Response Team (RRT) for capturing the animal to avoid lethal encounter. The RRT to be equipped with the following:-
(i) A field van/mini-truck with built in rails for accommodating a trap cage, with space for equipments, attendants and staff.
(ii) A tranquilization kit with drugs for chemical immobilization.
(iii) Taser gun for instant immobilization of the animal.
(iv) 2 mobile phones for continued communication with the authorities.
(v) 4 wireless handsets.
(vi) 2 GPS sets.
(vii) 1 long ranging night vision for seeing objects in the dark.
(viii) A digital camera.
(ix) 4 trap cages (2 for tiger and 2 for leopard).
(x) 1 mini-tractor for transporting the cage in rugged terrain.
(xi) 2 search lights.
(xii) 2 radio collars with receiver and antenna.
(xiii) 2 portable tents.
(xiv) Portable hides - which can be set up fast, to be used for persons with tranquilizers
(xv) 2 folding chairs with table.
(xvi) Hand held audio system.
(xvii) Rope and net.
(xviii) First aid kits
(k) The rapid rescue team is required to ensure unobtrusive close monitoring of the animal with least disturbance, for tracking its movement.
(l) In addition, at places which are not waterlogged, camera traps should be set up (fixed to a post or a tree) for establishing the identity of the animal.
(m) The rapid rescue team also requires capacity building and 'hands on' training involving the WII and other relevant outside experts, if needed.

N S Dungariyal

Accusation & a plea from a maneater

By Dr A.J.T.John Singh, Member NTCA

The trail, shrouded in morning mist, along which I was walking with my mother, in one of the intact forests in the Himalayan foothills, was heavily littered with animal signs. There were tracks and dung of elephant, sambar, chital, barking deer and wild pig. There were sloth bear, Himalayan black bear and leopard signs too.

Overpowering the smell of all these animals was the odour of my race and there were old and new saucer-sized pugmarks, lumps of droppings, claw-marks at a height of 2-2.5m on the boles of large trees which had soft bark. Many of the bushes overhanging the path also had the strong whiff of my race. It was a clear sign that it was an ideal home for me, a young tiger about 10 months old, to grow as an adult under the protective care of my mother who had inherited this piece of jungle, rich in animals, from her mother.

It appears that generations of my mother's ancestors have lived in this forest, defending territory, hunting and raising family. When I was young I had a brother and a sister; brother got trampled by an elephant and my sister was bitten by a large snake. After their death my mother took care of me very affectionately and zealously guarded me from all possible dangers. Once in 4-6 days she would kill a prey, usually a deer or a pig, which gave us enough food and strength for the period.

Today she was keen to kill as attempts made by her last night were not successful. It is surprising that killing a prey, even in a forest rich in animals, is difficult for her who can move through the forest silently like a ghost. So today she was padding the trail silently, occasionally stopping, listening and looking around to locate a suitable animal to kill. Fortunately, there were no monkeys, either langur or the macaque, up in the canopy. Otherwise they would have alerted the entire jungle about our presence which would have warned the prey animals on our trail.

MP Ecotourism Board

As taught by her, I was following her at a distance slowly and silently. All of a sudden my mother stopped as her left forefoot was caught in a metal device which had two halves each with a row of long and sharp powerful teeth which had buried deeply

into the paw of my mother. My mother didn't scream but jumped here and there and tried to pull her leg away from the clutches of the device but the set of teeth got deeper and deeper into her paw, cutting the skin, muscles and blood vessels. Blood started oozing and soon moaning and groaning in pain, she lay on the ground panting and subdued.

I went around her, licked her face and the wound and nudged her to get up. Soon, we heard the sound of men coming. They were talking in a hushed tone. There were four of them, one had a heavy stick, another had a long spear and the other two had knives. My mother made one final attempt to free herself from the device but possibly it gave her more pain and she sat on her belly as if resigned to her fate. When the men came closer she gave her last warning growl — a signal for me to run away.

I ran up a densely-wooded hill slope nearby where there was a rocky area some hundred metres from the place where my mother lay trapped. There, crouching among the rocks, I watched what was happening to my mother. I could not see it clearly but I saw the man beating her on the head with the heavy stick, the man with the spear pierced her throat through the mouth and soon my mother fell silent.

The men hurriedly skinned her and the skin, with the head and the paws, was put in a gunny bag. Then the men swiftly removed the flesh from the body, the dismembered bones were put into another gunny bag and the rest — the stomach, intestine and the flesh — were thrown into the nearby bush. Although the men were at a distance of 100m, I could clearly see their face smeared in blood and sweat. Their faces got etched in my memory. I took a vow that when I grow up I will kill all of them one by one when they enter the forest again.

As I was only 10 months old, I had great difficulty in just surviving. My mother had given me some preliminary training to stalk safer prey such as peafowl, fawns and female deer. She had warned me that I should never make a frontal attack of either a deer with branch-like hard antlers or a wild boar with long curved sharp tusks. But till my mother died I had not made any kill myself. Now with no mother to protect me, with immense fear and care, I wandered through the forest, avoiding animals like the elephant, Himalayan black bear and the large male tiger of the nearby territory who my mother didn't like very much. I didn't know much about my father. Possibly, he also got killed by people. My mother used to tell me that he was so brave, swift and powerful that no animal in the forest would be able to kill him.

On the third day, I was extremely hungry and I thought that any time I may faint. Luckily I came upon a peacock in full train feeding on fallen fruits of an Indian plum tree under a thorn bush. Fortunately, it was only a few metres away when I saw it. I rushed towards the cock, it tried to fly but its long tail feathers got entangled in the thorn bush and before it could free itself, I grabbed and killed it.

Biting and clawing, with difficulty, I removed the feathers and ate the juicy flesh which was still warm and alive. A few days later, hunger prompted me to look for some food. In one clearing, I saw a group of wild pigs feeding. There were many healthy piglets with the group. I rushed at them. The pigs initially ran away but after some distance clustered together and advanced towards me aggressively.

In the melee which followed soon after my rush, one fat piglet fell into a ditch. The group stood around for some time threatening me and then ran away leaving the screaming piglet in the ditch. After the group left the place and when I realized that I had no danger from the group, I got into the ditch, killed the piglet and carried it into a dense cover and ate it peacefully. Gradually, as my hunting skills improved, I killed and ate regularly and steadily grew into a large male tiger. But often I remembered the faces of the four men and the thoughts of avenging them gave me more and more strength to hunt regularly and become stronger and stronger.

It was a winter month and most of the sambar stags in my jungle were sporting hard antlers and one among them was huge with magnificent antlers. Often I saw him proudly and gracefully walking through the jungle as if he was the lord of the jungle.

Many female sambar had a great liking for him. Often I thought of killing him because if I kill him, I thought that there will be sufficient meat for me for several days and I need not hunt at least for 10 days. But I was a little wary of his hard antlers as its ivory tips were very sharp and if I bungle in my first rush the antlers can cause serious injury to me which could eventually turn to be fatal. I hunt alone and if I am injured I can't hunt for several days which will weaken me and I could be challenged by the large male in the nearby territory who has an eye on my rich territory which has several females.

One late forenoon, I was basking on the rock slope from where I saw my mother getting skinned. Soon there was a huge commotion in the jungle — dogs were barking, men were shouting and I saw the sambar stag running through the bushes followed by the dogs and several men. The stag was running towards a pool in the forest where it could protect itself by standing in the water and hitting the dogs with its powerful forelegs. But for the

men, possibly the stag would have saved itself from the dogs. When the men arrived on the scene, the dogs barked viciously, jumped in the water lunging towards the stag which threatened the dogs by swaying its antlers and hitting the water with its forelegs. The dogs stayed back, fearing the branch-like antlers and its powerful hits on the water with the forelegs. Now, the man with the spear advanced closer to the stag and with all his might he threw the spear on to the side of the deer a little behind its shoulder blade.

The sharp spear went deep into the body of the stag. Yet, the stag, fearing the dogs, didn't leave the safety of the pool. The men gathered large stones and threw them at the stag. Some stones missed the stag but many hit him hard on the face, neck and even near the spear. Slowly, the stag sank to the ground and the men screaming and shouting rushed to the stag and holding its tail, antler and the legs with difficulty pulled it out of the water. Then they started cutting the stag into pieces, with knives and an axe, wrapped the blood-dripping large pieces of the stag in tall grass cut from the nearby grass patch and carried away their booty. The dogs stayed around for some time licking the blood on the ground and eating fragments of meat scattered around. Then they sauntered after the men.

Now I am nearing 10 years of age and over the last five years or so I have mated with several females and fathered many cubs. Most of them, particularly my sons, as they grew up, disappeared from my area. Yet during the last few years I have seen lots of worrying changes in my forest. I understand that our home, once continuous for hundreds of miles along the foothills of the great mountain, is now broken into several pieces by the greediness and thoughtlessness of human beings.

They did not realize that the intact vast forests are much more beneficial to the human race than to our race. For example, they make use of the water, on which every life and civilization is dependent, which arises from these forests, much more than we do. They break the habitat but, in spite of having several deliberations, don't have either the vision or dedication to restore the break which is possible in many places.

I hear more human voices in the jungle and often I find people camping in the interior parts of the jungle. Occasionally, I come across signs indicating that animals including my race have been killed. Rains have become less and less now and more cattle, as they don't have much food around the villages, come into the forest for grazing. The cattle people set fire to the forest to get the flush of grass for their cattle. I don't understand why humans and their cattle can't manage their needs outside the forest where the land available to them is much more than we have in the forest.

Once I was stalking a wild boar which was feeding at a distance. The wind was blowing from the boar towards me. I use my long whiskers to detect the wind direction. The boar was facing away from me and rooting the ground. I was in an ideal situation to hurry from behind and kill him by biting through his nape. As I was about to rush, a man came along the trail along which the boar was feeding. On seeing him the boar grunted and ran into the forest. I was disappointed. I had a clear look at the man and realized that he was one among the four who killed my mother.

The years had taken away much of my anger. I had no desire to kill him. Yet with the intention of threatening him I stood on the path and growled. The man, brave or stupid he should be, instead of running away took a stone and threw at my face. The stone hit me hard below my right eye and the pain aroused my dormant hatred for him. In anger I growled and bounded towards him and the man, a coward, tried to run. But within few bounds I caught him by the head and the neck and brought him down. I crushed his skull like an egg shell. It was unbelievable that he was so fragile and he quivered and died within seconds. I never thought that human beings are so weak. I lay down near his body for some time but the smell of the warm blood oozing from his nape attracted me. I smelt the blood and it was pleasant. I licked the blood and tasted the flesh around his neck. It was tasty. I didn't realize that I was in the process of becoming a man-eater, a terror that needs to be weeded out of the forest for the welfare of mankind.

I hear rumours that the skin and bones of my mother, and many of my kin, were carried by people beyond the big mountain, at the base of which I grew up, to the countries beyond where the people use the skins as dresses and the bones for making medicine. I hear there is big money in this business. Can't the people beyond the mountains live without our skins and bones? They can easily make dresses out of materials like cloth and wool and they can certainly get other medicines for their ailments.

Only change of their heart, not to use our skins and bones, would ensure the survival of my kith and kin in the forests on the southern slopes and the foothills of this great mountain.

Otherwise throngs of men will continue to kill my kith and kin and send the skin and bones across the mighty mountain which will eventually exterminate my race.

— A man-eater

K'taka villagers come to trapped tigress' rescue

THE TIMES OF INDIA, NEW DELHI
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K'taka villagers come to trapped tigeress' rescue

TIMES NEWS NETWORK

New Delhi: A tiger or leopard accidentally trapped near human settlements often meets a violent end. Invariably, raging mobs gather to attack the animal, leading to human casualties. But what happened in village Nidugumba, about 1.2km away from the edge of Karnataka's Nagarahole National Park, could well be cited as a model response in such situations.

On Tuesday morning, residents of the village in Kodagu district were surprised to find a young tigress whose left paw was snagged in a barbed wire fence of a coffee estate. According to NGO Wildlife Conservation Society (WCS), the coffee planter, Sullimada Muthanna, as well as other villagers prevented any mobbing and harassing of the struggling tiger.

The forest staff of Nagarahole was promptly informed. Responding swiftly, a team of forest rangers, staff and veterinarians, led by field director Basavaraj Hosmath and deputy director Kumar Pushkar took control of the situation. WSC said the villagers cooperated with the forest team, allowing them to function professionally.

The tigress was tranquilized, then untangled from the fence and transported to the Mysore Zoo. Experts at the zoo will be examining the animal's injuries, and assessing her age and health status so that an informed decision can be made about her future.

Nagarahole has a high tiger density of around 10-12 animals per 100 sq km. WCS said animals from the national park stray out due to competition with other members of their species.

"Such incidents of tigers straying into villages are bound to happen around wildlife parks such as Nagarahole, Bandhavgarh or Corbett, which have had success in tiger conservation. In a way, these are signs of success. But people need to be educated on how to deal with these situations. Nidugumba village has shown the way," said K Ullas Karanth, director of science (Asia), WCS.

WALKING INTO A MESH: A tigress which became entangled in a barbed wire fence 1.2km away from the Nagarahole sanctuary was rescued by forest officials and moved to Mysore zoo for treatment

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