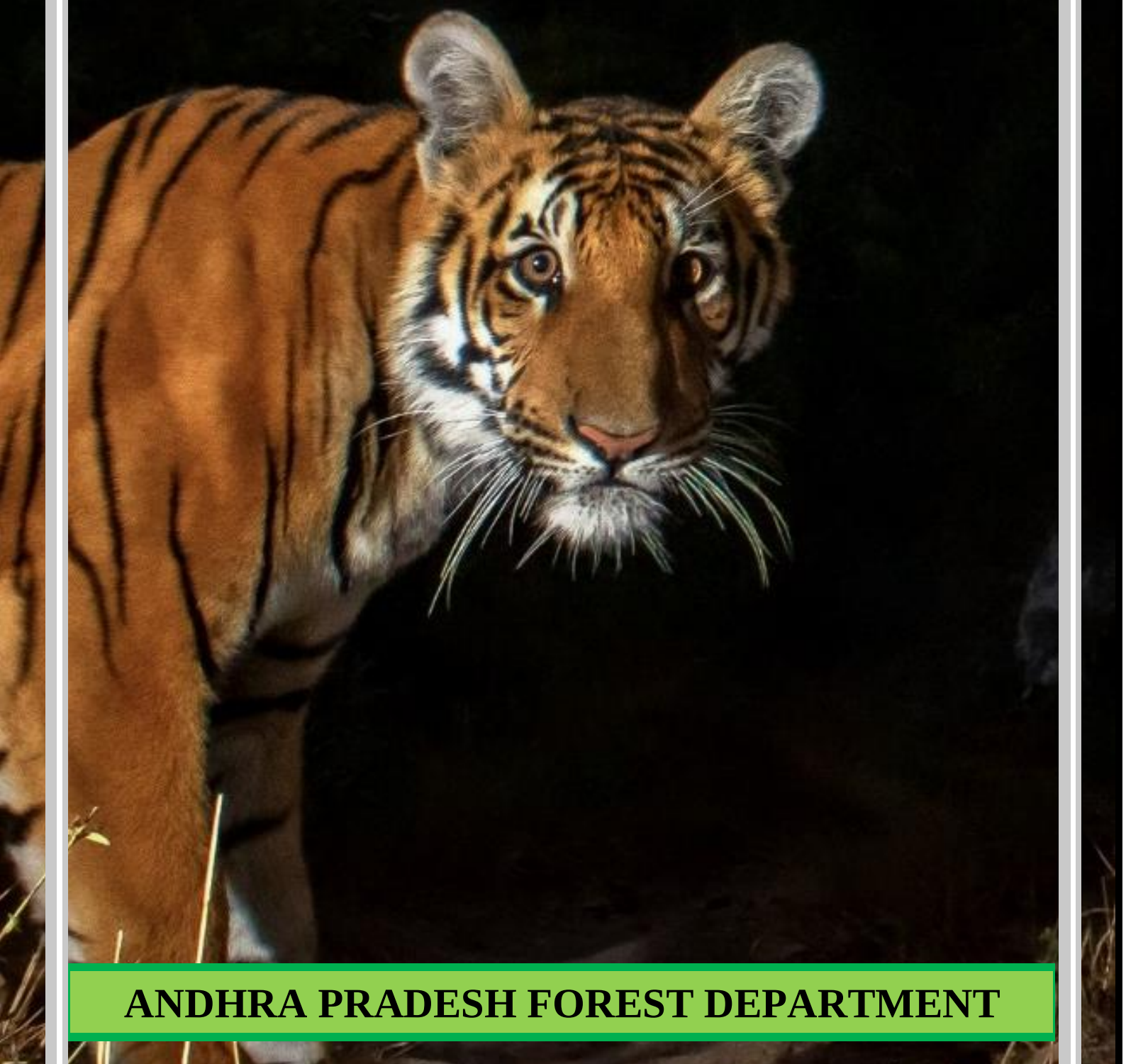
TIGER CONSERVATION PLAN
NAGARJUNASAGAR SRISAILAM TIGER RESERVE
(2023-24 To 2032-33)

VOLUME V
NTCA ANNEXURES



ANDHRA PRADESH FOREST DEPARTMENT

GOVERNMENT OF ANDHRA PRADESH

TIGER CONSERVATION PLAN
NAGARJUNASAGAR SRISAILAM TIGER RESERVE
(2023-24 To 2032-33)

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ANNEXURE - I

COMPENDIUM OF

GUIDELINES & CIRCULARS

ISSUED

BY

DIRECTOR

(PROJECT TIGER)

NEW DELHI

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November, 2004

'Project Tiger' implementation by States is governed by the Government of India guidelines and the Indian Board for Wildlife Task Force Report on Project Tiger. The Task Force had suggested adherence to the holistic environmental approach for field management of Tiger Reserves. Para 8.7.1 of the report explicitly states that in Wildlife Reserves, wildlife interest must take priority over timber production. The Steering Committee of Project Tiger (1976) has emphasised that forestry operations in the buffer zone should be organised and reoriented to keep the interests of wildlife as the primary objective. The general strategy of the Project, therefore, involve setting up of several Tiger Reserves each including a "core area" free of all human use, and a "buffer" having conservation oriented land use. The Management Plans for each Reserve is prepared on the three cardinal principles:-

- Elimination of all kinds of exploitation and disturbance from the core area, while rationalizing such activities in the buffer.
- Limiting the habitat management to repairing the damages inflicted on it by biotic pressure so as to resurrect the habitat in its natural form.
- Researching facts about habitats and wild fauna, while monitoring the changes in flora/fauna owing to Project Tiger initiatives.

The report of the Task Force of the Indian Board for Wildlife (1983) on "Eliciting Public Support for Wildlife Conservation" also emphasised that the security of wildlife reserves should be ensured by constituting "buffer belts" surrounding core units. While the core should be free from all human use, the buffer should allow restricted human use with a **strong conservation bias.** This would require people to forego all use of forests in the core, while considerably curtailing such use in the buffer zone. In order to compensate for these restrictions, the productivity of the outer depleted area should be managed as a **"multiple use surrounded"** in terms of both agriculture and other related activities with viable alternatives. Therefore, such multiple use areas should be regarded as **"special areas for eco-development".**

The buffer zone/multiple use area is a delineated area around a Core Zone of a Tiger Reserve/National Park/Sanctuary, which facilitates:

- **Extension Buffering** (Providing Habitat Supplement to the spill over population of wild animals from the core)

- **Social Buffering** (Providing socio economic function to local people living in such areas so that their resource dependency on the protected area/core zone of tiger reserve is reduced)
- The habitat conserved in the buffer zone also serves as a **corridor** for wild animals.

Guidelines for the Management of Buffer Zone/Multiple use Areas of Tiger Reserves:

The buffer zone of a Tiger Reserve has twin functions, viz.:

- To provide habitat supplement to the spill over population of wild animals from the core area, conserved with the active cooperation of stakeholder communities, and

- Providing site specific, need based, participatory eco-development inputs to local stake holders for reducing their resource dependency on the core zone and for eliciting their support towards conservation initiatives in the area.

Therefore, both the buffer zone and the multiple use area, if any, surrounding the buffer, should be subjected to conservation oriented community programmes as a part of eco-development, taking care not to distort the village dynamics in an artificial manner resulting in the entry of market economy, which may make the whole exercise counter-productive.

Hence, the following guidelines are made for the management of buffer zone/multiple use areas around Tiger Reserves:-

1. The Management Plan of a Tiger Reserve should have a separate section/chapter for buffer zone highlighting the strategy for eco-development in the impact area. The numerous village level micro plans would form part of this section.

   (A) Communities living in the buffer zone/multiple use area of Tiger Reserves, Reserved Forest, Protected Area (having the status of Sanctuary, Conservation reserve, Community reserves or revenue land) should be involved in the management of Tiger Reserves with reciprocal commitment as a part of overall conservation strategy. The reciprocity would decide in the mutual *quid pro quo of*

   (i) Fostering site-specific eco-development initiatives based on participatory micro-level village plans to provide alternative resources to people apart from livelihoods. The eco-development inputs, interalia, may include biomass substitution (eg. alternative fuels), biomass generation and forestry, eco-tourism, agriculture, watershed management, small irrigation, local livestock improvement, agro processing, artisanry and any other site specific item as desired by the people, not having a deleterious effect on Protected Area resources.

(ii) Reciprocation by the local people through specific measurable actions as per a MOU for improving protection and conservation, which interalia, may include curtailment of illicit grazing, reducing fuel wood and small timber collection from Protected Areas, increasing participation in fire protection and anti-poaching efforts.

(B) Community involvement in the management of Sanctuaries, Conservation Reserve and Community Reserve, in case they form part of the buffer zone of the Tiger Reserve, should be promoted as provided in sections 33B, 36B and 36D of the Wildlife (Protection) Act, 1972.

2. No intensive form of land use like mining, quarrying and the like should be fostered in the buffer zone, and due care should be exercised while granting NOC to such activities in private/revenue areas, if any, included in the buffer/multiple use area.

3. No 'clear felling' should be allowed in the forest areas of the buffer/multiple use surround included in the Tiger Reserve. Such areas should be managed by specially formulated, site specific **'forest plans'** forming part of village level microplans and should be executed with the active involvement of local communities. Only 'selection-cum improvement fellings' should be done with the main objective of sustaining the demands of people living in the area.

4. Protected Area/Ecotourism activities in the buffer zone/multiple use areas of Tiger Reserve should be fostered as a component of eco-development with the active involvement of stakeholder communities.

5. Capacity Building of field staff as well as Eco-Development Committee members should be undertaken on a regular basis.

(DR. RAJESH GOPAL)
IGF & DIRECTOR, PROJECT TIGER

‘MENU’ OF OPTIONS EMERGING FROM BEST PRACTICES UNDER THE INDIA ECODEVELOPMENT PROJECT (BASED ON A STUDY BY THE “PEACE INSTITUTE”, NEW DELHI):

A) POLICY AND LEGAL MATTERS

1) It is evident that sites like Periyar TR, Kanha TR, KMTR, Gir NP, Buxa TR and Pench TR which have benefited from **clear policy directives** and **enabling legal regime/s** have produced commendable results. Clearly in future timely planning and action on devising national / state level ecodevelopment policies that facilitate institution building would be sine quo non for achieving lasting results. Further any policy sans enabling legal regime/s shall remain at best a half hearted step.

2) States need to see the results of IEDP as more than just a short term project’s outputs but devise policy tools that **address threats that go beyond the control of the PA management.**

3) **Reciprocal commitments** by the beneficiaries for park protection as provided by the IEDP has gone a long way in improving park’s protection and built good synergy between the people and the park. This should be incorporated as an essential element of any future ecodevelopment strategy.

B) INSTITUTIONAL MATTERS

a). Effective management planning as experienced by Periyar TR, KMTR, Kanha TR and Gir NP needs to be emphasised.
b). Specialised EDCs at Periyar has been a singular exceptional initiative under the IEDP. Periyar TR model should accordingly be adapted elsewhere too.
c). Transfer of responsibility to manage EDC affairs at Kanha TR and Pench TR in form of an EDC member being nominated as the Joint Secretary of EDC is a positive development whose success needs to be monitored and replicated elsewhere if experiment at Kanha and Pench show encouraging results in form of EDC empowerment.
d). Unified Buffer division at Kanha TR is a success story which should be replicated in other such Pas.
e). Capacity Building of frontline staff and the local people at Gir NP through focussed training and long term **EE** has changed attitudes and empowered staff as well as the local people. The Gir experience needs to be widely disseminated and adapted at other sites.

C) CROSS CUTTING INNOVATIONS

a). Income Generating Activities (IGAs) for social change at KMTR is an excellent example of visionary leadership and team effort.
b). Women’s saving and credit groups (SHGs) at GHNP are again a remarkable effort resulting from motivated leadership.
c). Eco tourism and use of ‘Mowgli’ as the Park’s mascot at Pench TR is an innovative use of historical / literary fame for attracting tourists.
d). Pilgrim management at Periyar that has transformed a recurring problem into an opportunity is a glaring example of successful conflict management.

IMPACT OF IEDP INPUTS IN VARIOUS SITES VIS A VIS ILLEGAL ACTIVITIES / REDUCTION IN CRIME INVOLVING THE FRINGE DWELLERS

PA	Relevant Inputs	Impact	Remarks
Periyar	A). Revised Management Plan, Staff training, Staff welfare measures, patrolling camps, watch towers, improvement of roads, trek paths, and vehicles for improved mobility B). Formations of EDCs and participatory micro planning. Reciprocal commitments by EDCs. C). Awareness campaigns and EE of people in fringe areas	1). Illegal Ganja collection reduced by 80 % 2). Illegal Sandalwood felling reduced by 90 % 3). The ex-Vayana (Cinnamon) bark collector EDC apprehended 77 cases of illegal extraction leading to full control over illegal extraction which was found to be about 30,000 kg (10,000 trees) annually as per a study conducted in the year 2000. 4. Forest fire incidences have stabilized due to greater transparency, better reporting and patrolling. 5. Regulation of Sabarimala pilgrimage attracting around 50 lakh pilgrims per year by the SAPP EDC have protected forests from illegal felling of trees for fuel wood by substituting fire wood by LPG.	Periyar is an excellent example of park – local people synergy that benefits both Park and the Park fringe dwellers.
Pench	A). Establishment of patrolling and anti-poaching camps, effective wireless network, fleet of vehicles and motorized boats, improvement of roads, labour huts and staff quarters, Surveillance along HT lines, Erection of Game Proof Walls. Strategic creation of water bodies in the Park. B). Participatory micro planning and the formation of EDCs. Distribution of Bio gas plants, fuel efficient stoves and LPG connections. Pasteur development in fringe villages. Development of informer networks with EDC assistance (Reciprocal commitment). C). Promotion of Eco tourism.	1). There has been no incidence of wild animal poaching in 2002 and 2003. 2). The menace of illegal fishing in the Totladoh reservoir has been effectively stopped during the year 2002-03. 3). Incidences of forest fires and illegal grazing have been effectively controlled. 4). Illegal collection of fire wood from the Park has been brought under control as the people have reduced their dependence on fire wood. 5). Incidence of road kills along the National Highway have been effectively controlled by judicious creation of water bodies for animals so that they no longer require to cross the NH in their search for water.	As a result of IEDP there is now a better understanding and appreciation of each other's problems and build up of good trust between the Park and the people in the fringe villages.

Gir	A). PA consolidation, strengthening of check posts, improvement in wireless communications, erection of watch towers, vehicles. Training of staff and EDC members. B). Participatory micro planning and formation of EDCs C). Environmental Education and awareness generation amongst the people of the fringe villages.	1). Park boundary better defined and demarcated by rubble wall over 41 km. 2). Long standing encroachments over Park land voluntarily withdrawn by the fringe villagers. 3). Reduction and regulation in grazing by the Maldhari and other cattle. 4). Reduction in instances of illegal forest fires in the Park. 5). Reduction in instances of illegal fuel wood collection from the Park	By addressing social issues the PA authorities have been able to reduce Park people conflicts
Buxa	A). Upgradation of Management Plan, training of staff, construction of staff quarters, consolidation of roads and boundary surveys and demarcation, augmentation of wireless communications. B). Participatory micro planning, constitution of EDC and FPC, Reciprocal commitments. C). Environmental education and awareness activities.	1). No poaching of mega fauna in last 4 years. 2). No fire in BTR for last 4 years. 3). No assault on staff in last 4 years. 4). Illegal firewood collection reduced by 70% 5). Reduction in illegal grazing. Some of the fringe FPC/EDC have invested in a cattle pound and have been quite effective in controlling grazing in their areas.	Clear government orders have formed the basis of EDC and FPC formation. A confederation of FPCs/EDCs at beat level for better synergy is a good innovation.
Ranthambore	A). Preparation of Management Plan, enhancement of Park infrastructure including staff quarters, roads, wireless network, survey demarcation and fixing of boundary pillars, training of staff and EDC members. B). Establishment of EDCs and participatory micro planning. Village development activities. C). EE and awareness activities	1). Illegal grazing significantly controlled. 2). Poaching of animals under control. 3). Distribution of LPG and other fuel saving measures has reduced incidences of illegal and felling of trees and removal of fuel wood as head loads. 4). Boundary demarcation has controlled encroachment over Park land. 5). Incidences of forest fires have virtually been eliminated in the core and the buffer areas of the Park.	a). Tiger population in the Park has shown an increasing trend. b). The Park has faced severe fund flow and timely sanction of works problem during the IEDP implementation.

Palamau	A). New Management Plan prepared. Regional planning Committee established and functional. Roads improvement, staff quarters, Field equipment sets for frontline staff, new vehicles for improved mobility. B). Participatory micro planning and formation of EDCs in 65 villages. Gender considerations taken into account through a women coordinator. Women SHGs constituted. Funds channeled through the EDC account for ED activities.	1). Reduction in grazing pressure on forests. 2). Joint patrolling of park by staff and the EDC members. 3). EDC in villages in Kechki east range have assisted the FD in effecting two major seizures of timber smuggling in 2003.	a) Palamau suffers from a serious law and order problem in form of extremists inside the park.
Nagarhole	A). Solar fencing of park boundary, Elephant proof wall and trench, Field staff quarters, anti poaching camps, road maintenance, watch towers, new vehicles. B). Participatory micro planning and establishment of 108 EDCs. ED activities like fuel saving devices, housing construction material, EPTs, and repairing of community halls and schools, Income Generating activities. Development of *Hadis* emphasised. Tribal relocation programme. C). Awareness generation and EE of local communities.	1). Illicit grazing of livestock from the EDC villages in the park has been almost eliminated. 2). EDC villagers have formed village forest protection force (VPF) which supports FD in protection of park against fire, illegal felling and poaching of wild animals. 3). Solar fences have reduced elephant – man conflicts. 4) The number of forest – wildlife offences have dropped from over 300 in 1997-98 to under 150 in 2002-03.	a). Park – people relations have improved significantly as a result of the project.
GHNP	Non IEDP site	-	-
KMTR	Non IEDP site	-	-
Kanha	Non IEDP site	-	-

ANNEXURE-II

MENU OF OPTIONS IN ECODEVELOPMENT PRACTICES (BASED ON A STUDY BY THE IIFM, BHOPAL)

Sl. No.	Problems (General for all PAs) Nature of problems	Strategies to tackle problems (General)	Strategies (Special)	PAs where practiced
1.	Large human and cattle population (Dependent on forest)	• Alternative employment in collaboration with other departments. • Awareness generation • Alternative livelihood provided • Started stall feeding	• Measures for transboundary cooperation	Buxa
2.	Grazing	• Epidemic control by prophylactic immunization • Alternative employment in collaboration with other departments.	• People sold away cattle	KMTR
3.	Poverty & Livelihood problems	• Trust building efforts • Installation of bio-gas, distribution of pressure cookers LPG	• Micro-credit scheme for women empowerment • Training and tourism centers • Pavitra van around temple • Adoption of school by Forest Department	Buxa GHNP Nagarhole
4.	Illicit felling & encroachments	• Environmental education and awareness generation • Effective management planning	• Boundary pillars created to demarcate park boundary	Pench / Ranthambhore, Gir, Periyar
5.	Fire	• Fire control • Regular patrolling • Increase of staff strength • Alternative employment in collaboration with other departments. • Maintenance of roads, fire lines, trenches, patrolling tracks etc.	• 6250 kms of 'D' lines & fire lines cleared	Nagarhole
6.	Poaching	• Equipping staff with rifles, wireless & vehicle etc.	• Creating EDC of ex-poachers to stop poaching • A team of anti-poaching watchers created • Formulation of forest protection force • Yearly census of wild animals • Aranya Sena	Periyar Ranthambhore Nagarhole Periyar
7.	Human animal conflict crop raiding		• Feedback from tourists • Nature Camps	Ranthambhore Periyar

8.	Low participation of women	• Gender empowerment through training programmes	• Capacity building of the local people	Gir
9.	People's Participation		• Transfer of responsibility: Joint Secretary of EDC • Three types of specialized EDCs: Neighbourhood, user-group & professional groups EDCs. • Pilgrim management and conservation. • 'Mowgli' as a park Mascot and its impact on tourism • Providing a legal basis to Ecodevelopment. • Clear Govt. orders for effective institutionalization • Reciprocal commitments from people	Pench Periyar Periyar Pench KMTR / Periyar GHNP

ANNEXURE - III

ILLUSTRATIVE, INVENTORY OF POSSIBLE ACTIVITIES UNDER ECODEVELOPMENT IN CONSERVATION AND EXTENSION BUFFER ZONES OF PROTECTED AREAS (Source: WII)

Note: Depending upon site attributes (climate, terrain, soils, present patterns of farming, fishing, livestock raising, practices of other resource use, status of conservation/degradation, potential for restoration, variety of non-wood forest products, local skills, existing and possible infrastructure etc.) a holistic site-specific package of measures in an appropriate combination most suited to the given site should emerge as a result of a fully participatory planning process, involving local people, NGOs (Is) and government agencies (concerned with land and resource use, and rural development) as conducted by the PA management with the coordinating assistance of district administration.

A. In Forests, grasslands & scrub-savanna lands

(i) Orientation of forestry operations for the concurrent promotion of biodiversity conservation and meeting resource needs of and generating employment for local people.

(ii) Joint management of forests, grasslands and scrub-savanna lands with formalized prior agreements for substantial sharing of (even exclusive claim on) usufruct, in return for direct contribution to protection and conservation.

(iii) Organized collection of important non-wood .forest products with measures to ensure long term sustenance of productivity.

(iv) Cultivation and/or organized collection of medicinal plants, essential oil bearing herbs, mushrooms, pepper, cardamom, other species, tussar silk cocoons etc, which is compatible with other forestry objectives, especially conservation and other local interests.

(v) Preferential and concessional availability of wood and non-wood resources to local people directly participating in conservation of forest and other resources.

(vi) Pasture improvement through weed suppression/eradication and enrichment planting with complete or rotational closures.

(vii) Economic employment generation through weed suppression *e.g. Lantana* harvests for pulp, chipboard or basket making on small or cottage industry scale.

(viii) Providing green fodder at beginning of monsoon by hiring irrigated fields, at least during the 'gestation period' to enable people to take to rotational grazing/ lopping and stall feeding.

(ix) Rotational lopping and promotion of goatary subject to stall feeding based on sustainable lopping regimes.

(x) Harvest of green grass and plant fodder during monsoon in designated areas (if necessary, rotational) in the 'conservation' and 'extension' buffer zones.

(xi) Harvest of grass at the end of monsoon and providing hay in return for cooperation in observance of regulated grazing/lopping.

(xii) Special consideration to exclusive pastoralists in above measures, backed where necessary by relocation from forests and a viable package of rehabilitation in other near by lands (or forests where non-forest land is unavailable) with green fodder farms (grass and/or fodder trees/plants).

(xiii) Simple water harvesting and catchment treatment works.

(xiv) Preferential employment to locals in all the above works.

B. In private farms

(i) Improved dry farming techniques (improved seed, manure/ fertilizer regimes).

(ii) Efficacious water harvesting (surface and ground water).

(iii) Soil conservation measures.

(iv) Preference to cash crops *e.g.* pulses, oil seeds, spices, cotton, medicinal plants.

(v) Agroforestry.

(vi) Sericulture & horticulture with assured employment through these on one's own land and from other community works, in order to tide over the 'gestation period'.

(vii) *Jhumming areas.:* l}Partial switch over to agro-forestry and/or cash crops (including medicinal plants and plantation crops) with assured employment through these work on one's own land and on other community works, in order to tide over the 'gestation period'.

(viii) Apiculture.

C. Minor Irrigation

(i) Simple diversion or diversion cum storage type micro-minor irrigation schemes including development of village tanks with preferential employment to local people.

(ii) Lift irrigation schemes using micro-hydel (or grid where available) power or pumpsets, based on rivers, reservoirs and wells.

(iii) Bore well irrigation, where feasible.

D. Animal Husbandry, dairying and wool crafts

(i) Phased reduction in population of scrub livestock and improvement of breed through controlled fertilization of female stock in proper health and age with males of better local breeds, aided by sterilization of scrub bulls.

(ii) Goatary and sheep raising subject to stipulations suggested under ' A ' above.

(iii) Cooperative dairying with marketing support.

(iv) Support to small scale enterprises based on meat and wool.

E. Fisheries

(i) Exclusive rights to organized cooperatives/user groups of local people in all situations, subject to observance of regulations for sustainability and optimal economic productivity - especially, closed areas/seasons and mesh size of fishing nets, and cooperation in ensuring ban on use of explosives and other forms of poaching.

(ii) Marketing support backed by cold storage and appropriate transport arrangements.

(iii) Special to deltaic mangroves: Sustainable prawn culture without prejudice to natural regeneration in the estuaries.

(iv) Special to coasts: Sustainable harvests using sail and/or powered boats with appropriate back up to keep away large scale commercial operators exploiting directly. The latter should acquire the catch on reasonable payments from user groups.

F. Ecotourlsm:

(i) Obligatory use of local guides (after training) on nature trails, trekking and mountaineering routes.

(ii) Preferential and assisted allocation of way side lodges on long trekking mountaineering routes to locals, with a back up of micro-hydel power and fodder development to mitigate pressures on forests and pastures in high altitude areas.

(iii) Development of trekking routes in tracts which have potential for ecotourism.

(iv) Preferential employment to locals in protected areas and tourism facilities, after education and training as necessary.

(v) Promotion of local handicrafts as tourist souveniers with appropriate sale outlets.

G. Infrastructure

(i) Microhydel/ grid/ solar power for energy for cottage industries and local value addition by processing.

(ii) Ropeways or trails, especially for goods movement in difficult and remote high altitude areas so as to ensure better economic returns from products exported and economic prices for goods (including food) imported.

(iii) Wind mills/water mills for food processing and crafts *e.g.* turnery.

(iv) Piped (gravity) supply, hand pump or open wells for drinking water.

H. Cottage Industry & Handicrafts

(i) Promotion based on local skills with appropriate technological and infrastructure support.

(ii) Curing/processing of collected/cultivated products *e.g.* medicinal herbs and essential oil for value addition.

(iii) Investigation of potential plants/products by pursuing ethno botanical and ethno zoological studies and rich development for consumption/marketing.

Development Projects

(i) Obligated to have a local orientation so that they become part of local area development and in no case upset local people's resource equations, especially in relation to CPRs. Appropriate compensation/alternatives to be built into project costs.

(ii) Obligated to compensate by providing inputs into site-specific packages of ecodevelopment measures *e.g.* lift irrigation along reservoir and along the river upstream and downstream.

(iii) Obligated to allow (where admissible *vis-à-vis* the PA) local people to farm in draw down areas by providing lift irrigation facilities.

(iv) Preferential employment to locals, if necessary after arranging education. and/ or training.

CENTRALLY SPONSORED SCHEME

PROJECT TIGER

XTH FIVE YEAR PLAN

GUIDELINES

****

PROJECT TIGER DIVISION
MINISTRY OF ENVIRONMENT & FRORESTS
GOVERNMENT OF INDIA

RESUME

Project Tiger is a centrally sponsored continuing scheme. This **focussed project** has a **holistic approach** for conserving the **eco-system** in its totality by focussing initiatives on the **flagship species – tiger**.

The project, launched in April 1973 in 9 eco-typical specially designated areas of the country, has a **core – buffer strategy**. While the core area has a completely **wildlife conservation oriented land use**, the buffer is treated as a **multiple use zone** to provide vegetal connectivity for spill over population of wild animals from the core conservation unit. In addition, the buffer zone also facilitates implementation of site specific eco-developmental inputs for eliciting the support of stake-holder indigenous people towards tiger conservation.

The pattern of funding is 100% central assistance for non-recurring items, and 50% for recurring ones. The non-recurring items basically involve structural inputs to improve the field formations and recovering the habitat for fostering a viable population of tigers. The recurring expenditure involves protection, water development, maintenance of forest roads, veterinary care and the like. **During the Xth plan, the guidelines of the Project Tiger remain the same and there is no deviation from the past. However, there is merger of two ongoing schemes viz. Beneficiary Oriented Tribal Development Scheme and Eco-development Scheme around Protected Area.** The eco-development and BOTD activities in end around tiger reserves would be implemented through the funds available under Project Tiger. It is relevant to add that in the two merged schemes also **there is no deviation from the guidelines adopted earlier,** and the merger has been done during the plan period to faciliate administrative convenience for ensuring the necessary complementary effect. **Thus, during the Xth Plan the Project Tiger is a merged scheme of three earlier schemes without any change in the basic character of the schemes.**

Title of the Scheme "PROJECT TIGER"

A PROJECT TIGER

1.1 Description of the Scheme and its objectives

Project Tiger was launched in 1973 with an objective "to ensure maintenance of a viable population of Tigers in India for scientific, economic, aesthetic, cultural and ecological values and to preserve for all time areas of biological importance as a national heritage for the benefit, education and enjoyment of the people".

The Project has been successfully implemented, and at present there are twenty seven Tiger Reserves in seventeen states, covering an area of 37761 sq. km. The selection of reserves was guided by the need to conserve unique ecosystem/habitat types across the geographic distribution of tigers in the country. Project Tiger is undisputably the custodian of major gene pool of the country and a repository of some of the most valuable ecosystem and habitats for wildlife.

For the purpose of management, tiger reserves are constituted on a **'core – buffer'** strategy. In **core area**, forestry operations, collection of minor forest produce, grazing, human settlement and other biotic disturbances are not allowed and is singularly oriented towards conservation. The **buffer zone** is managed as a **'multiple use area'** with conservation oriented land use, having the twin objectives of providing habitat supplement to the spillover population of wild animals from the core, apart from facilitating site specific eco developmental inputs to stake holder communities. **The main thrust of the project is protection and mitigation of deleterious biotic impacts with a view to comprehensively revive the natural ecosystem in the reserves for fostering a viable population of tigers, co-predators and herbivore.**

Upto 1979-80, the scheme operated as a 100% Centrally financed (Plan) Scheme, but during the VI Five Year Plan i e., 1980-85, the central funding was reduced to 50% and the State Governments contributed the matching graph. Since then, the pattern of funding has been 100% Central assistance on expenditure of non- recurring items and 50% that on recurring items.

An amount of rupees 172.65 crores has been provided as Central assistance since inception of the Project Tiger (from 1973-74 to 1997-98). The Plan-wise break up of the Central assistance is as follows:

Table-I

Plan	Central assistance to all Tiger Reserves (Rs. in lakhs)
IV Plan (only 1973-74)	2.53
V Plan (1974-75 to 1978-79)	387.25
Roll-ing Plan (1979-80)	63.90
VI Plan (1980-81 to 1984-85)	494.86
VII..PIan	1475.42
1990-91	700.98
1991-92	549.81
VIII Plan	3890.09
IX Plan	7500.00
2002-2003	2200.00
TOTAL	**17264.84**

1.2 Justification of the Scheme .

This is an ongoing project and is proposed to be continued in the X Five Year Plan. Preservation of threatened species, establishment of a network of protected areas, their maintenance and development have been accorded high priority in the National Wildlife Action Plan. **In pursuance of this and as detailed above, the scheme is proposed to be continued in the X Five Year Plan, alongwith the merger of two existing schemes (eco-development and benificiary oriented tribal development) with their original components of activities.**

1.3 Description of the manner in which the scheme is proposed to be implemented, including execution and agency thereof :

100% Central assistance would be made available for expenditure on all non-recurring items including the new ones, viz. eco-development, relocation of families living inside Tiger Reserves, use of communication and information technology in crime detection, establishment of GIS based network in all Tiger Reserves, evaluation of tiger habitat in the country with the state of art technology, monitoring of tiger populations in all the tiger range states, fostering eco-tourism activities in the Tiger Reserves, creation of Special Strike Forces, providing compensation to villagers for human deaths/cattle killings/crop damages caused by tigers/panthers/ herbivores around Tiger Reserves, staff welfare measures, replacement and purchase of new vehicles for existing and new Tiger Reserves and providing 'Project Allowance' to all staff of Tiger Reserves. In addition, 100% Central Assistance will also be provided for both nonrecurring as well as recurring expenditure relating to veterinary units, research units, research projects including scholarships to research fellows selected for

specific projects relating to tiger conservation, monitoring and evaluation (to be taken by independent agency) and compensation to the legal heirs of the staff/person killed while performing the official duty related with the Project. The plan recurring expenditure will be borne on the basis of 50:50 by the central and respective state governments, and the executing agency, as in the past, would be the Wildlife Wing of Forest Department of the State concerned. The project is administered through a Directorate (H.Q.) in the Ministry of Environment and Forests, guided by a **Steering Committee** (Project Tiger). The IGF &Director, Project Tiger is the Member Secretary of this Steering Committee. The Project is reviewed biannually by the official/non-official members of the Steering Committee.

Schedule of Programme and Target date of completion :

Project Tiger is an ongoing scheme and will be continued in the Xth Plan. Further continuance would be decided in due course.

2.0 Nature of the scheme :

This is a centrally sponsored (Plan) scheme. As stated earlier, 100% Central assistance would be provided for non-recurring expenditure and 50% Central assistance would be provided for recurring ones. The major non-recurring activities are construction of buildings, development of communication - road, wireless etc., purchase of various equipments, scientific items, protections, development of water facilities, eco-development works, shifting of villages and cattle, miscellaneous tools, development of veterinary research and compensation to the legal heirs of staff/person killed while performing official duty of Tiger Reserve, and any other non-recurring item specific to the Tiger Reserves. The recurring activities are allowance of the staff, habitat improvement, salt lick, water facilities, fire protection, maintenance of various items, publicity and extension, protection measures and legal assistance for dealing with wildlife offences and any other item, recurring in nature, specific to the Tiger Reserve.

Total Outlay (Non-recurring and Recurring) - broad outline and year-wise phasing :

The approved outlay under the Scheme during IX Plan was **Rs. 75.00 crores.** This outlay, however, is considered insufficient considering the magnitude of problems and additionalities like eco-development and relocation of villages, apart from the fact that about four more new areas are proposed to be included under the Project. This will require a budget of Rs. 150.00 crores during X Plan. The main thrust of Project Tiger, as in the past, is protection and mitigation of deleterious biotic impacts with a view to comprehensively revive the natural eco system in the reserves for fostering a viable population of tigers, co-predators and prey base. These areas would serve as **'source'** for radial dispersal of genes.

JUSTIFICATION :

During the VIII Five Year Plan, a budget allocation of Rs.40.00 crores was provided to the Centrally Sponsored Plan Scheme 'Project Tiger', for managing 23 Tiger reserves. Due to the escalation in wage rates and cost of maintenance of existing infrastructure, apart from inclusion of 4 new Tiger Reserves, this was enhanced to Rs.75.00 crores during IX Plan. With the merger of two schemes, (Eco-Development and Benificiary Orinted Tribal Development) the total requirement during X Plan period would be Rs.150.00 crores.

The year-wise phasing of total outlay (after merger of Ecodevelopment/ BOTD Schemes) during the X plan period would be as follows:

Year	**Proposed amount (including NE) (Rs. in crores)**
2002-02	24.00
2003-04	30.00
2004-05	30.00
2005-06	32.00
2006-07	34.00
TOTAL	**150.00**

2.2 Achievements/Returns expected - other economic implications :

The Project would be completing three eventful decades shortly. It has been acclaimed internationally as one of the greatest conservation ventures in modern times, not only for putting the tiger on an assured course of recovery from the brink of extinction, but more for saving the floral and faunal genetic diversity in some of our unique and endangered wilderness areas. The adoption of a total ecosystem approach has resulted in an overall improvement of habitat, an increase in number of wildlife with better dispersal leading to efficacious utilisation of habitat in the tiger reserves.

(a) Employment Generation :

The activities under the Project generate employment for both regular personnel and daily wagers. Among the regular personnel are senior technical officers and field professionals besides staff for protection and enforcement. Both protection and developmental activities under the project are labour intensive and generate considerable employment for rural communities in the interior forest areas. The scheme, thus, provides substantial employment opportunities.

(b) Indirect Benefits :

Apart from direct employment opportunities, indirect benefits like arresting of erosion, enrichment of water regime, regeneration of grass and ground flora provide are useful to animals and communities in neighborhood.

B. MERGED COMPONENTS OF ECO DEVELOPMENT

To ameliorate the hardship faced by the villagers living in and around National Parks and Sanctuaries due to curtailment of their access for grazing and collection of fuelwood, bamboo, fodder, MFP, etc., due to the setting up of these protected areas, a new Centrally Sponsored Scheme, 'Eco development around National Parks and Sanctuaries including Tiger Reserves', was launched during the year 1991-92. The package of programmes designed to meeting requirements of different areas to be implemented under the scheme, demonstrate the concern of the protected area managers for the socio-economic development of the fringe or buffer zone villages, which would result in greater cooperation of the indegenous communities in conservation and management of wildlife.

1. THE SELECTION OF TARGET AREAS:

Considering the wide-ranging problems the scheme is designed to address eco development for all villages and settlements located on the fringes of each Tiger Reserve. However, in view of limited availability of funds and the capacity of wildlife managers to operate the scheme, priority would be given to those Tiger Reserves where man-animal conflicts and confrontation between the villagers and the protection staff have reached an alarming stage and immediate action is required to remedy the situation. Some of the conditions for deciding the extent of an urgency could be:

I) Tiger Reserves from where extremist engineered disturbances have been reported.

ii) Areas subject to chronic droughts, floods, fires are other natural calamities.

III) Areas where the buffer zones are either non-existent or are in a badly degraded state and are unable even to partly support the demand of the local villagers for fuelwood, fodder, etc.

IV) Villages shifted out of national parks and resettled particularly outside the core area of a tiger reserve .

A question has arisen whether eco development should be extended to villages inside national parks, keeping in view the policy to resettle them outside for obviating man-animal conflicts. There is an apprehension that extending developmental benefits to these villages would provide a disincentive against shifting. While such villages, as a general principle, should not be covered under the scheme, exceptions must be made in those cases where practical problems in shifting a village exist, while the need for harmonizing the relations of the villagers with the park staff needs to be given a high priority. This can be decided on the basis of prevailing conditions, including the constraints of enforcing the legal requirements of translocation.

2. Activities and programmes under eco development

The initiatives should be designed keeping in view the primary objectives of satisfying basic needs of local villagers, reducing their dependency on Tiger Reserve resources and improving productivity of the fringe area. In the buffer zones of Tiger Reserves, there is considerable scope for innovation in designing programmes of ecodevelopement tailored to the needs of specific areas. A survey to ascertain the present socio-economic status of villages or clusters of villages around each Tiger Reserve, including basic needs and the nature and extent of conflicts with wildlife management, would be necessary for designing the ecodevelopmental programmes. The NWDB publication "Microplanning: A Tool for Social Forestry Implementation" is a useful reference for this purpose. However, certain activities and programmes of generic nature, which will be the basic components of ecodevelopement, can be taken up rightway while the survey is being conducted. These programmes can be substantially supplemented and fine-tuned after results of the survey are known. Thus the ecodevelopment programmes would be carried out in two phases as follows:

PHASE I ACTIVITIES

These are basic ecodevelopment programmes and will comprise of :-

I) Formation of Eco development Committees

II) Survey and preparation of management plans, village level micro plans with participatory planning.

III) Silvipastoral development.

IV) Raising of close-spaced fuelwood and fodder plantations of fast growing indigenous species.

V) Setting up of livestock veterinary centers.

VI) Setting up of fixed/mobile dispensaries including vaccination/ family planning clinics.

VII) Providing safe drinking water.

VIII) Fixing of electrical /solar street lights.

IX) Supply of improved chullas, solar cookers and gobargas plants.

X) Erection of physical barriers, including electric fencing to protect crops, etc. from wild animal depredation.

XI) Soil conservation mensures like gully plugging terracing of cultivated fields and the like.

XII) Setting up of small irrigation dams/anicuts.

XIII) Training of staff, volunteers and village-level workers in ecodevelopment and related activities/techniques.

XIV) Purchase of vehicles and equipments directly concerning the above activities and construction of buildings.

B) **PHASE II ACTIVITIES**

I) Insurance of life, crops and property against animal depredation.

II) Improved dryland farming techniques.

III) Improvement soil productivity, soil conservation and crop rotation.

IV) Horticulture suited to local conditions including cultivation of medicinal plants and other MFPs.

V) Farming of domestic animals like pigs and poultry.

VI) Apiculture, sericulture and pisciculture.

VII) Setting up of cottage industries based on appropriate technology.

VIII) Providing facilities for marketing of various produce.

IX) Education and recreation facilities aimed at explaining the role of the protected areas and wildlife management in general in maintaining land productivity, soil fertility, etc.

X) Study of culture and traditions of local communities to establish the link between their lifestyles and maintenance of ecological equilibrium.

Additional innovative activities, as an outcome of the socio-economic survey, can also be taken up with the prior approval of Government of India.

3. IMPLEMENTATION AGENCY

The scheme will be implemented by the wildlife wings of the State Forest Departments through the officers-in-charge of Tiger Reserves, where ecodevelopment would be carried out. Because of the wide range of activities involved, it would be essential to associate different development departments, viz. animal husbandry, horticulture, primary health, agriculture extension, soil conservation, fishery, tribal welfare, small industries, etc. While in selected areas experts from such departments may be required to be taken on deputation for planning/implementing the ecodevelopment programmes, it will be important to ensure that these departments are actively associated with the scheme. It will therefore be necessary to constitute a District Level Coordination Committee under the District Collector/Magistrate, with the Deputy Director of the Tiger Reserves as the member secretary This would also facilitate sectoral integration and pooling of resources.. The committee should include representatives of the cooperating departments, the NGOs and the concerned *Gram Panchayat* leaders. The committee should meet at least once in two months and the minutes of the meetings should be included in the proposals for central assistance under the scheme. The State Government may consider payment of a modest honorarium to the committee members for attending the committee meetings and the expenditure on this account can be charged to the scheme.

Since the ecodevelopement scheme is primarily concerned with the welfare of forest-dwelling communities, it will be necessary to involve NGOs with proven track record in rural development programmes in the scheme, as also in monitoring the inputs. Socio –economic surveys, popularising smokeless *chullas* or running of education centers can be directly entrusted to them after a MOU for such collaboration. It would be advisable to have the names of participating NGOs approved by the State Governments. The above guidelines will not replace the Codification/Resolution adopted by State Governments for involving stake holder communities in conservation, but should be used in a complementary manner.

4. PLANNING FOR ECODEVELOPMENT

As ecodevelopment is an integral part of Tiger Reserve development, it is necessary that activities under the scheme, like other activities for wildlife management, are planned adequately both on a perspective (5-10) years) and on an annual basis. It may be useful to add a chapter on ecodevelopment in the management plan of the Tiger Reserve, and following could be the contents of this chapter:-

ECO- DEVOLOPMENT

I. BASIC INFORMATION:

i) Names of villages with populations and live stock population, proximity to protected areas.

ii) Economic status of the residents, their main sources of livelihood.

iii) General conditions of the buffer areas, e.g. extent of degradation and capacity to meet the resource demands of local communities.

2. An analysis of the demand of local communities for fuelwood, fodder, bamboos, MFP, etc. and the local availability of these resources. This will also cover the extent of reduction in availability of these resources due to establishment of the Tiger Reserve.

3. The extent and nature of conflicts between wildlife management and the villagers. There could be a different account for each village. Incidents of serious damage to life and property due to animal depredation, should be listed.

4. Past attempts at ecodevelopment with analysis of their success.

5. List of activities/programmes proposed for each village or cluster of villages, with budget estimated, yearwise.

6. Development agencies involved in implementing the programmes and the mechanisms to be set up to ensure involvement and coordination of such agencies.

7. NGOs associated with the programmes and nature of collaboration envisaged with them. A list of such NGOs should be appended as also a copy of the agreement to be entered with the NGOs.

8. Method/mechanism for monitoring the ecodevelopment programmes.

The scheme was initiated during 1991-92 as an Annual Plan Scheme and was continued during VIII plan and IX Plan. It is proposed to merge the scheme during X Plan period along with Project Tiger Scheme for Tiger Reserves areas, with out changing the basic character.

II Financial Implication:

Nature of the scheme

This is a Centrally Sponsored Scheme to be operated on the basis of 100% Central Assistance for approved items of expenditure.

(b) **Total outlay – broad outline and year wise phasing:**

The approved outlay under the scheme during IX Plan was Rs 40.00 crores. The year wise expenditure of total outlay during the IX Plan period and projection for X Plan are as follows:

(Rs. in Crores)

IX Plan Expenditure		X Plan projection (only for Ecodevelopment Component)	
Year	Amount	Year	Amount
1997-98	Rs 4.34	2002 - 03	Rs. 4.00
1998-99	Rs 6.34	2003 – 04	Rs. 4.00
1999-2000	Rs 7.99	2004 – 05	Rs. 4.50
2000-01	Rs 9.99	2005 – 06	Rs. 5.00
2001-02	Rs 15.35	2006 - 07	Rs. 5.00
Total	**Rs 54.01**	**Total**	**Rs. 22.50**

(c) **Achievement / returns expected – other economic implications** :
The scheme is meant to serve the purpose of reducing dependency of indigenous stakeholder communities dwelling on the fringes of Tiger Reserve and ensuring their socio-economic welfare through ecodevelopment to elicit support for conservation.

C. MERGED COMPONENTS OF BENEFICIARY ORIENTED TRIBAL DEVELOPMENT

Beneficiary Oriented Scheme for Tribal Villages of Project Tiger Areas, National Parks and Wildlife Sanctuaries (Centrally Sponsored).

a) **Description of the Scheme**:

There are 88 National Parks and 490 wildlife sanctuaries in the country. Out of these, 27 Parks/Sanctuaries have been brought under Project Tiger. Management of these areas envisage exclusion of biotic interference, which could be in the form of habitations, domestic livestock, agriculture and other land-use practices. Project Tiger areas and National Parks should have the least human interference, whereas in wildlife Sanctuaries this may be permitted to some extent. Nevertheless, it remains a fact that for safeguarding the precious gene pool, concerted measures have to be taken to reduce human interference which inevitably involve relocation of existing habitations. In the past, 41 villages have been relocated from Tiger Reserves. However, 125 villages yet remain to be relocated from these areas.

Relocation of villages involves resettlement and socio- economic rehabilitation of the affected persons. It envisages identification of villages to be affected by relocation plans of Project Tiger areas, resettlement of displaced families through support for development of agricultural land, provision of building material, social and economic rehabilitation by providing necessary infrastructure e.g., approach road, drinking water facilities, cattle ponds, fodder and fuelwood.

Objectives :

Rehabilitation of tribal and other families affected under relocation plans of the Project Tiger areas.

b) Components of the Scheme:

Important components of the scheme are listed below: -

1. Identification of villages to be relocated and affected families:

This will be done by the respective State/UT Governments according to the priority given to such measures in the management plans.

2. Identification of sites for relocation:

The sites to be selected for resettlement of the displaced persons will be identified by the States. Ordinarily revenue lands available with the State/UT Governments will be availed for this purpose. However in case no such lands are available, degraded forest areas or fringes of forests could be identified for this purpose. This will inevitably involve seeking prior approval of the Central Government under the Forest (Conservation) Act, 1980 which must be obtained well in advance.

3. Preparation of the Rehabilitation Projects:

The State/UT Governments will pose the Scheme in the form of a project which will contain complete details of the rehabilitation, time frame for its implementation and the financial outlay. The projects will be considered by the Ministry of Environment & Forests and financial allocation will be made for certain items of works, subject to availability of funds.

4. Financial assistance will be provided for the following items:

(i) **Land development**:

Development of the land assigned to the displaced persons will exclude cost of acquisition, if any. The assistance will be limited to 2 hectares per family at the rate of Rs. 10,000 per hectare for land development. This item is considered essential owing to the fact that displaced persons will often occupy uncultivated land. The net amount admissible would be worked out after deducting the monetary compensation, if any, payable to the affected persons. The amount, however, will not be paid to the beneficiaries, instead, it will be utilised by the Project implementing agency for development of the land to make it suitable for agriculture.

ii) **Building material for construction of houses**:

Requisite material for house construction will be provided to the affected families and the cost will be debited to the Scheme. Similarly, labour charges will be paid to the beneficiaries. Total amount to be charged to the Scheme for providing building material and labour should not exceed Rs. 10,000 per family.

iii) **Transport of household goods:**

Cost of transport of household goods will be borne under the Scheme but the amount should not exceed Rs. 1000/- per family.

iv) **Approach road:**

Approach road to the newly rehabilitated villages would be provided under the scheme. The admissible expenditure on this should not exceed Rs. 50,000 per village, which may ordinarily suffice for a length of about 2 Km..

v) **Drinking water facilities:**

This will be provided by sinking an open well or any other means. The admissible expenditure will be limited to Rs. 50,000 per village.

vi) **Cattle pond/tank:**

A village cattle pond will be established at a cost not exceeding Rs. 30,000/- per village.

vii) **Woodlots and fuel reserves:**

For meeting domestic needs of the displaced persons especially in respect of household utility timber, bamboo and firewood, woodlots will be raised under the scheme. Wherever land is scarce, such plantations will be raised in about 50 hectares with an input of Rs. 5,000/- per hectare. However, in some cases, where relocation is to be done on fringes of forests, these commodities could be provided from existing forests with comparatively smaller investment.

viii) **Pasture and fodder development:**

Measures as suggested under item (vii) above will also be taken for development of pastures and fodder. Under intensive cultivation at least 100 ha would be needed for a village of about 50 families. The assistance provided would be Rs. 5000 per hectare. In some cases, especially when resettlement is to be done on fringes of forest it may be possible to meet part of fodder needs from adjoining areas. Nevertheless it would be desirable to develop exclusive fodder reserves for resettled families to avoid social conflict between them and the local inhabitants.

a) **Method of implementation:**

The scheme will be implemented by respective State/Union Territory Forest Departments through their Wildlife Organisation, by adopting a Project Approach. The following phases are identified for this purpose:-

(i) Phase I- Identification of the Project Tiger area from which relocation is to be done, number of villages and families affected, socio-economic survey of household and infrastructrural requirements, selection of site for rehabilitation, formulation of a project proposal which will contain complete details of the activities to be undertaken, organisational support, and the period required for completion of different activities.

(ii) Phase II – Examination of the project proposals by Government of India, financial sanction thereto, implementation of the project by the State/Union Territory Forest Departments.

(iii) Phase III – Appraisal and evaluation of the scheme or further continuance, modification and the like.

In Government of India, the scheme will be coordinated and monitored by the Project Tiger Division, Ministry of Environment & Forests.

b) ***Justification for the scheme***

The scheme has been under implementation since 1989-90. The expenditure incurred during the IX five Year Plan is as given below:

Total approved outlay for IX Plan : Rs. 19.00 cr.

YEAR	OUTLAY
1997-98	: Rs. 135.00 Lakhs
1998-99	: Rs. 350.00 Lakhs
1999-2000	: Rs. 370.00 Lakhs
2000-01	: Rs. 250.00 Lakhs
2001-02	: Rs. 400.00 Lakhs

The details and funds released during the IX plan and the projection for Xth plan are as below:

(Rs. in Crores)

IX Plan Expenditure		X Plan projection (only for BOTD Component)	
Year	Amount	Year	Amount
1997-98	Rs 1.10	2002 - 03	Rs. 2.00
1998-99	Rs 3.50	2003 – 04	Rs. 2.00
1999-2000	Rs.2.69	2004 – 05	Rs. 2.50
2000-01	Rs 3.10	2005 – 06	Rs. 2.00
2001-02	Rs 4.00	2006 - 07	Rs. 2.00
Total	Rs . 14.39	Total	Rs. 10.50

2. Financial implication of the proposal.

Since the Scheme would be site specific and need based, rigid stipulations for outlays under each item are therefore not desirable. The admissibility of expenditure needs to be restricted to Rs.1,00,000/- per family.

Out of the Rs. 1.00 Lakhs admissible for a family, the break up is as follows:

(Amount in Rs.)

a)	Land Development (2 Hec.)	36,000
b)	Building materials per family	36,000
c)	Transport of Household goods per family	1,000
d)	Community facilities commuted per family	9,000
e)	Wood lot and fuel reserves per family	8,000
f)	Pasture and fodder plantation per family	8,000
g)	Cash incentives for shifting	1,000
h)	Miscellaneous activities	1,000
	Total	**1,00,000**

20% variation in each item subject to the total ceiling cost may be approved when demanded, site specific requirements.

F.No. PS(DIR) – PT Dated: 9th April, 2003

To,

Field Director
(All Tiger Reserves)

SUBJECT: Regulation of Tourist Visitation in Tiger Reserves

Sir,

As you are aware, there is considerable tourist influx (both inland and foreign) in many of our Protected Areas and Tiger Reserves, which necessitate regulation of such visitation in the interest of minimizing the biotic disturbance to wild animals and their habitat. It must be borne in mind, ecotourism should be fostered in the right perspective in these areas, so that there is no compromise or trade –off in wildlife interests, since our Tiger Reserves are ecotypical repositories of valuable gene pool. Hence, the following may be ensured in this regard:

- The tourist visitation should be regulated as per the **carrying capacity** of the area.
- In place of open gypsies and smaller vehicles, medium sized buses, with a closed body and sliding windows, may be used for park excursions. This will minimize the risk of close encounters with wild animals, apart from reducing the number of vehicles inside the park at any point in time .
- A minimum mandatory distance of at **least 500 meters** should be maintained between two vehicles plying on the same road.
- A minimum mandatory distance of **30 meters** should be maintained by tourist vehicles while spotting a tiger or any other wild animal.
- The route guides should be more professionally trained and penalty should be imposed on visitors in case they violate park rules.

Further, a model calculation of the Tourist Carrying Capacity is also appended for ready reference, which is fairly robust and can be computed in a site-specific manner by collecting some basic field data. It is requested, this computation may please be done for your Reserve and this Ministry may be apprised accordingly. Since a certain amount of risk is always involved in jungle excursions despite all precautions, a standardized 'Indemnity Bond' may also be prescribed indemnifying the park authorities from litigation / arbitration which may arise on account of accidents suffered by tourists during park round. All due formalities in this regard may be completed before the tourists are allowed entry into the Tiger Reserve. Under no circumstances tourist excursions should be allowed during the night. It goes without saying, apart from causing immense disturbance to wild animals, such ventures are extremely risky. It is also reiterated, no tourist facilities should be created in the 'core Zone' of a Tiger Reserve.

Yours Sincerely,

Dr Rajesh Gopal
(IGF & DIRECTOR, PT)

Copy to: All Chief Wildlife Wardens

MODEL CALCULATION

KANHA TIGER RESERVE

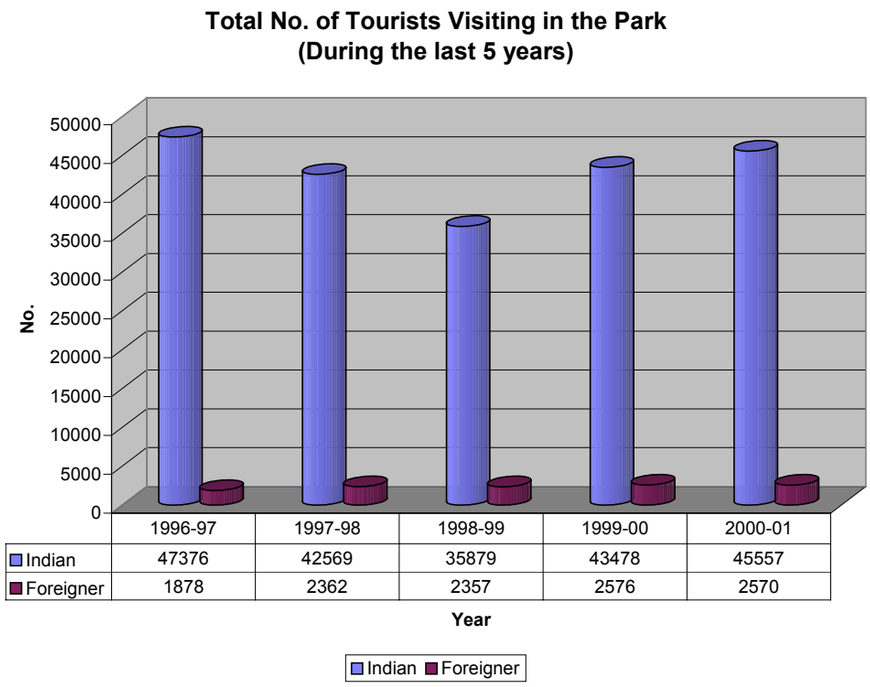
(a) Visitation Data

(Average of last 5 years)
Visitors (Indian) : 42971.8
Visitors (Foreign) : 2348.6

Total: : 45320.4

Number of tourist vehicles per day (average) = 50

(b) Carrying Capacity Computation



i. Physical Carrying Capacity (PCC)

PCC = A x v/a x Rf

- ✓ Only vehicular movements permitted on forest roads, hence road length is more relevant than area
- ✓ "Standing area" is not relevant, but closeness between vehicles is important
- ✓ There is a required distance of at least 500 m. (½ km.) between 2 vehicles to avoid dust (2 vehicles / km.)
- ✓ At least 3½ km. hours are needed for a single visit
- ✓ The PA is open to tourists for 9 months in a year and 9 hours per day
- ✓ Linear road length (for tourists) = 283 km.

$$\text{Rotation Factor (Rf)} = \frac{9 \text{ hours}}{3.5 \text{ hours}} = 2.6$$

PCC = 283 km. x 2 vehicles / km. x 2.6
= 1471.6 or 1472 visits / day

ii. Real Carrying Capacity (RCC)

☞ Road Erosion

Total Road Length = 283 km. (Mt.)

Medium erosion risk = 50 km. (weightage factor = 2)

High erosion risk = 40 km. (weightage factor = 3)

M_1 = 50 x 2 + 40 x 3 = 100 + 120 = 220 km.

$$Cf_e = \frac{220}{283} \times 100 = 77.8 \text{ or } 78\%$$

☞ Disturbance to Wildlife

Barasingha (1 month) = Cf_1 = 1/9 x 100 = 11.1 %

Chital (2 months) = Cf_2 = 2/9 x 100 = 22.2 %

Tiger (2 months) = Cf_3 = 2/9 x 100 = 22.2 %

Overall corrective factor for disturbance of wildlife in Kanha National Park =

Cfw = $Cf_1 + Cf_2 + Cf_3$ = 11.1 +22.2 + 22.2 = 55.5 or 55%

☞ Temporary closing of sites

$$Cf_t = \frac{\text{2 limiting weeks / year}}{\text{36 weeks / year}} \times 100 = 5.5\%$$

$$RCC = PCC \times \frac{100 - Cf_e}{100} \times \frac{100 - Cf_w}{100} \times \frac{100 - Cf_t}{100}$$

$$1472 \times \frac{100 - 78}{100} \times \frac{100 - 55}{100} \times \frac{100 - 5.5}{100}$$

1472 (0.22 x 0.45 x 0.95)

138.4 or 138 visits / day

iii. Effective Permissible Carrying Capacity

(MC = Managerial Capacity = 40%)

EPCC = RCC x MC

138 x 0.40 = 55.2 or 55 vehicles / day

No. 1-16 / 2002 – PT Dated the 21st June, 2002

To,

Chief Wildlife Wardens
(All States)

Sir,

As you are kindly aware, the guidelines for execution of Project Tiger has laid down mandatory provisions for State Governments to review, from time to time, the progress and implementation of the project with a view to evaluate its performance. In this regard, a directive was sent from this Ministry vide letter No. F.No. 1-6 / 2001-PT dated 10th September, 2001, for constituting a 'Monitoring and Evaluation Committee' at the level of State Governments, in consultation with identified Institutes / Centres of excellence in states. The action taken in this regard from your end has not been communicated to this Ministry so far.

For close monitoring at the level of Government of India, the formats for monthly, half yearly and annual reports are appended for ready reference. It is requested that the information sought in these formats may be sent to this Ministry as below:-

1. Monthly Report - by the 20th of the month following to which it relates.

2. Half Yearly Report - within 2 months of the expiry of the half year to which it relates.

With the Second Half Yearly Report an analytical report should also be submitted which should contain a comprehensive assessment of the project, highlighting the problems, current issues and achievement of physical and financial targets and bottlenecks.

3. Annual Report - 1st week of June following the financial year being reported upon.

It is requested that the Field Directors may please be directed for needful action and compliance in this regard.

Yours sincerely,

(Dr. Rajesh Gopal)
IGF & Director, Project Tiger

PROJECT TIGER

MONTHLTY REPORT FOR THE MONTH OF ……..

1. State

2. Tiger Reserve

3. Date of initiation

4. Plan Provision

5. Provision for the current year

Sl. No.	Item of works	Financial Target for The year (Rs.)	Achievements during the month (Rs.)	Cumulative progress till the end of month	Remarks
1	2	3	4	5	6

6. Works

6.1 Capital

6.1.1 Buildings

6.1.2 Communication

6.1.2.1 Roads

6.1.2.2 Wireless

6.1.3 Equipment, Scientific and others including arms and ammunitions

6.1.4 Water development works

6.1.5 Cost of shifting villages

6.1.6 Cost of shifting cattle

6.1.7 Miscellaneous – Tools

6.2 Works (Recurring)

6.2.1 Staff including special Protection staff

6.2.2 Habitat Manipulation

6.2.2.1 Details of works

6.2.2.2 Planning

6.2.2.3 Improvement of pasture land

6.2.3 Supplementary feeding

6.2.3.1 Artificial salt lick

1	2	3	4	5	6

6.2.4 Water facilities

6.2.4.1 Transportation of water

6.2.4.2 Running of pumping sets

6.2.4.3 Desilting of wells

6.2.4.4 Dugouts

6.2.4.5 Water trough

6.2.5 Fire protection

6.2.5.1 Water Tower

6.2.5.2 Layout of fire lines

6.2.5.3 Fire fighting squads

6.2.6 Maintenance

6.2.6.1 Buildings

6.2.6.2 Livestock

6.2.6.3 Motor Vehicles

6.2.6.4 Fire lines

6.2.7 Compensation to cattle owners
6.2.8 Veterinary care

6.2.9 Research

6.2.10 Training

6.2.10.1 Officers

6.2.10.2 Field staff

6.2.11 Publicity and extension

6.2.12 Unforeseen and miscellaneous

---

7. Difficulty - bottlenecks, Additional remarks

Field Director

PROJECT TIGER
HALF YEARLY REPORT REPORT

ENDING SEPTEMBER

1. State

2. Tiger Reserve

3. Date of initiation

4. Plan Provision

5. Provision for the current year

Sl. No.	item of Works	TARGETS								
		Physical				Financial				Remarks
		Annual	½ Yearly	Achievements ending Sept.	Deficit excess	Annual	½ Yearly	Achievements ending Sept.	Deficit excess	State Sector
1		2		3	4	5	6	7	8	9	10

6. Works

6.1 Capital

6.1.1 Buildings

Sl. No. Item of

Works	1	2	3	4	5	6	7	8	9	10

6.1.2 Communication

6.1.2.1 Roads

6.1.2.2 Wireless

6.1.3 Equipment, scientific and others including arms and ammunitions

6.1.4 Water development works

6.1.5 Cost of shifting villages

6.1.6 Cost of shifting cattle

6.1.7 Miscellaneous – Tools

6.2 Works (Recurring)

6.2.1 Staff including special Protection staff

6.2.2 Habitat Manipulation

6.2.2.1 Details of works

6.2.2.2 Planning

Sl. No. Item of

Works	1	2	3	4	5	6	7	8	9	10

6.2.2.3 Improvement of pasture land

6.2.3 Supplementary feeding

6.2.4 Water facilities

6.2.4.1 Transportation of water

6.2.4.2 Running of pumping sets

6.2.4.3 Desilting of wells

6.2.4.4 Dugouts

6.2.4.5 Water trough

6.2.5 Fire protection

6.2.5.1 Water tower

6.2.5.2 Layout of fire lines

6.2.5.3 Fire fighting squads

6.2.6 Maintenance

6.2.6.1 Buildings

Sl. No. Item of

Works	1	2	3	4	5	6	7	8	9	10

6.2.6.2 Livestock

6.2.6.3 Motor Vehicles

6.2.6.4 Fire lines

6.2.14 Compensation to cattle owners

6.2.15 Veterinary care

6.2.16 Research

6.2.17 Training

6.2.10.1 Officers

6.2.10.2 Field Staff

6.2.18 Publicity and extension

6.2.19 Unforeseen and miscellaneous

7. Manpower employed

8. Bottlenecks if any or additional remarks

9. No. of cases of illicit grazing, hunting, forest cutting and others

Detected - Challenged Findings

10. No. of fires controlled - Area burnt Loss

11. Loss of any wild animal - Cause Action taken

12. A brief narrative about evaluation of the Field Director about progress of the Project.

Field Director Date

13. Remarks of the Chief Conservator of Forests

C.C.F. Date

PROJECT TIGER
HALF YEARLY REPORT-II
ENDING MARCH

1. State

2. Tiger Reserve

3. Date of initiation

4. Plan Provision

5. Provision for the current year

Sl. No.	item of Works	TARGETS															
		Physical							Financial								Remarks
		½ achieve-	Deficit for the year	Net to be target	Actual yearly	Cumulative or excess	Annual achieved	Yearly excess	½ achieve-	Deficit for the year	Net to be target	Actual Sector	Cumulative	Annual	State		of achieved
1	2	3		4	5	6	7	8	9	10	11	12	13	14	15	16	

6. Works

6.1 Capital

6.1.1 Buildings

6.1.2 Communication

Sl. No.	Item of Works								
1	2	3	4	5	6	7	8	9	10

6.1.2.1 Roads

6.1.2.2 Wireless

6.1.3 Equipment, scientific and others including arms and ammunitions

6.1.4 Water development works

6.1.5 Cost of shifting villages

6.1.6 Cost of shifting cattle

6.1.7 Miscellaneous – Tools

6.2 Works (Recurring)

6.2.1 Staff including special Protection staff

6.2.2 Habitat Manipulation

6.2.2.1 Details of works

6.2.2.2 Planning

6.2.2.3 Improvement of pasture land

Sl. No.	Item of Works								
1	2	3	4	5	6	7	8	9	10

6.2.3 Supplementary feeding

6.2.3.1 Artificial salt lick

6.2.4 Water facilities

6.2.4.1 Transportation of water

6.2.4.2 Running of pumping sets

6.2.4.3 Desilting of wells

6.2.4.4 Dugouts

6.2.4.5 Water trough

6.2.5 Fire protection

6.2.5.1 Water tower

6.2.12.1 Layout of fire lines

6.2.12.2 Fire fighting squads

6.2.13 Maintenance

6.2.13.1 Buildings

Sl. No.	Item of Works								
1	2	3	4	5	6	7	8	9	10

6.2.13.2 Livestock

6.2.13.3 Motor Vehicles

6.2.13.4Fire lines

6.2.7 Compensation to cattle owners

6.2.8 Veterinary care

6.2.9 Research

6.2.10 Training

6.2.10.1 Officers

6.2.10.2 Field Staff

6.2.11 Publicity and extension

6.2.12 Unforeseen and miscellaneous

7 Manpower employed

8 Bottlenecks if any or additional remarks

9 No. of cases of illicit grazing, hunting, forest cutting and others

Detected - Challenged Findings

10 No. of fires controlled - Area burnt Loss

11 Loss of any wild animal - Cause Action taken

12 A brief narrative about evaluation of the Field Director about progress of the Project.

Field Director Date

13 Remarks of the Chief Conservator of Forests

C.C.F. Date

PROJECT TIGER

…… TIGER RESERVE

ANNUAL REPORT

Introduction

Brief narrative of the Tiger Reserve
Background information
Objective – Justification

Narrative summary of targets proposed

Narrative summary of targets achieved

Highlight of project achievements, performance in the State Sector.

Protection All over the project area	from poachers		Mention cases detected and their results	
	from wood poachers			
	from fire	-	Give narrative of fire accidents, loss and control measures applied both preventive and control.	
	from grazing of-domestic cattle		Shifting of village Shifting of cattle	
	from other human interference		---	
	Against diseases	-	Veterinary care provided	
	Accidents	-	Veterinary care provided	
Construction Sector	Building		Central Sector	State
Works	Communication Roads Water			
Facilities for animals Sector	-	Water-Construction works and achievements		State
		Food	Canopy development Artificial feeding Salt Licks Pasture Development	State
		Shelter	Canopy manipulation	
Research				
Progress of Research Brief of each scheme		Research findings Papers published	Give brief summary in the Appendix	

New designs made

Training		Narrative
Publicity and extension works		Extensions, lectures, cinema shows
Men employed		
Visitors -	Scientists V.I.P.s Tourists	With brief of remarks remarks in the visitor's book
Evaluation	By the Field Director	
	By the Chief Conservator of Forests	
Appendix	(1) Statement of 11	half yearly report
	(2) Photographs maps	
	Census results, Other material	
	List of animals killed or poached	

No. F.1-6/2001-PT
Government of India
Ministry of Environment & Forests
(PROJECT TIGER)
*****

Annexe No. 5, Bikaner House
Shahjahan Road, New Delhi-110011
Date the 11th September, 2001

To

The All Field Directors of
Tiger Reserves.

Subject: Mortality Survey.

Sir,

The mortality survey in a habitat is important to ascertain the age/sex specific natural mortality of wild animals. You are therefore requested to kindly issue suitable instruction to the field staff to collect all evidences of such mortality (mandibles/skulls) found on the forest floor every six months. A compiled information in this regard with categorisation (Cervid/Bovid/Field/Canid) may be subsequently sent to this office.

Yours sincerely,

DR. RAJESH GOPAL
IGF & DIRECTOR (PROJECT TIGER)

Copy To: The Chief Wildlife Wardens of States having Tiger Reserves for information and necessary action.

DR. RAJESH GOPAL
IGF & DIRECTOR (PROJECT TIGER)

No.1-18/2002 – PT
Government of India
Ministry of Environment & Forests
(PROJECT TIGER)
*****

Annexe No. 5, Bikaner House
Shahjahan Road, New Delhi-110011
Date the 18th June, 2002

To

The Chief Wildlife Warden,
(All States)

Subject: Protection initiatives in Tiger Reserves/National Parks/Sanctuaries.

Sir,

As you are perhaps aware, many gangs of poachers have been recently apprehended from Protected Areas like Nagarhole (Karnataka) and Nagarjunsagar Srisailam (Andhra Pradesh). These miscreants hail from States like Rajasthan, Haryana, M.P. and travel along with their kith and kin in small groups. They sneak inside Tiger Reserves/National Parks/Sanctuaries and other forest areas and carry on their activities. Basic interrogation has revealed their linkages with some notorious poachers. This calls for a dispassionate the view of protection initiatives in our Protected Areas for reinforcing the same with site-specific strategies based on past experience. While no generalised approach can be prescribed for the entire country, certain broad points are highlighted below, which may be of use in evolving or improving the protection strategy in-vogue:-

(1) Review of the existing patrolling camps/chowkis in Protected Areas, so that each chowki/patrolling camp has, on an average, an area of 25-30 sq. km. under its jurisdiction to ensure the desired amount of legwork by beat guards and his camp followers posted in such patrolling camps/chowkis.

(2) Prescribing a daily schedule of patrolling keeping in mind the vulnerability of the area from protection point of view.

(3) Maintaining a monitoring/daily observation register in each patrolling camp/chowki in the local language preferably, in which the field personnel can record their daily observations based on patrolling.

(4) Adopting a regula supervision schedule for field officers, alongwith minimum patrolling to be done by them jointly with patrolling camp/chowki staff.

(5) Maintaining a system of "surprise checking" of chowkies/patrolling camps by senior officers.

(6) Keeping a record of the local village level market days in the peripheral areas, and deploying information/staff in civil dress to keep track of any untoward incident/transaction relating to wildlife.

(7) Organising vehicular patrolling by constituting squads comprising of field staff, labourers and police/SAF personnel (if necessary), with wireless handset and paraphernalia for apprehending offenders, apart from prescribing a patrolling calendar for the squad.

(8) Maintaining a list of vehicles passing through manned barriers, and surprise checks by senior officers at such points during every month.

(9) Evolving a monitoring system for collation of information regarding livestock depredation/human injury/loss of human life/large scale crop depredation by wild animals through wireless and prompt payment of compensation as per Citizens' Charter.

(10) Wherever half eaten careasses of livestock on account of carnivore depredation are reported, such careasses should be incinerated in the presence of a gazetted officer to eliminate the possibility of poisoning for revenge killing by local people.

(11) In areas where more than three incidents of livestock de-predation are reported within a fortnight, continuous monitoring based on field evidences should be done by deploying trackers.

(12) Ensuring periodic monthly meetings with the neighboring district officials for exchanging wildlife crime dossiers to facilitate joint action.

(13) Exchange of crime dossiers with local police to facilitate their updation, apart from organising monthly review meetings with the Superintendent of Police.

(14) Periodic meetings with the District Judge to expedite the disposal of pending cases relating to wildlife offences.

(15) Organising surprise raids jointly with the local police in railway stations, local trains, bus-stops, buses, catchers and cafeteria.

(16) Ensuring special site-specific protection measures, during monsoon as 'Operation Monsoon' – considering the terrain and accessibility of Protected Areas.

(17) Organising inter-state meetings at least once in three months, specially to exchange wildlife crime data between border Parks/Tiger Reserves/Sanctuaries.

(18) The area should be constantly monitored to ascertain the presence of gaags and wandering pastoral people., apart from keeping an inventory of their temporary settlements.

(19) Wherever EDCs have been constituted, a village level crime register should be maintained at the EDC level to keep track of villagers involved in wildlife offences.

(20) At the range level, dossiers of perpetual offenders should be maintained, which may help in tracing new crimes to old offenders.

(21) Identifying pro-active local persons and imparting them the basics of wildlife crime detection so as to avail their services as and when required as informers.

(22) Preparing a monthly crime map of each Protected Area on a 1:50,000 scale indicating the locations of each crime with date. It should also highlight the recorded cases of live stock depredation by carnivores during the period.

(23) Patrolling camp/chowki staff should be instructed to collect field evidences like pugmarks, plaster cast of foot-prints on a regular basis, so that individual identities of carnivores like tiger can be fixed. This would serve as a continuous monitoring also.

(24) Laying out impression pads near water points in villages to ascertain the presence of carnivores in the area.

(25) Constituting a Defence Squads comprising of local, pro-active villagers at the EDC level, which can assist the PA staff in apprehending miscreants involved in wildlife poaching.

It is requested, keeping the above in mind, suitable directives may be issued to the field formations under intimation to this Ministry.

Yours sincerely,

(DR. RAJESH GOPAL)
IGF & DIRECTOR, PROJECT TIGER

Copy to :-

1. Addl DGF (WL)
2. Forest Secretaries (All States)
3. Director, Project Elephant.
4. Deputy Directors, Wildlife Preservation (Northern/Southern/Eastern/Western Region).
5. Joint Director (WL) & Joint Director, Project Tiger

(DR. RAJESH GOPAL)
IGF & DIRECTOR, PROJECT TIGER

No.F.1-6/2001 – PT
Government of India
Ministry of Environment & Forests
(PROJECT TIGER)
*****

Annexe No. 5, Bikaner House
Shahjahan Road, New Delhi-110011
Date the 10th September, 2001

To

The Chief Wildlife Warden,
(All Tiger Range States)

Subject:MONITORING AND EVALUATION OF PROJECT TIGER INITIATIVES IN TIGER RESERVES – REG.

Sir,

As you are well aware, the Govt. of India (Project Tiger) provides allocation (100%) for the annual 'Monitoring and Evaluation' of initiatives executed under the Project. However, despite allocation, very few reports of monitoring and evaluation have been received from the field units, which is a matter of serious concern. It is therefore requested that this may be pursued in right earnestness and the task should be preferably entrusted to institutes like SFRI or other Centres of excellence in you State. Further, in constitution with such identified institutes, a 'Monitoring and Evaluation Committee' may also be constituted with representation from the Office of the Chief Wildlife Warden, field units and the office of the Regional Chief Conservator of Forests. An early action in this regard is desirable and the Govt. of India (Project Tiger) may be apprised of the same.

Yours sincerely,

(DR. RAJESH GOPAL)
IGF & DIRECTOR (PROJECT TIGER)

No.F.1-6/2001 – PT
Government of India
Ministry of Environment & Forests
(PROJECT TIGER)
*****

Annexe No. 5, Bikaner House
Shahjahan Road, New Delhi-110011
Date the 10th September, 2001

To

The Chief Wildlife Warden,
(All Tiger Range States)

Subject: Monthly Report on mortality of tigers, co-predators and wild animals.

Reference: This office letter No. 1-6/2000-PT dated 23rd June, 2000.

Sir,

Further to the reference cited above, it is seen that monthly reports relating to the mortality of tigers, co-predators and other wild animals are not received regularly from the various field units, despite repeated reminders from this end. Consequently, considerable difficulty is experienced by this office in sending reply to Parliament Questions and assurances. You may please ensure necessary compliance in this regard so that the monthly report in the prescribed format reaches this office by the 15th of every month. A copy of the format is appended once again for the needful.

Yours sincerely,

(DR. RAJESH GOPAL)
IGF & DIRECTOR (PROJECT TIGER)

No.F.1-6/2001 – PT
Government of India
Ministry of Environment & Forests
(PROJECT TIGER)
*****

Annexe No. 5, Bikaner House
Shahjahan Road, New Delhi-110011
Date the 11th September, 2001

To

The All Field Directors of Tiger Reserves

Subject: Patrolling Strategy and AntiPoaching Initiatives.

Sir,

Effective 'Anti Poaching' measures and 'Patrolling Strategy' should be accorded topmost priority in a Tiger Reserve management. The need for a reliable, round the clock wireless system, strategically placed forest patrolling camps and an ever vigilant, motivated frontline staff requires no elaboration. However, in the recent past, in several tiger reserves, mortality of wild animals has not been timely detected by the field staff, which poorly reflects on the management and degree of protection. Since Govt. of India allocates considerable resources for antipoaching and patrolling under Project Tiger, this is a matter of serious concern. Therefore, the following initiatives should be ensured in the overall protection strategy of your Tiger Reserve.

Creation of Patrolling Camps at sensitive points with deployment of staff/labour as required.

Listing of Staff/Camps with duty allocation and route chart.
Appropriately equipping the patrolling team with fire arms and mobile wireless sets.
Special instructions to squads/parties covering several aspects viz.:

- Suvreillance : hotels, tourist points, vehicles, bus stand
- Surveillance : traditional hunters etc.
- Coordination with local police
- Networking
- Issue of Special 'Preliminary Offence Report' books
- Preparation of daily schedule
- Local Country side market checking
- Surprise checking of barriers.
- Preparation of monthly wildlife "crime maps" (preferably in the GIS domain using GPS or on a 1:50,000 scale map)
- Monitoring Cattle kill, human kill, injury
- Monitoring water points near habitation
- Preparation of crime gang dossiers.
- Monitoring/updating at the level of Field Director/Dy. Director through wireless.
- Maintenance of 'village level' crime registers through village committees.
- Taking note of offences registered in local police station.
- Using tape recorder/camera to record evidences.
- Registration of fire arm license holders as per the directives of the Hon'ble Apex Court.

While situations in field units would vary necessitating site-specific strategy, the success of Wildlife Protection and crime risk management depends on good surveillance, timely reporting and networking, prompt situation analysis and immediate action. You are required to send the 'crime map' on a 1:50,000 scale along with (floppy/hard copy) details of wildlife crime registered, criminally prosecuted and convicted every 3 months to the PT monitoring cell of this office.

Yours sincerely,

(DR. RAJESH GOPAL)
IGF & DIRECTOR (PROJECT TIGER)

No.F.1-6/2001 – PT
Government of India
Ministry of Environment & Forests
(PROJECT TIGER)
*****

Annexe No. 5, Bikaner House
Shahjahan Road, New Delhi-110011
Date the 11th September, 2001

To

The All Field Directors,
All Tiger Reserves

Subject:- Disease surveillance and livestock immunization.

Sir,

As you are aware, wildlife disease may become one of the decimating factors causing high mortality among wild animals even in well established Protected Areas. Therefore, regular disease surveillance becomes important. Wild animals are prone to diseases which may be viral, bacterial, protozoan, mycotic, Helminth or ectoparasitic in nature. These diseases are mutually transferable between wild animals and livestock, and hence regula prophylactic immunization of nearby village cattle should be ensured by utilizing the services of local veterinary department. Further, seasonal pathological faecal matter analysis of major wild animal species (herbivores & carnivores, including departmental elephants) may be done, apart from blood tests with due permission as required under the Wildlife Protection Act, 1972.

Yours sincerely,

(Dr. Rajesh Gopal)
IGF & Director (Project Tiger)

No.F.1-6/2001 – PT
Government of India
Ministry of Environment & Forests
(PROJECT TIGER)
*****

Annexe No. 5, Bikaner House
Shahjahan Road, New Delhi-110011
Date the 11th September, 2001

To

The All Field Directors
of Tiger Reserves

Subject: Physical Assault on Staff

Sir,

Any incidence of physical assault on field staff leading to death and other serious happenings may please be communicated to the Project Tiger Directorate through fax/e-mail/telephone at the earliest (within 24 hours), followed by a detailed report after ground truthing. Needless to add, this is essential to highlight the factual position to all concerned, and in the absence of such spot reports undue credence is given to hearsay accounts and stray media coverages which may not reflect the true picture.

Yours sincerely,

(Dr. Rajesh Gopal)
IGF & Director (Project Tiger)

Copy to: The Chief Wildlife Warden, _____

(Dr. Rajesh Gopal)
IGF & Director (Project Tiger)

No. 7-1/96-PT
GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT & FORESTS
PROJECT TIGER
*****

Annexe No.5, Bikaner House
Shahjahan Road, New Delhi-110003
Dated the 15th May, 1997

To

The Chief Wildlife Warden,

Sir,

Kindly refer to this office letter of even number dated 28th April, 1997 together with the recommendations of the Committee appointed by MoEF on tiger estimation.

Some of the states had already carried out estimation by the time the recommendations were sent to you. In other words the recommendations obviously can not be implemented during this years' estimation all over the country.

The conventional method being practiced till to date is well established with Forest Department. The recommendations of the Committee are not difficult to be followed either.

You will kindly appreciate that exact tiger numbers after each estimation has created lot of controversies and many people have put a question mark on our sincerity. You will also agree that this is more due to the fact that we have always tried to be honest to publish exact number which may not have been true because of human error.

In view of above I will suggest that instead of disseminating exact numbers we may announce a range of ± 10%.

I am sure you will agree with the proposal or if you have any other suggestion you are most welcome with you ideas.

Yours sincerely,

(P.K. SEN)
DIRECTOR, PROJECT TIGER

Copy forwarded to: Field Director,

(P.K. SEN)
DIRECTOR, PROJECT TIGER
E-mail: dirpt@envfor.delhi.nic.in

No. 7-1/99-PT Dated the 15th June, 2001

To,

1. Principal Secretary Forests of all States having presence of tigers
2. CWLW, All States having tiger.
3. Field Director, All Tiger Reserves.
4. All members of Steering Committee Project Tiger.
5. All members of the Committee.

In continuation to the guidelines issued by this Ministry vide letter of even number dated 28-04-1997, there was a detailed discussion of Officials, Conservationist, Statisticians, Scientists and Non-Govt. organizations on the issue of Tiger Estimation in the country. There was an unanimous agreement that different methods should be used for different situations depending upon site specific factors, for example in Sunderbans and large areas of North-East, getting precise number of tigers by use of pug mark methodology is impossible. Similarly each methodology for estimation is not applicable to all tiger habitats in the country.

After careful consideration the decision taken on 4 – 4 – 1997 also enclosed with the new guideline and it is requested that a sincere effort must be made to implement the guidelines for estimation of tiger and other prey species and compliance reported to this Ministry for each financial year latest by 30th June of the next financial year.

Yours faithfully,

(P.K. Sen)
Director, Project Tiger

GUIDELINS FOR ESTIMATING TIGERS
DATED 22nd May 2001

1. The term census was not appropriate and thus the term "estimations" is to be adopted for the purpose of determining the trends in the wildlife populations. Therefore the annual exercise will be termed as "All India Wildlife Estimation".

2. There is a diversity in areas across the country in the terms of available resources, skills and ecological conditions. Therefore different approaches are to be adopted for different areas for conducting tiger estimation.]

3. Different goals were identified for practicing managers, researchers and conservationist depending upon above consideration. Accordingly the following approaches are to be adopted:
   (a) Spatial distribution maps (At a large scale) for all tiger population in the country are to be generated.
   (b) In major protected areas with tiger population, simple but reliable indices of tiger densities are to be developed.
   (c) In a few selected sites where sufficient resources and skilled manpower both from within and outside forest development is available, actual density study of tiger and prey species may be taken up and attempts be made to generate number of tiger population in the area for such specific sites only by more advanced technologies like camera trapping, digital photographs of pug marks, radiotelemetory or any other technology feasible.

4. It was decided no to attempt generation of tiger numbers where ecological factors and management / resource constraints, prevent the generation of invalid results.

5. A core group would be formed to oversee the results derived from tiger monitoring all over the country and assist the Ministry in arriving at a range of estimates for the purpose of informing the public and Parliament.

6. The consensus was reached that the guidelines issued by Project Tiger Division for monitoring of tiger and prey population on 04.04.1997, considering all the above aspects, will be followed. Therefore the proposed core group would ensure specific plan of action for proper implementation of the guidelines all over the country.

7. It was also agreed that the availability of maps of tiger habitats was a major constraint for management and research and special efforts to be made to be obtained them from FSI and other agencies.

8. All information collected from estimation should be readily available to managers, scientists and conservationist, in a central repository with Project Tiger Directorate.

9. Efforts will be made to put infrastructure in place in entire forest areas to carry out the tiger estimation as per plan elicited above expeditiously.

(P.K. Sen)
Director, Project Tiger

No. 8(2) – 9 / 98-PT

GOVERNMENT OF INDIA

MINISTRY OF ENVIRONMENT & FORESTS

PROJECT TIGER

*****

Annexe No.-5, Bikaner House,
Shahjahan Road, New Delhi-11
Dated the 29th January, 1998

To

(1) Forest Secretary,
Govt. of

(2) P.C.C.F.,
Govt. of

(3) Chief Wildlife Warden,
Govt. of

(4) Field Director,

SUBJECT :- GUIDELINES FOR IMPLEMENTATION OF THE INDIA ECO-DEVELOPMENT PROJECT IN SEVEN PILOT PROTECTED AREAS.

Sir,

The Externally Aided India Eco-development Project is being implemented in your State. With a view to implementing the project in its right guidelines, a copy of which is circulated herewith for your information and guidance.

Yours faithfully,

(P.K. SEN)
DIRECTOR, PROJECT TIGER

MINISTRY OF ENVIRONMENT & FORESTS

PROJECT TIGER

SUBJECT: GUIDELINES FOR IMPLEMENTATION OF THE INDIA ECO-DEVELOPMENT PROJECT IN SEVEN PILOT PROTECTED AREAS.

Guidelines for implementation :

INTRODUCTION :

The main phase of India Eco-development Project (IEP) approved by the Cabinet Committee of Economics Affairs has become operational. The project is defined as a Centrally Sponsored Scheme with a IDA loan and GEF grant component.

The IEP received criticism on some issues mostly on account of lack of full information on the project. Nevertheless, some bottlenecks in the project need to be removed by framing well defined guidelines so that the project achieves its objectives.

The project has four components for which the following guidelines are issued:-

FIRST COMPONENT :
Improved P.A. Management :

The objective of the biodiversity conservation within the protected areas has to be ensured. Top priority may be accorded to habitat improvement so that maximum biomass is regenerated and made available to the herbivores for reaching optimum carrying capacity. In many of the states where externally aided forestry projects are in vogue, priorities are given to widening of the forest roads, construction of buildings, bridges and culverts which do not merge with the environment. Therefore, it is suggested that:

(a) No building should be constructed in isolation which is inconsonant with the surrounding.

(b) No widening of forest roads should be taken up; and

(c) Bridges and culvert, if at all necessary, should be constructed so as not to carry a load beyond eight tones.

(d) The fire watch towers should be so designed so that it is possible to lock access when not manned. The wireless and anti-poaching structures be carefully designed to prevent unauthorized access.

SECOND AND THIRD COMPONENTS
*****-DEVELOPMENT AND ECO-DEVELOPMENT SUPPORT COMPONENT**

Detailed discussions were held in the workshop organized by W.I.I., Dehradun on 25th and 26th of August, 1997. The selected Pas are seven pilot project sites whose success will decide India's future biodiversity conservation programme. Therefore, it is essential that only such activities are taken up which facilitate quantification of achievements.

It was accepted in the workshop that two major issues are common not only in the seven selected sites covered by this project, rather they are prevalent in all the P.As. Therefore, it is expected that the P.A. Managers will priorities their activities so that our achievements through this project are visible to one and all. The identified common pressure points are: (a) grazing (b) fuelwood, fodder and small timber collection (c) low output from the existing resources of villagers and (d) no income generation during lean period for marginal and submarginal and landless villagers.

Any other issue is site specific and therefore no common guideline can be issued on that. Though the staff appraisal report envisages implementation of eco-development work according to microplans which have to be formulated for each identified village but emphasis should be given to these issues while submitting the A.P.O. and executing eco-development activities. A few of the suggestions are noted below.

(a) Fuel & small timber: Plantation of indigenous fast growing fuel, small timber and fodder in:

(i) Community land
(ii) Village waste land
(iii) Private waste land
(iv) Other revenue waste land

(b) Grazing:
(i) reduction in number of scrub cattle.
(ii) substitute them by improved or cross breed cattle.
(iii) Biogas plants.
(iv) Veterinary Care Units.

While raising such plantations application of chemical fertilizers and insecticides may preferably by avoided.

(c) Augmentation of output: -

(i) Adoption of soil and water conservation techniques
(ii) Small irrigation facilities earthen check dams, stop dams, ponds etc.

(d) Income generation:

(i) bee keeping
(ii) poultry
(iii) piggery
(iv) Tassar
(v) Sewing and knitting etc.

(e) Any other:

Such items as insisted by villagers which may be area specific.

The suggested percentage of investment under these components is:

(a) - 40%
(b) - 20%
(c) - 25%
(d) - 10%
(e) - 5%

Only labour oriented earthen works should be taken up to cut down the expenditure on cement and steel items.

A close proximity with the District Administration will avoid duplicity of work; rather District Administration should be closely associated with this project so that the P.A. authorities may take up the case of additional development work in selected village through D.R.D.A. funds.

FOURTH COMPONENT
PROJECT MANAGEMENT COMPONENT

All the investments should flow out of the approved Plan for the protected area. It is proposed to write new management plans for each PA and, therefore, special training for such officers have been suggested in the consultancy. The guidelines for new management plan have already been circulated by W.I.I. In situ training schedule for category of staff below Forest Ranger should be finalized with W.I.I., as well as training of management plan officers should be taken up with W.I.I. immediately under intimation to the Director, Project Tiger. Similarly the research component too have to be management plan oriented and, therefore while revising the Management Plan, utmost attention must be given to the research component which has substantial share in this project.

PS-DIR(PT)-2003 MISCE Dated: 29th May, 2003

To,

Chief Wildlife Wardens
(All States)

Subject: Habitat occupancy map of tigers.

Reference:

a) This Ministry's letter No. 7-1/96-PT dated 27th November, 2001, and subsequent three reminders.
b) This Ministry's letter No. 4(5)-1/2001 – PT dated 12th June, 2002.

Sir,

Please refer to the correspondence cited above, wherein a State level Forest Map on a 1:250,000 scale was requested, depicting boundary delineation of forest divisions / Protected Areas, with the spatial presence of tigers plotted as "dots", corresponding to the estimation data sent from your end. This information is still awaited, due to which "vetting" of the figures by the core committee is held up. It is requested, the same may be expedited without any further delay.

In addition, the Addl. DG (Wildlife) has desired that the Field Directors and Protected Area Managers should maintain seasonal Habitats Occupancy Maps of tiger for the tiger populations, pertaining to their own field units. The methodology to be followed is simple and based on available field data. For guidance, a brief write-up is annexed.

This information is vital for a country level appraisal of tiger presence and therefore suitable directives may be issued to all concerned for doing the needful. Further follow-up work will be indicated as soon as the analysis of Habitat Occupancy Maps is carried out.

Yours sincerely,

(Dr. RAJESH GOPAL)
IGF & DIRECTOR (PT)

Copy to:

1. Addl. DG (Wildlife), Ministry of Environment & Forests, New Delhi.
2. Principal Secretary / Forest Secretary of all respective States.

(Dr. RAJESH GOPAL)
IGF & DIRECTOR (PT)

Preparing Seasonal Habitat Occupancy Maps (HOMs)

The documentation of presence or absence of a species through evidences and sightings in forest compartments on a map is a quick, simple, user friendly way of making a beginning to understand response of the species to the ecological conditions prevalent in an administrative management unit. It helps the forest managers in fine tuning the knowledge base relating to his/her area and notice the impacts of management interventions in a very short time, within their tenures of service in the area.

Tiger is an ecological indicator species. The tiger habitats may not be fully occupied by tiger populations all the time. What are the habitat occupancy dynamics of any particular species, or a group of animals species, in a Tiger Reserve or any other wildlife management unit is the basic knowledge that is needed to formulate management strategies and prescriptions.

To start with understating of the Habitat Occupancy Dynamics of tigers we need the following material:-

1. A map of the total management unit, say a Tiger Reserve, showing compartments boundaries, major land based features including location of human habitations, roads, rivers and watercourses, etc. The scale of the map should be such that the entire management unit can be seen on a single sheet of quarter imperial drawing board size. An ammonia sheet map will be acceptable.
2. Tracings and plaster casts of 3 recent census exercise years, on which locations and date from where these were picked up.
3. Colour pens, each colour for a specific year.

After reading the location and year in which any particular tracing or plaster cast was picked up, as indicated by the collector on it, place a dot, in colour coded for that particular year, in the compartment on the map where it was picked up. The objective of this action is only to indicate that a tiger (irrespective of its age or sex) had used that compartment during the census month in that particular year.

A single map showing the pattern of occupancy by tigers by colour dots during the three census years is the basic map to act as a bench mark for future work.

Likewise single sheet will, in future, be needed for registering HOMs on seasonal basis. Each season will be given a separate colour code for the entire year. However, the perceived pinch-period for tigers prey base must be covered. This work, to cover occupancy by tigers

during the identified seasons, should be started w.e.f. 1st June, 2003 and taken up at 4 month intervals. For this purpose census exercise will not be needed. Reporting of presence of pugmarks, scats and other evidences, and sightings if any will suffice as data to be placed on Habitat Occupancy Map.

If the management authority would like to proceed ahead, HOMs may also be prepared simultaneously for leopard, bear, gaur, and major tiger-prey species on separate sheets.

An overview will be taken of the HOMs prepared as and when these are ready to decide about moving onto the next steps to be taken.

No.PS/Dir (PT)/2004-Misce. Dated the July 22, 2004

To

The Field Directors
(All Tiger Reserves)

Subject: Preventive measures/surveillance for Trypanosomiasis in wild, free ranging conditions.

Sir,

As you are aware, Trypanosomiasis (commonly known as Surra), is an acute, sub-acute or chronic disease caused by a protozoa (Trypanosoma evansi). The disease is characterized by fever, progressive emaciation, anemia, neural symptoms and death. While in dogs and cats the disease is acute and fatal, it may become chronic in ruminants. The disease is reportedly an enzootic one occurring in domestic animals. However, several references are available relating to free ranging wild animals also, and the outbreak has been observed during the onset of mansoon synchronizing with the breeding activities of files. In our country, the transmission of this disease occurs due to blood sucking flies belonging to genera Tabanus and Stomoxys which seve as vectors. The wild animal may get infection by feeding on an infected carcass/prey animal or through the flies. The Tabanus fly lives along fresh water ponds or rivers, whereas Stomoxys breed on decomposing fecal or waste matter, especially from cattle shed. Since chances of infection of infection to in-situ population of wild animals exists, the following preventive measures are suggested:-

1. Population control of flies around cattle sheds by destroying their breeding area in peripheral villages of Tiger Reserves.
2. Control of disease in domestic animals in villages in and around Tiger Reserves.
3. Controlling the movement of nomadic and village cattle inside Tiger Reserves.
4. Surveillance of the disease and prophylactic treatment of sick and reservoir domestic animals at the periphery of Protected Areas/Tiger Reserves.
5. Periodical surveillance of diseases in wild and domestic animals at waterholes and grazing lands near peripheral villages.
6. Treatment of suspected animals particularly of threatened species.
7. Ensuring a regular monitoring system through wireless, involving the Eco-development Committees.

Yours sincerely,

(DR. RAJESH GOPAL)
IGF & DIRECTOR, PROJECT TIGER

Copy to: 1. Principal Secretary/Secretary, Forest Department (All States having Tiger Reserves)
2. Principal Chief Conservator of Forests (All States)
3. Chief Wildlife Wardens (All States having Tiger Reserves)

No. 7-1/ 96- PT
Government of India
Ministry of Environment & Forests
(Project Tiger)
****

Annex No. 5, Bikaner House,
Shahjahan Road, New Delhi- 110 011.
Telefax: 3384428
E-mail: dirpt-r@hub.nic.in

Dated 27th Nov., 2001

To

Chief Wildlife Warden,

(All Tiger Range States)

SUBJECT: All India Estimation of Tiger/ Leopard/ Wild Animals.

Sir,

The All India Census of Tiger/ Leopard/ major wild animals (free ranging, as well as captive) is due in the current year. As done during 1997, apart from tiger and leopard, other major wild animals are also to be estimated viz. rhino, gaur, wild buffalo, brow antlered deer, hog deer, cheetal, wild pig, crocodile, barasingha, neelgai, black buck, barking deer, hog deer, elephant and the like. This list is by no means exhaustive, and hence other important faunal species found within your jurisdiction may also be taken into account during the estimation.

As you are aware, detailed guidelines for estimating carnivores have been issued from this Directorate in the past. A copy of these guidelines are once again appended for ready reference. Further, guidelines have also been issued subsequently in 1997 for estimating tigers, followed by additional directives for refinement in 2001.

Estimation of tiger population, based on pug marks and related evidences, still remains the most cost effective and time tested methodology suited to our conditions, which if carried out due care in a systematic manner, can lead to authentic results. Therefore, as indicated in the guidelines, considerable emphasis may be given on the training aspects, and preferably three or four "spearhead teams" consisting of 3 frontline staff (1 Range Officer/ Dy. Range Officer, 1 Forester, 1 Forest Guard) may be given intensive practice so that they are in a position to collect the pug/ impressions and supporting evidences from the field in a reliable manner. Instructions may also be issued to all field units for "preserving" the pug marks of tiger/ leopard by protecting them with stones or sticks encircled all around, so that they are not obliterated by vehicular or pedestrian movement. Such "preserved impressions" may be telecasted/ photographed only by the spearhead team so that the basis in telecasting/ photographing gets reflected throughout consequently leading to its destination.

As per the directives issued subsequently, if the area permits further movement, results of such refinement may also be supplemented along with the pug marks data.

Estimation of other wild animals may also be done using one of the following methods as per feasibility:-

i) Direct block counting (to be done on 2 days with a correction factor)
ii) Pellet/ dung density estimation
iii) Waterhole counts
iv) Transect counts(vehicular/ non-vehicular)

Considering the infrastructural limitations and terrain conditions for the various protected areas and forest areas, it is neither desirable not practical to advocate any single method of estimating the wild animals other than major carnivores like tiger/ leopard,

therefore, necessary instructions/ field training may be imparted to the managerial staff in consultation with the Wildlife Institute of India or other resource persons readily available. Since livestock is also an important denizen of our right burdened forests, forming a sizeable component in the diet of major carnivores, the number of livestock depredated along with compensation disbursed by the field units during the year for such depredation may invariably indicated. Likewise, exgratia paid for loss of human life or injury may also be furnished field unit-wise.

To ensure uniformity, transparency and desired standard in the entire exercise, it has been decided to constitute a "Supervisory Committee" at the State level consisting of the respective Chief Wildlife Warden, NGO/NGI of long standing association with wildlife, and a regional scientist. You are requested to kindly suggest a panel in this regard for the consideration of the Ministry.

The time schedule for the estimation exercise is appended in the Annexure-A.

For taking into account the transient animals (especially tigers), it is imperative that the estimation exercise should be coordinated with the neighboring States by tallying the evidences collected in the vicinity. As desired fit, suitable instructions may kindly be issued for such coordination meetings, and a "Coordination Committee" comprising of local officers may also be constituted under intimation to this Ministry.

It is once again reiterated that the estimated figures should be supplemented with the continuous monitoring data along with the outcome of other refinement carried out, if any.

A meeting would be shortly convened in this regard and you are requested to furnish the select list of NGOs/ NGIs/ Scientists at an early date.

Yours sincerely,

(Dr. Rajesh Gopal)

IGF&Director(PT)

D.O. NO.1-18/2002-PT Dated: 31-01-2005

Shri Arun Sen,
APCCF & Chief Wildlife Warden (Rajasthan)
Jaipur.

Sir,

Our recent discussion relating to Sariska & Ranthambhore Tiger Reserve following my field visit to these Protected Areas may please be recalled. The following actions may please be ensured for systemic improvement in the management of Sariska & Ranthambhore:

1. Intensive search may be carried out in the Sariska Tiger Reserve and adjoining forest areas (Jamua Ramgarh, Dosa, Alwar, Jaipur) in the coming fortnight. The field survey should also include ground truthing for snares, traps and other untoward objects in the habitat, which may be carried out by deploying forest guard trainees from the state along with the local staff.

2. The vehicular pilgrim traffic inside Sariska as well as Ranthambhore has gone up tremendously in the recent past (almost 1500 vehicles per day in Sariska), which is a major disturbing factor for wild animals. Necessary directives may be issued for regulating the same as per the guidelines issued from this Ministry.

3. The format for wild animal monitoring by front line staff is enclosed. The field staff may be directed to maintain a daily record of monitoring in this format, with frequent supervisory checks by the Deputy Director(s) and the Field Director(s).

4. The directives regarding protection issued earlier from this Ministry are once again appended for compliance.

The field situation in both the Protected Areas leave a lot to be desired. In general, there is a need for systematic improvement as per the normative guidelines of Project Tiger. Since the desired level of protection involves considerable leg-work, a long term staff development plan is required for these areas, with officers having experience and aptitude for field work. It is suggested, the situation may be reviewed urgently and this Ministry may be apprised of the action taken.

Yours sincerely,

(DR. RAJESH GOPAL)
IGF & DIRECTOR (PT)

Copy to :

1. PPS to Secretary (E&F), MoEF, CGO Complex, New Delhi
2. PPS to DGF & SS, MoEF, CGO Complex, New Delhi
3. PPS to Addl. DGF(WL), MoEF, CGO Complex, New Delhi
4. PCCF (Rajasthan), Jaipur.

No.5-37/2004-PT Dated the 17th February, 2005.

To

The Chief Wildlife Wardens
(All Tiger Reserve States)

Sir,

During the All India Meeting of the Field Directors held recently at Bandipur Tiger Reserve, the protection strategy adopted in various reserves was reviewed, apart from standardizing formats for the forthcoming all India estimation of tigers, co-predators and prey animals. Further, a compendium of Project Tiger circulars on various issues relating to field implementation was also provided to the Field Directors, reiterating its compliance.

You are requested to ensure compliance of the directives and quarterly biannual and annual reports, apart from monitoring the protection initiatives periodically at your level under intimation to this Ministry. A copy of the compendium under reference is again annexed for reference.

Yours sincerely,

(DR. RAJESH GOPAL)
IGF & DIRECTOR, PROJECT TIGER

Copy to : 1. Principal Secretary (Forests)/Forest Secretary (All Tiger Reserve States).
2. Principal Chief Conservator of Forests (All Tiger Reserve States).

(DR. RAJESH GOPAL)
IGF & DIRECTOR, PROJECT TIGER

No.PS-DIR(PT)/2005-MISCE. Dated the February 28, 2005.

To

Field Directors
(All Tiger Reserves)

Subject: Monitoring monthly frequency of pug-marks in the habitat

Sir,

During the recent deliberations in the All India meeting of field directors at Bandipur , the format for daily monitoring of wild animals and habitat parameters was circulated . It is reiterated , the field staff may be directed to record the day to day field monitoring data in the prescribed format to be maintained at nakas/patrolling camps/chowkis w.e.f. 15-3-2005, which would be checked by the officials of this Ministry during their supervisory field visits. This would be in addition to the traditional tracking record being maintained in the reserve . *Further , the total number of tiger pug marks /scats /kills seen/collected in the reserve during the last seven days in a month should also be recorded and communicated to this ministry every month in the enclosed format every month*. **While counting pugmarks care should be taken to take note of only one pug mark from a track pertaining to a single animal**. This would facilitate continuous monitoring of tiger population in the habitat, so that reasons for any change in the relative abundance of such evidence in the habitat can be looked into as a part of the continuous monitoring strategy . This may please be accorded top most priority.

Yours sincerely,

Encl: As above.

(Dr. Rajesh Gopal)
IGF & Director , ProjectTiger

Copy to :

(1) Principal Chief Conservator of Forests (All Tiger Reserve States)
(2) The Chief Wildlife Wardens (All Tiger Reserve States)

]

DATA SHEET FOR TIGER MONITORING

Name of the recorder : _____ Date : _____

Forest Division _____ Forest Circle _____

Range _____

Days	Number of Tiger Signs collected/seen (Pugmark/Scat)
1	
2	
3	
4	
5	
6	
7	
Total	

1) Has any tigress with cubs been reported during the past 3 months?
Yes _____ No _____

a) Seen by staff, b/ Pug Marks, c/ Reported by local persons, d) Seen by Officials
How many cubs _____ approximate age of cubs _____

2) In case tigers are known to be present in the beat, but no sign was obtained during the sampling period then mention on what evidence was this conclusion made (pugmark, direct sighting, scat, other sign) _____

3) How many livestock predation events have been recorded in the past 3 months _____by tigers?

No.PS-DIR(PT)/2005-MISCE. Dated February 28, 2005.

To

Principal Chief Conservator of Forests
(All Tiger Reserve States)

Sir,

The All India estimation of tigers, co-predators and prey animals would be conducted from November, 2005 to February, 2006. This Ministry would be deputing a panel of experts/supervisors for assisting and overseeing the estimation work in States. While detailed guidelines in this regard would be sent in the near future, you are requested to maintain a monthly monitoring data of tigers seen in the various forest divisions and protected areas outside the Tiger Reserves, in the prescribed format annexed with this letter w.e.f. 01-04-2005. The number of evidences pertaining to tiger presence (pug marks, scats, kills) should be recorded during the last seven days in a month by field staff. **While counting pugmarks, care should be taken to take note of only one pug mark from a track pertaining to a single animal.** The total number of pug marks/scats/kills pertaining to tiger in the area should be compiled range-wise for each division, and the collated circle level information has to be maintained month-wise in the office of the Chief Wildlife Warden.

The field staff may be directed to maintain the range level records for supervisory checks by the expert team of this Ministry. This may please be accorded top most priority, as the information is crucial to ascertain the status of tiger presence in areas outside the Tiger Reserves. All Conservators, Divisional Forest Officers and Protected Area Managers may be directed accordingly under intimation to this Ministry.

Yours sincerely,

Encl: As above.

(DR. RAJESH GOPAL)
IGF & DIRECTOR, PROJECT TIGER

Copy to : 1. Forest Secretary (All Tiger Reserve States)
2. Chief Wildlife Warden (All Tiger Reserve States)
3. Field Director (All Tiger Reserve States)

(DR. RAJESH GOPAL)
IGF & DIRECTOR, PROJECT TIGER

ANNEXURE -II

F. No. 15-13/2007-NTCA
National Tiger Conservation Authority
(Statutory Body under the Ministry of Environment & Forests, Govt. of India)

Annexe No. 5, Bikaner House,
Shahjahan Road, New Delhi-110011.
E-mail: dirpt-r@nic.in
Telefax: 2338 4428
Dated: 8th December, 2007

To

The Chief Wildlife Warden(s)
All Tiger Reserve States

Sub: Declaring big cats as man eaters

Sir,

I am enclosing a copy of the guidelines issued in the past for declaration of big cats as man eaters. This may be read with the following additional guidelines for dealing with instances relating to the subject:

(a) Preventive measures

(i) Declaring the peripheral areas of the core or critical tiger habitat as a buffer zone for its management as a multiple use area, as required under section 38V of the Wild Life (Protection) Act, 1972, for reducing man-wild animal conflicts.

(ii) Preparing a Tiger Conservation Plan as provided in the guidelines of the NTCA vide technical document No. NTCA/01/07, for mainstreaming wildlife concerns in the tiger landscape amongst various sectors operating in the area, with reciprocal commitments.

(iii) Ensuring active, ecologically sustainable, integrated development for the benefit of local people living in the area, based on village specific micro plans with reciprocal commitments through village level committees (Ecodevelopment Committees) on a quid-pro-quo basis, as provided in NTCA guidelines (technical document No. NTCA/01/07).

(iv) Keeping track of cattle depredation by carnivores through wireless on a daily basis, and ensuring timely compensation to affected people.

(v) Monitoring movement of wild carnivores near human habitations through "impression pads" created near water points and other sensitive areas, and maintaining a record of such village level monitoring in the Gram Sabha / Panchayat / EDC.

(vi) Alerting / sensitizing local people appropriately, including safe disposal of livestock carcass and other garbage, to prevent habituation of wild carnivores like panther from frequenting and subsequently becoming resident in the area.

(b) Control measures

(i) Deployment of tracking squads comprising of frontline staff and experienced local people, and plotting day-to-day movement of the aberrant wild carnivore (preferably using GPS in the GIS domain).

(ii) Deployment of a "watch team" for patrolling the affected village area during night, involving the EDC/Panchayat, while using simple repelling techniques like crackers, light, etc.

(iii) Deployment of elephant squads, if available.

(iv) Deployment of local workforce to prevent local people from trespassing the affected area.

(v) Using camera traps / impression pads for collecting field evidences relating to the wild carnivore for arriving at an inference.

(vi) Constituting an advisory committee comprising of field staff, experienced trackers and NGOs for obtaining advice relating to identity / sex of the aberrant wild carnivore causing depredation, especially for ascertaining its sex, age, physical deformity and other related parameters.

(vii) In case of recurring human depredation in quick succession, use of dummies with a bent posture inside trap cages for trapping the aberrant animal (such traps, with inbuilt mechanism for automatic closure after animal entry, should be placed at several sensitive areas).

(viii) In collaboration with the Revenue Authorities, alerting local people for taking necessary precautions, apart from deploying squads to prevent people from trespassing the affected areas.

It is reiterated, all efforts should be made for live trapping of the aberrant animal, either through trap cages or using chemical immobilization, before deciding on its elimination.

Yours sincerely,

(Dr. Rajesh Gopal)
IGF & Member Secretary
National Tiger Conservation Authority

Copy to: The Field Director(s) – All Tiger Reserve States

(Dr. Rajesh Gopal)
IGF & Member Secretary
National Tiger Conservation Authority

Guidelines for declaration of bigger cats as man –eaters

Both tiger and panther are included in scheduled I of the Wildlife (Protection/) Act, 1972 and have been given full protection against hunting under section 9 (1). They can be hunted only if they become dangerous to human life or if they are so disabled or diseased as to be beyond recovery. Under section 11 (1) (a), only the Chief Wildlife Warden has been given the authority to permit any person to hunt such as animal and before doing so, he has to state in writing the reasons thereof. Tigers and panthers turned man eaters on the past and continue to do so even now. Inspite of several theories being propounded about the non-existence of man-eaters, it is a stark reality that tigers and panthers turn man-eaters and action is to be taken to remove the menace to human life. It is not intended to give here the various reasons and circumstances that turn these animals into man-eaters, but the fact has to be recognized that tigers and panthers do turn into man-eaters and it is necessary to lay down some guidelines to help the Chief Wildlife Wardens in deciding the circumstances and the stage at which an animal could be declared a man-eater. The following guidelines are indicated:

It is necessary to differentiate between man-killing and man-eating. There are several circumstances under which human beings are attacked accidently by tigers and panthers and may as a result die, but these cases are to be considered only as accidental killings. Such circumstances include.

(i) Approach by man to an area when a tigress is sheltering her cubs.
(ii) Approach accidentally to a sleeping tiger/tigress specially by grass cutters, wood collectors, etc.
(iii) A bent-in posture by man when a tiger takes him to be an animal and attacks. In such cases, the tiger/tigress does not eat the dead person in the first case, but it may start eating the dead body if the tiger/tigress come across such accidents more than once. If the tigress is with cubs and is confined to a limited area with shortage of natural prey, she is more prone t o eat the dead body. The mere fat that the dead body has been eaten does not prove that the animal is a man-eater. Similarly, the fact that a particular animal has killed more than one human being also does not prove it to be a man –eater. The circumstances under which the animal killed the human being has to be examined in detail to arrive at any conclusion.

If a tiger/panther begins to seek out, stalk and wait for human beings and has after killing a person, eaten the dead body, it is established beyond doubt that the animal has turned into a man-eater. It is not necessary in such cases to wait till several human lives are lost. It may be difficult to establish such cases after the first case, but after the second case of human kill it can easily be decided if the animal has turned into a man-eater.

The place where the human kills take place should also work as a guide. In certain area, where forests are disturbed due to intensive working, grazing or fire, tigresses tend to move to adjoining sugarcane fields to litter. Labour and farmers working in the sugarcane fields get killed by such tigresses, and their dead body is eaten by them. As given in para (1), such animals are not to be considered man-eaters. But in case, a tiger starts living in such sugarcane fields, he is more likely to turn into a man –eater, as he goes out there for food. He seeks after pigs and animals in the field and can kill and eat human beings also.

A male tiger killing a human being near a village or in sugarcane field will in all probability be a man-eater.

This evidence should not be used against panthers, which usually live close to villages and move in the night even though the village in search of dogs, unless the panther has begun to lie in wait for human beings.

Even if enough evidence has not come forth to establish an animal as a man-eater, but there are definite grounds to suspect after one human kill that the animal has the tendency to turn into a menace, steps should be taken to trap it. Trapping of panthers will not be difficult, but may be so in the case of tigers. Efforts to tranquilise such animals should start immediately.

Where it is established that the animal is a man-eater, it has to be declared so without delay and steps should be taken to destroy the animal. Efforts to trap and tranquilise the animal should, however, continue along with the steps taken to destroy it. But in no case efforts to destroy it should slacken for the sake of trapping or tranquilising to succeed.

When a tiger has been declared a man-eater, only experienced and senior forest officers should be authorized to destroy it. In no case permits should be given to others. There is such a heavy demand from shikaris and others to get a permit to destroy man0-eating tigers that they bring heavy pressure, both political and otherwise on the authorities to declare a tiger as a man-eater. To remove the chances of such pressures working against innocent tigers, it is necessary to eliminate outside from getting any permit for their destruction. This also destruction of only the genuine man-eater.

In the case of panthers, operating in hilly tracts, it may be necessary to take the help of experienced shikaris, as young and experienced persons are needed to operate in these hilly areas. On account of complete ban on hunting of tigers and panthers since that last one decade, and also due to the rise in the price of arms and ammunitions, it is difficult to find a young forest officer, with adequate experienced who can be authorized to destroy the man-eater. Unlike the case of a man-eating tigers, where age does not work as a handicap and where middle-aged forest officers can take care of the animal in the plains, the man-eating panther needs an agile and young shikari who can over miles and miles of difficult hilly terrain on foot.

No authority other than the Chief Wildlife Warden is legally competent to permit any one to hunt such animals. Cases have, however, occurred where civil authorities have unofficially authorized and encouraged hunting of such animals by shikaris, experienced and otherwise, leading to a ‘free-for all’ in the area of operation. Such irresponsible action on the part of any authority should be severely dealt with by the Government, as it leads not only to the destruction of several innocent animals, but may create more man-eaters through injury caused by these shikaris.

Normally no reward should be announced or given for the destruction of man-eaters. Where it is necessary to engage a shikari, who cannot himself take care of the financial burden involved in the operation, all assistance and material help should be provided to him by the Government. Government may also consider the release of the trophy of the animal destroyed in favour of the hunter (GOI).

ANNEXURE - III

No. 3-1/2003-PT
National Tiger Conservation Authority
(Statutory Body under the Ministry of Environment and Forests, Govt. of India)

Annexe No. 5, Bikaner House,
Shahjahan Road, New Delhi-11.
E-mail: dirpt-r@nic.in
Telefax: 2338 4428

Dated the 25th February, 2008

To

The Chief Wildlife Warden(s)
All Tiger States

Sub: Revised guidelines of the ongoing Centrally Sponsored Scheme of Project Tiger.

Ref: Letter dated 21.2.2008 of even number from this Ministry.

Sir,

Kind reference is invited to the correspondence cited above, relating to the revised guidelines of the ongoing Centrally Sponsored Scheme of Project Tiger. The following clarification is provided relating to definition of a "family" vis-à-vis the revised / enhanced relocation package from the core / critical tiger habitats:

Definition of an eligible family

A "family" would mean a person, his or her spouse, minor sons and daughters, minor brothers or unmarried sisters, father, mother and other members residing with him/her and dependent on him/her for their livelihood. A family would be eligible for the package from only one location where it normally resides even if it owns land in other settlements requiring relocation.

The following will be treated as separate families even if they currently live together:

1. A major (over 18 years) son irrespective of his marital status
2. Unmarried daughter/sister more than 18 years of age

3. Physically and mentally challenged person irrespective of age and sex
4. Minor orphan, who has lost both his/her parents
5. A widow or a woman divorcee

All other definitions will strictly follow the provisions described in Wild Life (Protection) Act, 1972, and the Scheduled Tribes and Other Traditions Forest Dwellers (Recognition of Rights) Act, 2006.

Yours faithfully,

Sd/-
(Dr. Rajesh Gopal)
Member Secretary (NTCA)

Copy to:

1. PPS to Secretary (E&F), MoEF.
2. PPS to DGF & SS, MoEF
3. The Principal Secretary (Forest Department), All Tiger Range States
4. The Principal Chief Conservator of Forests, All Tiger Range States
5. All Field Directors including Officers in-charge of Protected Areas which have been accorded in principle approval for declaration as Tiger Reserves.

F. No. 3-1/2003-PT

REVISED GUIDELINES FOR THE ONGOING CENTRALLY SPONSORED SCHEME OF PROJECT TIGER

FEBRUARY, 2008



National Tiger Conservation Authority
Ministry of Environment & Forests
Government of India

Government of India
Ministry of Environment & Forests
National Tiger Conservation Authority

REVISED GUIDELINES FOR THE ONGOING CENTRALLY SPONSORED SCHEME OF PROJECT TIGER

(1) Introduction:

Project Tiger is an ongoing Centrally Sponsored Scheme of the Ministry of Environment and Forests. The revised guidelines incorporate the additional activities for implementing the urgent recommendations of the Tiger Task Force, constituted by the National Board for Wildlife, chaired by the Hon'ble Prime Minister. These, interalia, also include support for implementing the provisions of the Wild Life (Protection) Amendment Act, 2006, which has come into force with effect from 4.09.2006. The activities are as below:

(i) Antipoaching initiatives
(ii) Strengthening infrastructure within tiger reserves
(iii) Habitat improvement and water development
(iv) Addressing man-animal conflicts
(v) Co-existence agenda in buffer / fringe areas with landscape approach
(vi) Deciding inviolate spaces and relocation of villages from crucial tiger habitats within a timeframe by providing a better relocation package, apart from supporting States for settlement of rights of such people
(vii) Rehabilitation of traditional hunting tribes living in and around tiger reserves
(viii) Providing support to States for research and field equipments
(ix) Supporting States for staff development and capacity building in tiger reserves.
(x) Mainstreaming wildlife concerns in tiger bearing forests outside tiger reserves, and fostering corridor conservation in such areas through restorative strategy involving local people to arrest fragmentation of habitats.
(xi) Providing safeguards / retrofitting measures in and around tiger reserves and tiger bearing forests for wildlife conservation.
(xii) Strengthening the infrastructure of National Tiger Conservation Authority at the Centre.
(xiii) Carrying out independent monitoring and the evaluation of tiger reserves.
(xiv) Establishment and development of eight new tiger reserves.
(xv) Provision of project allowance to all categories of staff working in tiger reserves.
(xvi) Providing residential amenities to facilitate basic education to children of frontline
field staff posted in tiger reserves.
(xvii) Providing assistance to States for fostering ecotourism to benefit local people.

1.1 "Project Tiger" was launched in April, 1973 with the objective "to ensure maintenance of a viable population of Tigers in India for scientific, economic, aesthetic, cultural and ecological values, and to preserve for all times, areas of biological importance as a national heritage for the benefit, education and enjoyment of the people".

1.2 The Project has been successfully implemented, and at present there are **28 Tiger Reserves** in **17 states**, covering an area of **37761 sq. km.** Apart from above 'in principle' approval for creation of eight new Tiger Reserves has been accorded. The selection of reserves was guided by the need to conserve unique ecosystem/habitat types across the geographic distribution of tigers in the country.

1.3 Project Tiger is an ongoing Centrally Sponsored Scheme, which is continued, in the XIth five-year Plan. Conservation of endangered species and their habitat, strengthening and enhancing the Protected Area Network, control of poaching, monitoring, research and ensuring people's participation in Wildlife Conservation have been accorded high priority in the National Wildlife Action Plan and the Wildlife Conservation strategy, 2002.

2. Past funding pattern and major activities supported under the Scheme

During present plan period, 100% Central Assistance is being made available to States for expenditure on all non-recurring items; for recurring items, the Central Assistance is restricted to 50% of the expenditure, while the matching grant is provided by the Project States. The activities / field inputs under Project Tiger, interalia, include : (**Non recurring**) strengthening of protection, deployment of armed squads in tiger reserves, creating basic infrastructure for management, roads, wireless, civil works, habitat development, augmenting water resources, compensatory ameliorative measures for habitat restoration, eco-development, village relocation, use of Information Technology in crime detection, establishment of a digitized database in Tiger Reserves having collaborative linkage with Project Tiger Directorate in the GIS domain, monitoring and evaluation of tiger reserves, monitoring of habitat status, carrying out All India Estimation of Tigers, Co-predators and Prey animals in the GIS domain with the state of art technology, continuous monitoring of tiger populations in various tiger range states (tiger reserves and other forest areas outside tiger reserves), fostering wildlife viewing for tourists in Tiger Reserves, providing compensation to villagers for human deaths/livestock depredation by carnivores in tiger reserves, staff welfare measures, providing 'Project Allowance' to all categories of staff working in Tiger Reserves, establishment of veterinary facility, and fostering research / research projects relating to tiger conservation, replacement and purchase of new vehicles for existing and new Tiger Reserves to ensure staff mobility. (**Recurring**) creation / deployment of local work force for patrolling/barriers, habitat improvement, providing salt licks, water facility, fire protection measures, maintenance of various items, publicity and extension and legal assistance.

3. Constitution of the National Tiger Conservation Authority (NTCA)

The Govt. of India had launched "Project Tiger" to promote conservation of the tiger, since the significance of its conservation has ramifications beyond State boundaries. Management of forests and wildlife is primarily the responsibility of concerned States. The field implementation of the project, protection and management in the designated reserves is done by the project States, who also provide the matching grant to recurring items of expenditure, deploy field staff/officers, and give their salaries. The Project Tiger Directorate of the Ministry of Environment and Forests was mandated with the task of providing technical guidance and funding support.

3.1 The implementation of Project Tiger over the years has highlighted the need for a statutory authority with legal backing to ensure tiger conservation. On the basis of the recommendations of National Board for Wild Life chaired by the Hon'ble Prime Minister, a Task Force was set up to look into the problems of tiger conservation in the country. The recommendations of the said Task Force, interalia include strengthening of Project Tiger by giving it statutory and administrative powers, apart from creating the Wildlife Crime Control Bureau. It has also recommended that an annual report should be submitted to the Central Government for laying in Parliament, so that commitment to Project Tiger is reviewed from time to time, in addition to addressing the concerns of local people. Broadly the urgent recommendations of the said Task Force are as below:

- Reinvigorating the constitution of governance.
- Strengthening efforts towards protection of tiger, checking poaching, convicting wildlife criminals and breaking the international trade network in wildlife body parts and derivatives.
- Expanding the undisturbed areas for tiger by reducing human pressure.
- Repair the relationship with local people who share the tigers habitat by fielding strategies for coexistence.
- Regenerate the forest habitats in the fringes of the tigers protective enclaves by investing in forest, water and grassland economies of the people.

3.2 The Tiger Reserves are faced with ecological disturbances and various other problems. Fragmentation of habitats occurs owing to overuse of forest habitats, apart from conflicting land uses leading to loss of habitat. There are also in some cases, significant village population with large number of cattle, which graze in the forests, leading to ecological degradation, apart from major sources of regular or intermittent disturbance, such as temples and commercial entities such as tea estates. This also leads to man-animal conflicts, resulting in tiger and prey mortality.

3.3 Several constraints affect field implementation of the project, viz. delayed release of Central Assistance given to the States for Field Units, staff vacancies, ageing of field staff, lack of capacity building initiatives, weak enforcement and monitoring of protection work etc. The events in the recent

past have highlighted the fact that there is a need in the States for greater commitment and vigilance. The field administration managing the tiger reserves require capacity building and supervision.

3.4 There is also an urgent need to strengthen the system at the Central Government level (Project Tiger Directorate), which has the mandate to oversee and guide tiger conservation in the country. Involvement of Parliament is also required to ensure review and guidance. Likewise, involvement of Chief Ministers of States and strengthening the field administration, supervision of the project and building a participatory base by including interests of local people living in and around tiger reserves are extremely important.

3.5 Considering the urgency of the situation, Project Tiger has been converted into a statutory authority (NTCA) by providing enabling provisions in the Wild Life (Protection) Act, 1972 through an amendment, viz. Wild Life (Protection) Amendment Act, 2006. This forms one of the urgent recommendations of the Tiger Task Force appointed by the Prime Minister. The NTCA would address the ecological as well as administrative concerns for conserving tigers, by providing a statutory basis for protection of tiger reserves, apart from providing strengthened institutional mechanisms for the protection of ecologically sensitive areas and endangered species. The Authority would also ensure enforcing of guidelines for tiger conservation and monitoring compliance of the same, apart from placement of motivated and trained officers having good track record as Field Directors of tiger reserves. It would also facilitate capacity building of officers and staff posted in tiger reserves, apart from a time bound staff development plan.

3.6 The Wild Life (Protection) Amendment Act, 2006 has come into force with effect from the 4th of September, 2006, and the NTCA has also been constituted on the same date.

3.7 Despite three decades of Project Tiger and the efforts of the Centre and States, tiger continues to remain one of the most endangered large predators in the world. The causative factors are many, and to name a few, we may mention the important ones like loss of habitat due to agriculture expansion and development, revenge killings by people due to man- animal conflicts and above all, the demand for the body parts and derivatives of tiger in the illegal international market. These factors contribute to the decimation of our in-situ population in the wild. Therefore, continuance of a focused, species-specific, multifaceted, ecosystem project like 'Project Tiger' becomes important and crucial at this juncture to address the threats faced by the tiger and its habitat.

3.8 The three key imperatives in tiger conservation which necessitate a 'project mode' are: a focused approach to prioritize actions, in the interest of tiger conservation (within and outside the tiger reserves), eliciting the support of local stakeholder communities and ensuring the necessary infrastructure for protection and management. Considering the fact that conservation of tiger has ecological national significance transcending State boundaries, the

Government of India provides funding support and technical guidance to States through the ongoing Centrally Sponsored Scheme of Project Tiger and other schemes for wildlife conservation. Tigers are present in the forests of seventeen states in our country at present, which also include their protected areas / tiger reserves.

3.9 The distribution of tigers and their density vary in States due to several ecological and human reasons, viz. the forest cover, terrain, natural prey availability, presence of undisturbed habitat and the quality of managerial efforts taken towards protection. Since tigers are at the top of the ecological "food -chain", their conservation results in the overall conservation of all other species of plants and animals occupying the ecosystem. We can say that tigers are indicators of the well being of the ecosystem. A healthy tiger population indicates that the other ecological components in its habitat are equally robust, since tigers need large amount of prey and good habitat. The investments made in a project of this kind are more than justified.

4. Ongoing activities and additionalities to be supported under the revised Centrally Sponsored Scheme of Project Tiger:

4.1 Anti-poaching activities (ongoing) (non recurring for antipoaching squad/Tiger Protection Force deployment, and recurring for wages towards patrolling camp labourers/watchers)

The antipoaching operations in Tiger Reserves are site specific. However, the following activities, interalia, would form part of the protection strategy in Tiger Reserves:

- Deployment of antipoaching squads
- Establishing and maintenance of existing patrolling camps/chowkis and deployment of camp labourers for patrolling.
- Organising vehicular patrolling by constituting squads (Tiger Protection Force), comprising of field staff, labourers and police/SAF/ex-army personnel, with wireless handset and paraphernalia for apprehending offenders, apart from prescribing a patrolling calendar for the squad.
- Establishing and maintenance of wireless network.
- Organising surprise raids jointly with the local police in railway stations, local trains, bus-stops, buses, catchers and cafeteria.
- Ensuring special site-specific protection measures, during monsoon as 'Operation Monsoon' – considering the terrain and accessibility of Protected Areas.
- Deployment of ex-army personnel / home guards.
- Deployment of local work force for patrolling, surveillance of water holes, manning barriers.
- Procurement of arms and ammunition.
- Procurement/maintenance of elephant squads.
- Rewards to informers.

- Legal support for defending court cases.
- Procurement of vehicles, boats.
- Procurement field gear, night vision device.

4.2 Strengthening of infrastructure within Tiger Reserves (ongoing) (non recurring for new civil works and recurring for maintenance)

The following activities, interalia, would form part of reinforcing the infrastructure of Tiger Reserves (including support to new tiger reserves):

- Civil Works (staff quarters, family hostels, office improvement, patrolling camp, house keeping buildings, museum, culverts).
- Maintenance / creation / upgradation of road network.
- Maintenance / creation of wireless tower.
- Maintenance / creation of fire watch tower.
- Maintenance / creation of bridges, dams, anicuts.
- Maintenance / creation of firelines / firebreaks.
- Maintenance / creation of earthen ponds.
- Procurement / maintenance of vehicles (Gypsy, Jeep, Truck, Tractor).
- Habitat improvement works.
- Procurement of hardware, software / GIS.
- Procurement of compass, range finder, GPS, camera traps.
- Procurement of satellite imageries for management planning.
- Map digitization facility for management planning.

4.3 Habitat improvement and water development (ongoing) (recurring)

These, interalia, may include: weed eradication, removal of gregarious plant growth from grasslands, grass improvement, water retention structures and the like. These initiatives would increase the forage and browse values of the habitat for wild animals.

4.4 Addressing man-animal conflict (ensuring uniform, timely compensation for human deaths due to wild animals, livestock depredation by carnivores, crop depredation* by wild ungulates) (compensation for crop loss is a new component) (non recurring)

This would involve:

- Payment of compensation for cattle lifting, death of human beings and crop depredation* due to wild animals.
- Creation of crop protection structures.
- Procurement / deployment of traps, cages to catch problematic animals.
- Procurement of tranquilizing equipments, rescue vehicles and drugs.

The above initiatives are extremely important to avoid as well as redress the "park-people" interface conflicts.

(* would be supported as per prevailing norms of the State, in the delineated buffer area as explained in Section 38V of the Wild Life (Protection) Act, 1972, as amended in 2006.)

4.5 Co-existence agenda in buffer / fringe areas (landscape approach/sectoral integration/ecologically sustainable development programme/livelihood options/eco-tourism) (new activity in case of tiger reserves where buffer has not been notified so far) (non recurring)

The fringe areas around Tiger Reserve have corridor value, and their ecological sustainability is important to prevent the area from becoming ecological sinks on account of over use of resources and unwise land use. This calls for delineation of buffer zone around a tiger reserve to incorporate such fringe areas so that it can fulfill the following objectives:

- Providing ecologically viable livelihood options to local stakeholders for reducing their dependency on forests.
- Conserving the forest area through restorative inputs involving local people for providing habitat supplement to wild animals moving out of core areas.

A comparative assessment of the forest cover status of outer fringe areas of tiger reserves upto a radial distance of 10 kms. has been done in collaboration with the Forest Survey of India. The States are required to delineate the fringe/buffer area around the core zones of tiger reserves, and submit a Tiger Conservation Plan as required under Section 38 V of the Wild Life (Protection) Amendment Act, 2006, to ensure wildlife conservation while addressing the livelihood issues relating to local people.

4.6 Rehabilitation package for traditional hunting tribes living around tiger reserves (new activity) (non recurring)

There is an urgent need to launch a rehabilitation and development programme for the denotified tribes and tribes involved in traditional hunting, living around tiger reserves and tiger corridors. The following denotified tribes / communities are involved in traditional hunting of wild animals : Behelias, Ambalgars, Badaks, Mongias, Bavariyas, Monglias, Pardhi, Boyas, Kaikads, Karwal Nat, Nirshikaris, Picharis, Valayaras, Yenadis, Chakma, Mizo, Bru, Solung and Nyishi. While this list is not exhaustive, around 5,000 such families are required to be taken up under a welfare programme (forming part of NTCA initiatives) during the Plan period. The rehabilitation / welfare package should be evolved in a site specific, consultative manner with livelihood options, to include : wages for such people towards their deployment in foot patrolling for protecting

wildlife, providing agricultural land with irrigation, basic health care, housing and related community welfare inputs and basic education facilities. The experience gained in the past for settling denotified tribes by the salvation army is required to be considered dispassionately while structuring the programme.

4.7 Research and field equipments (ongoing) (non recurring)

The All India tiger estimation using the new methodology approved by the Tiger task Force has resulted in a permanent monitoring protocol for the field units. The format/protocol used for the Phase-I data collection in the new estimation process should be adopted for day-to-day field monitoring. Further, assistance would be provided for fostering field oriented research and to equip the staff with facilities like GPS, camera traps, night vision, range finder and related accessories including hardware and software. As decided in the 1st meeting of the National Tiger Conservation Authority, the tiger reserves are required to carry out the day to day monitoring of wild animals using the refined process in the GIS domain, which would enable "forecasting" vis-à-vis wildlife protection.

4.8 Staff development and capacity building (ongoing) (non recurring)

This would involve:

- Capacity building / training.
- Providing project allowance and special incentives.
- Specialized training in the use of GIS, antipoaching operations.
- Specialized training in jurisprudence and wildlife forensics.
- Study tours for appraisal of good practices in other reserves.
- Dissemination workshops.
- Specialized training in park interpretation.
- Specialized training in management planning.

The above inputs are extremely important for enhancing the skill of field staff. Several instances of poaching occur for want of specialized training in crime detection and related skills.

4.9 Deciding inviolate spaces for wildlife and relocation of villagers from core or critical tiger habitats in Tiger Reserves within a timeframe and settlement of rights (settlement of rights is a new activity) (non recurring)

The Wild Life (Protection) Act, 1972, as well as the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, require that rights of people (Scheduled Tribes and other traditional forest dwellers) recognized in forest areas within core/critical tiger/wildlife habitats of tiger reserves/protected areas may be modified and resettled for providing inviolate spaces to tiger/wild animals. This

requires payment of compensation (rights settlement in addition to the relocation package offered under the CSS at present). Chapter IV of the Wild Life (Protection) Act, 1972 (Section 24) provides for acquisition of rights in or over the land declared by the State Government under Section 18 (for constituting a Sanctuary) or Section 35 (for constituting a National Park). Sub-section 2 of Section 24 of the Wild Life (Protection) Act, authorizes the Collector to acquire such land or rights. Therefore, payment of compensation for the immovable property of people forms part of modifying / settling their rights which is a statutory requirement.

The ongoing study and the analysis of the available research data on tiger ecology indicate that the minimum population of tigresses in breeding age, which are needed to maintain a viable population of 80-100 tigers (in and around core) require an inviolate space of 800 -1000 sq km. Tiger being an "umbrella species", this will also ensure viable populations of other wild animals (co-predators, prey) and forest, thereby ensuring the ecological viability of the entire area / habitat. Thus, it becomes an ecological imperative to keep the core areas of tiger reserves inviolate for the survival of source populations of tiger and other wild animals.

Based on the recommendations of the Professional Agency, a new package for village relocation/rehabilitation has been proposed, with the following options / norms, which adequately covers the "National Rehabilitation and Resettlement Policy, 2007", while taking into consideration the difficulties / imperatives involved in relocating people living in forest areas:

The proposed package has two options:

Option I – Payment of the entire package amount (Rs. 10 lakhs per family) to the family in case the family opts so, without involving any rehabilitation / relocation process by the Forest Department.
Option II – Carrying out relocation / rehabilitation of village from protected area / tiger reserve by the Forest Department.

(i) In case of option I, a monitoring process involving the District Magistrate of concerned District(s) would be ensured so that the villagers rehabilitate themselves with the package money provided to them. In this regard, a mechanism involving handholding, preferably by external agencies should also be ensured, while depositing a considerable portion of the amount in the name of the beneficiary in a nationalized bank for obtaining income through interest generated.

(ii) In case of option II, the following package (per family) is proposed, at the rate of Rs. 10 lakhs per family:

(a)	Agriculture land procurement (2 hectare) and development	:	35% of the total package

(b)	Settlement of rights	:	30% of the total package
(c)	Homestead land and house construction	:	20% of the total package
(d)	Incentive	:	5% of the total package
(e)	Community facilities commuted by the family (access road, irrigation, drinking water, sanitation, electricity, tele-communication, community center, religious places of worship, burial/cremation ground)	:	10% of the total package

(iii) The relocation process would be monitored / implemented by the following two Committees:

(**State level Monitoring Committee**)

(a) Chief Secretary of the State	-	Chairman
(b) Secretaries of related departments	-	Members
(c) State Principal Chief Conservator of Forests	-	Member
(d) Non-official members of respective Tiger Conservation Foundation	-	Members
(e) Chief Wildlife Warden	-	Member-Secretary

(**District level Implementing Committee for ensuring convergence of other sectors**)

(a) District Collector	-	Chairman
(b) CEO	-	Member
(c) Representative officials from: PWD, Social Welfare, Tribal Department, Health Department, Agriculture Department, Education Department, Power and Irrigation Departments	-	Members
(d) Deputy Director of the Tiger Reserve/PA	-	Member Secretary

(iv) The above cost norms are indicative in nature to facilitate flexibility for State/site specific situation, and may be modified to allow inter component as well as inter family adjustments by respective State Governments as per site specific requirements.

(v) The relocated village would be taken up on a priority basis for eco development as well as local development through convergence of District level schemes.

(vi) The labour oriented works involved in the relocation process would be preferably implemented through the villagers who are being relocated, so that they derive benefits out of the same apart from ensuring the field implementation to their satisfaction.

(vii) In case resettlement has been done on a forest land, the new settlement will be eligible for access to forest resources for their bonafide use through the village level committee and Gram Sabhas.

(viii) The District Administration would facilitate fair price shop, education, health center close to the relocated site.

(ix) "Handholding" after relocation would be ensured through the forest department with ongoing ecodevelopmental inputs through central assistance and district administration involving convergence of schemes. In this effort help of competent independent agencies may be sought wherever available.

(x) The relocated villagers would be given priority for livelihood options emanating from the protected area.

(xi) In case the cost of relocation including settlement of rights per family exceeds Rs. 10 lakhs, the State Government has to meet the extra cost.

The relocation process would be an open ended one, since the progress of relocation process would depend on performance by States.

4.10 Mainstreaming wildlife concerns in tiger bearing forests and fostering corridor conservation through restorative strategy involving locals to arrest fragmentation of habitats (new activity) (non recurring)

The forests connecting Tiger Reserves or Protected Areas have tigers and other wild animals in most of the States. At present, there is no Scheme for addressing wildlife concerns in such areas, where restorative as well as protective inputs are required. The Wild Life (Protection) Amendment Act, 2006, provides for addressing such corridor areas. This, interalia, would involve:

- Redressing man-animal conflict.
- Capturing problematic / aberrant wild animals.
- Monitoring of wild animals.
- Antipoaching operations.
- Habitat improvement measures.

The communities living in fringe areas of National Parks, Sanctuaries and Tiger Reserves suffer from frequent depredation of their crops on account of damage caused by wild herbivores like blue bull, black buck, wild pig and elephants. The situation becomes acute in certain pockets, since people depend on a single annual rain fed crop with low productivity. This is one of the major reasons for man-animal conflicts around our Tiger

Reserves and Protected Areas, and is a serious bottleneck in enlisting the much needed local support for wildlife conservation.

Under Section 11 of Wild life (Protection) Act, the State Chief Wildlife Wardens and officers authorized on his behalf can permit killing of wild animals causing destruction to life and property, including standing crops. However, rural communities do not favor such killings due to religious sentiments attached to these animals. Trapping and translocation of such wild animals which gain a pest value is neither feasible nor cost effective. Therefore, the situation calls for adequately compensating the stakeholder communities around Tiger Reserves from this recurring loss. This would be supported as per prevailing norms of the State, in the delineated buffer area as explained in Section 38V of the Wild Life (Protection) Act, 1972, as amended in 2006.

4.11 Safeguards / Retrofitting measures in the interest of wildlife conservation (new activity) (non recurring)

Several Tiger Reserves are affected on account of heavily used infrastructure like roads, railway tracks and others. The high tension electric lines passing through many reserves cause mortality of wild animals due to electrocution by poachers. In the interest of wild animals several safeguards as well as retrofitting measures may be required, which would be supported on a site-specific basis.

4.12 Providing basic infrastructure/ Project Tiger Headquarter expenditure for consultancy, all India tiger estimation/continuous monitoring of tigers outside tiger reserves, strengthening of NTCA at the Center and establishing a monitoring lab in the Wildlife Institute of India. The following are envisaged (new activity) (non recurring):

- Creation of office space at Delhi for National Tiger Conservation Authority.
- Creation of GIS outstation laboratory at Wildlife Institute of India.
- Carrying out All India Tiger Estimation, monitoring.
- Support to research work.
- Contractual arrangement for special studies.
- International / National Workshops.
- Contractual arrangement for data entry, analysis.

4.13 Independent monitoring and evaluation of tiger reserves (ongoing) (non recurring)

The independent monitoring of tiger reserves was carried out using as many as 45 parameters by a panel of experts, based on IUCN format. The monitoring reports were peer reviewed by the IUCN and placed before the Parliament. This process would be continued during the XIth Plan period after further refinement.

4.14 Establishment and development of eight new Tiger Reserves (new activity) (recurring and non recurring as indicated for various activities)

'Project Tiger' has a holistic ecosystem approach. Though the focus is on the flagship species 'tiger', the project strives to maintain the stability of ecosystem by fostering other trophic levels in the food chain. This is essential to ensure an ecologically viable population of tiger, which is at the 'apex' of the ecological food chain. The community pressures on forests are ever on the increase in developing countries, and India is no exception. As a sequel, the tiger habitat has become fragile and weak at several places, warranting a focused conservation approach. Our protected areas / Tiger Reserves are analogous to "islands" in an ocean of the other-use patterns. Empirical evidences from 'island biogeography' indicate that "isolated" reserves lose their species rapidly owing to 'ecological insularization'. Further, apart from fragmentation, the situation is aggravated by degraded forest cover owing to biotic pressure, dislocated prey – predator ratio, absence of effective measures to ensure the desired level of protection and lack of eco developmental initiatives for the fringe dwelling stake holders to reduce their dependency on forest resources. Since 'Project Tiger' would go a long way in redressing the above situation, the Steering Committee of Project Tiger in its meeting held on 23.1.2003 recommended inclusion of new Tiger Reserve areas so as to increase the total area of Project Tiger from existing 37761 sq. kms. to 50,000 sq. kms. during the X Plan period. Accordingly, proposals for new Tiger Reserves were received from some States, on which 'in principle' approval has been accorded. The details are as below:

(i) Anamalai -Parambikulam Wildlife Sanctuaries	Tamil Nadu & Kerala
(ii) Udanti and Sita Nadi Wildlife Sanctuaries	Chattisgarh
(iii) Satkosia Wildlife Sanctuary	Orissa
(iv) Kaziranga National Park	Assam
(v) Achanakmar Wildlife Sanctuary	Chattisgarh
(vi) Dandeli Wildlife Sanctuary and Anshi National Park	Karnataka
(vii) Sanjay National Park and Sanjay Dubri Wildlife Sanctuary	Madhya Pradesh
(viii) Mudumalai Wildlife Sanctuary	Tamil Nadu

A total of 8 new Tiger Reserves are proposed to be included in Project Tiger, with an additional financial implication **of Rs. 32.00 crores** during the plan period.

4.15 Provision of Project Allowance to staff (all categories) of Project Tiger (providing project allowance to Ministerial staff is a new component) (non recurring)

The officers / staff of Tiger Reserves receive Project Allowance as approved by the EFC/CCEA during IX plan period as detailed below:

(a) Field Director	-	@ Rs. 1000 per month
(b) Deputy Director	-	@ Rs. 750 per month
(c) Assistant Director/ Research Officer/Veterinary Officer (equivalent rank)	-	@ Rs. 650 per month
(d) Forest Ranger and equivalent rank	-	@ Rs. 500 per month
(e) Forester and equivalent rank	-	@ Rs. 450 per month
(f) Forest Guard and equivalent rank	-	@Rs. 350 per month

The offices of Tiger Reserves are located in remote places. More often than not, the ministerial staff prefer postings elsewhere in regular Forest Division offices, as a result of which the routine official working in the Project Tiger Office are adversely affected. Further, several ongoing complimentary schemes from the Collector Sector are also dovetailed in Tiger Reserves as a part of the eco development strategy to benefit the stake holders. Such ongoing schemes, enhance the office work and therefore, able ministerial support becomes extremely crucial. However, to attract the best talent, it is proposed to extend the project allowance to ministerial staff working in Tiger Reserves as indicated below:-

Class II	-	Rs 500 (per employee per month)
Class III	-	Rs 350 (per employee per month)
Class IV	-	Rs 200 (per employee per month)

4.16 Staff welfare activities (ongoing) (non recurring)

The field staff of Tiger Reserves serve in remote and difficult areas, often subjected to endemic diseases like malaria, dengue, water-borne infections, apart from facing the risk of chance encounters with wild animals. Further, such postings are normally ‘ non- family postings’, and the frontline personnel has to bear the cost of maintaining his family in a nearby village or town having the basic schooling and medical facilities. It is relevant to add, accommodation in such rural areas are seldom readily available. In addition, the field staff of a Tiger Reserve, unlike his counterpart in Territorial Forest Divisions, has also to bear the brunt of local community dwelling in fringe areas, owing to restrictions on the latter for free access to forest resources. Thus, the role of a frontline field personnel in a protected area or Tiger Reserve is different from his counterpart in regular Forest Divisions. The physical assault on the staff of Tiger Reserves/Protected Areas by people nurturing a grudge against the management is more common, often resulting in casualties. Therefore it becomes essential to provide amenities for staff welfare, to attract the best talent in the working age group. During the Plan

period, staff welfare inputs like residential accommodation for the children of frontline staff in nearby towns/villages, supply of kerosene, medicine, field kit, mosquito net, torch and the like would be supported.

4.17 Fostering Eco-Tourism in Tiger Reserves (new activity) (non recurring)

'Ecotourism' in the context of Tiger Reserves is ecologically sustainable nature-tourism, which is emerging as an important component of tourism industry. It is distinct from 'mass tourism', having sustainable, equitable, community based effort for improving the living standards of local, host communities living on the fringes of Tiger Reserves. Ecotourism is proposed to be fostered with financial support to the host community through 'soft loans' from Ecodevelopment Committees, in accordance with site – specific 'Ecotourism plan' and carrying capacity of Tiger Reserves in the buffer areas. The core/critical tiger habitats would not be used for any form of tourism, and the ongoing tourism activities in such areas should be phased out in the fringe/buffer areas, without affecting its corridor value. The development of tourism related facilities within the buffer zones of Tiger Reserves would continue with inputs under Project Tiger. The opportunities for stakeholders would include management of low cost accommodation for tourists, providing guide services, providing sale outlets, managing excursions, organizing ethnic dances and the like.

5. The Tiger Reserve States would be required to enter into a Memorandum of Understanding with the Ministry of Environment and Forests, as provided in the format at **Annexure-1.**

6. The Tiger Reserves would receive funding support under the ongoing Centrally sponsored Scheme of Project Tiger on the basis of a reserve specific Tiger Conservation Plan as required under Section 38-V of the Wildlife (Protection) Act, 1972, as amended in 2006. This should be prepared in accordance with the guidelines issued by the National Tiger Conservation Authority vide its Technical Document – NTCA/01/07.

7. The centrality of Panchayati Raj Institution should be ensured through consultation for deployment of local workforce, issues relating to man – animal conflicts, livelihood options, village relocation and eco-tourism.

8. The tentative cost table for the scheme is provided at **Annexure-II** for guidance.

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MEMORANDUM OF UNDERSTANDING
BETWEEN
NATIONAL TIGER CONSERVATION AUTHORITY
BIKANER HOUSE, SHAHJAHAN ROAD
NEW DELHI
AND GOVERNMENT OF ……..

The National Tiger Conservation Authority, hereinafter referred to as the 'NTCA', and the State Government of _____, hereinafter referred to as the State Government, have agreed to enter into an understanding.

Whereas the State Government has submitted a proposal to NTCA seeking financial assistance for protection and development of …….tiger reserve, hereinafter referred to as the "____".

And whereas the NTCA is ready and willing to extend financial support for the approved items of work as shown in Article-II, on the terms and conditions given below:

ARTICLE I.

The State Government has agreed and affirmed that:-

(a) The buffer zone around the core/critical tiger habitats shall be delineated as required under the Wildlife (Protection) Act, and a Tiger Reserve specific Tiger Conservation Plan shall be prepared as per the statutory requirements.

(b) The staff vacancies shall be filled up for ensuring effective implementation and field protection.

(c) The money released by the National Tiger Conservation Authority shall not be taken in revenue account but shall be made available to tiger reserves for taking up the works proposed in the Annual Plan of Operations immediately, with due compliance of the normative guidelines and advisories of the said Authority.

(d) The estimated cost worked out by the State Governments are based on actual approved rates of PWD of the concerned State.

(e) The Director/Officer Incharge of the Tiger Reserve shall be empowered to spend the money provided by the National Tiger Conservation Authority for immediate execution of the schemes, as per the norms and procedures prescribed by NTCA and the State Government.

(f) The proposal shall have reference to Tiger Conservation Plan, which forms the basis of APO.

(g) The APO must indicate the location / area of proposed initiative / initiatives on a map, along with physical target, financial target and unit rate, with the basis of estimation.

(h) The progress report should invariably indicate the physical achievement (viz., quantity, number, area indicating location) and the objectives fulfilled on implementation of proposed activities.

(i) A year-wise photo catalogue of physical targets shall be maintained to facilitate verification during supervisory visits.

(j) During execution, details of estimate, man-days involved etc. shall be displayed near the work site.

(k) Utilisation Certificate showing unspent balance, if any, shall be furnished to National Tiger Conservation Authority annually after the close of the financial year so that the same is reached in this office by 31st May of each year. Complete Utilisation Certificate shall be submitted immediately on completion of the work.

(l) The accounts of the grants released by National Tiger Conservation Authority shall be maintained properly as per audit requirement and shall be open to inspection by the NTCA/Audit. A copy of these accounts shall also be released to NTCA. In case of construction / habitat improvement works, photocopies of the measurement books (for the work which was executed from NTCA's grant) shall also be sent to NTCA. Details of unspent amount, if any, shall be intimated to the Authority for adjustment as unspent balance or revalidation.

(m) The State Government will ensure that the Accounts of the grants released by NTCA are audited by Statutory Audit of the State Government on annual basis and on a certificate to this effect will be sent to NTCA annually latest by 31st May each year.

(n) The funds will be used only for the purpose of which it was sanctioned. Diversion of funds will not be allowed without the prior approval of NTCA.

(o) The records of all assets acquired out of the grant released herewith by the NTCA, shall be made available for scrutiny of audit. Such assets shall not be, without the prior approval of Govt. of India/ National Tiger Conservation Authority be disposed off, encumbered or utilized for the purpose other than those for which the grant is sanctioned.

(p) A statement showing the extracts of the assets created out of the grants released by NTCA shall be furnished to NTCA annually by 31st May of each year.

ARTICLE II

NTCA has agreed to provide financial assistance as "NTCA share" as grant for execution of following items of work:-

(**Rs. in lakhs**)

S. No.	Item of work	Amount

ARTICLE III

If there is any delay in execution of the work, the State Govt. shall notify the National Tiger Conservation Authority in writing giving the reason for delay. If the NTCA feels that work is not progressing according to the work plan, it shall be at liberty to withhold the financial assistance or withdraw the financial assistance already granted. The unspent amount of grant as on the date of communication of the decision of the withdrawal of financial assistance by the NTCA shall be immediately returned to NTCA.

SIGNED ON BEHALF OF NATIONAL TIGER CONSERVATION AUTHORITY	**SIGNED ON BEHALF OF GOVERNMENT OF**
NAME & DESIGNATION (With Stamp)	**NAME & DESIGNATION (With Stamp)**
DATED:	**DATED:**

EFC Annexure-II

(Rs. in crores)

S. No.	Name of Activities	2007-08	2008-09	2009-10	2010-11	2011-12	Total
1	Anti-poaching	5.00	5.00	5.00	5.00	5.00	25.00
2	Strengthening of infrastructure within Tiger Reserves (including new Tiger Reserves)	11.00	10.00	10.00	10.00	10.00	51.00
3	Habitat improvement and water development	2.00	3.00	3.00	3.00	3.00	14.00
4	Addressing man-animal conflict (ensuring uniform, timely compensation for human deaths due to wild animals, livestock depredation by carnivores, crop depredation by wild ungulates)	2.00	3.00	3.00	3.00	3.00	14.00
5	Co-existence agenda in buffer / fringe areas (landscape approach/sectoral integration/ ecologically sustainable development programme/ livelihood options/eco-tourism)	7.50	12.00	12.00	12.00	12.00	55.50
6	Rehabilitation / resettlement of denotified tribes / communities involved in traditional hunting	NIL	3.00	3.00	3.00	3.00	12.00
7	Research, providing equipments (camera traps, GPS, etc.), computer softwares, All India Estimation of Tiger/Co-predators/Prey Animals, habitat monitoring and evaluation	2.00	0.50	0.50	0.50	0.50	4.00
8	Staff development and capacity building	1.00	1.00	1.00	1.00	1.00	5.00
9	Deciding inviolate spaces for wildlife and relocation of villagers from core or critical tiger habitats in Tiger Reserves within a timeframe and settlement of rights	30.00	78.75	78.75	78.75	78.75	345.00
10	Mainstreaming livelihood and wildlife concerns in forests outside tiger reserves and fostering corridor conservation through restorative strategy involving locals to arrest fragmentation of habitats	NIL	1.50	1.50	1.50	1.50	6.00

11	Safeguards / Retrofitting measures in the interest of wildlife conservation	NIL	1.25	1.25	1.25	1.25	5.00
12	Providing basic infrastructure/ Project Tiger Headquarter expenditure for consultancy, all India tiger estimation/continuous monitoring of tigers outside tiger reserves, strengthening of NTCA at the Center and establishing a monitoring lab in the Wildlife Institute of India	2.00	1.50	1.50	1.50	1.50	8.00
13	Independent Monitoring and evaluation of tiger reserves	NIL	0.25	0.25	0.25	0.25	1.00
14	Establishment and development of eight new tiger reserves	NIL	8.00	8.00	8.00	8.00	32.00
15	Provision of project allowance to all categories of Project Tiger field staff	2.35	3.00	3.00	3.00	3.00	14.35
16	Staff welfare activities	0.150	1.00	1.00	1.00	1.00	4.150
17	Fostering ecotourism	NIL	1.00	1.00	1.00	1.00	4.00
TOTAL		**65.00**	**133.75**	**133.75**	**133.75**	**133.75**	**600.00**

ANNEXURE - V

F. No. 3-1/2003-PT (relocation)

FORMAT FOR PREPARATION OF VILLAGE RELOCATION PLAN FROM CORE / CRITICAL TIGER HABITATS

FEBRUARY, 2008



National Tiger Conservation Authority
Ministry of Environment & Forests
Government of India

FORMAT FOR PREPARATION OF VILLAGE RELOCATION PLAN FROM CORE / CRITICAL TIGER HABITATS

BACKGROUND

1. The Wild Life (Protection) Act, 1972, as well as the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, require that rights of people (Scheduled Tribes and other traditional forest dwellers) recognized in forest areas within core/critical tiger/wildlife habitats of tiger reserves/protected areas may be modified and resettled for providing inviolate spaces to tiger/wild animals. This requires payment of compensation (rights settlement in addition to the relocation package offered under the CSS at present). Chapter IV of the Wild Life (Protection) Act, 1972 (Section 24) provides for acquisition of rights in or over the land declared by the State Government under Section 18 (for constituting a Sanctuary) or Section 35 (for constituting a National Park). Sub-section 2 of Section 24 of the Wild Life (Protection) Act, authorizes the Collector to acquire such land or rights. Therefore, payment of compensation for the immovable property of people forms part of modifying / settling their rights which is a statutory requirement.

2. The ongoing study and the analysis of the available research data on tiger ecology indicate that the minimum population of tigresses in breeding age, which are needed to maintain a viable population of 80-100 tigers (in and around core) require an inviolate space of 800 -1000 sq km. Tiger being an "umbrella species", this will also ensure viable populations of other wild animals (co-predators, prey) and forest, thereby ensuring the ecological viability of the entire area / habitat. Thus, it becomes an ecological imperative to keep the core areas of tiger reserves inviolate for the survival of source populations of tiger and other wild animals.

GUIDELINES

3. Based on the recommendations of a Professional Agency, a new package for village relocation/rehabilitation has been proposed, with the following options / norms, which adequately covers the "National Rehabilitation and Resettlement Policy, 2007", while taking into consideration the difficulties / imperatives involved in relocating people living in forest areas:

4. The proposed package has two options:

4.1 **Option I** – Payment of the entire package amount (Rs. 10 lakhs per family) to the family in case the family opts so, without involving any rehabilitation / relocation process by the Forest Department.

4.2 **Option II** – Carrying out relocation / rehabilitation of village from protected area / tiger reserve by the Forest Department.

4.2.1 In case of option I, a monitoring process involving the District Magistrate of concerned District(s) would be ensured so that the villagers rehabilitate themselves with the package money provided to them. In this regard, a mechanism involving handholding, preferably by external agencies should also be ensured, while depositing a considerable portion of the amount in the name of the beneficiary in a nationalized bank for obtaining income through interest generated.

4.2.2 In case of option II, the following package (per family) is proposed, at the rate of Rs. 10 lakhs per family:

(a)	Agriculture land procurement (2 hectare) and development	:	35% of the total package
(b)	Settlement of rights	:	30% of the total package
(c)	Homestead land and house construction	:	20% of the total package
(d)	Incentive	:	5% of the total package
(e)	Community facilities commuted by the family (access road, irrigation, drinking water, sanitation, electricity, tele-communication, community center, religious places of worship, burial/cremation ground)	:	10% of the total package

4.2.3 The relocation process would be monitored / implemented by the following two Committees:

(**State level Monitoring Committee**)

(a) Chief Secretary of the State - Chairman
(b) Secretaries of related departments - Members
(c) State Principal Chief Conservator of Forests - Member
(d) Non-official members of respective Tiger Conservation Foundation - Members
(e) Chief Wildlife Warden - Member-Secretary

4.2.4 (**District level Implementing Committee for ensuring convergence of other sectors**)

(a) District Collector - Chairman
(b) CEO - Member
(c) Representative officials from: - Members
PWD, Social Welfare, Tribal Department, Health Department, Agriculture Department, Education Department, Power and Irrigation Departments
(d) Deputy Director of the Tiger Reserve/PA - Member Secretary

4.2.5 The above cost norms are indicative in nature to facilitate flexibility for State/site specific situation, and may be modified to allow inter component as well as inter family adjustments by respective State Governments as per site specific requirements.

5. The relocated village would be taken up on a priority basis for eco development as well as local development through convergence of District level schemes.

5.1 The labour oriented works involved in the relocation process would be preferably implemented through the villagers who are being relocated, so that they derive benefits out of the same apart from ensuring the field implementation to their satisfaction.

5.2 In case resettlement has been done on a forest land, the new settlement will be eligible for access to forest resources for their bonafide use through the village level committee and Gram Sabhas.

5.3 The District Administration would facilitate fair price shop, education, health center close to the relocated site.

5.4 "Handholding" after relocation would be ensured through the forest department with ongoing ecodevelopmental inputs through central assistance and district administration involving convergence of schemes. In this effort help of competent independent agencies may be sought wherever available.

5.5 The relocated villagers would be given priority for livelihood options emanating from the protected area.

5.6 In case the cost of relocation including settlement of rights per family exceeds Rs. 10 lakhs, the State Government has to meet the extra cost.

5.7 The relocation process would be an open ended one, since the progress of relocation process would depend on performance by States.

6. The funding support for village relocation from the core / critical tiger habitats in the Tiger Reserves would be provided through the Annual Plan of Operations, based on the reserve-specific Tiger Conservation Plan, on a case-to-case basis.

7. The provisions contained in Section 38V of the Wild Life (Protection) Act, 1972, as amended in 2006, should be strictly complied with during the relocation process.

8. The centrality of Panchayati Raj Institution should be ensured through consultation during the village relocation.

9. Format for preparing a village relocation plan

9.1 Introduction

9.1.1 Name of the Tiger Reserve

9.1.2 Name of the village

9.1.3 Total area of the village
9.1.4 Legal Status : Revenue / Forest / Other category
9.1.5 Summary
9.1.5.1 Number of families (category-wise)
9.1.5.2 Total human population
9.1.5.3 Total livestock population
9.1.5.4 Proposed site for relocation (in case of **option-II**)
9.1.5.5 Area of the proposed site and its legal status
9.1.5.6 Total allocation required

10. Details of families identified.

11. Details relating to settlement of rights.

12. Details of incentives provided.

13. Description of relocation site (in case of **option-II),** with a map showing the layout of homestead land, houses and community facility**.**

14. Details of proposed work at the relocation site:
- Agriculture land (procurement / development)
- Transportation
- House building
- Pasture / woodlot
- Access road
- Irrigation
- Drinking water facility
- Sanitation
- Electricity
- Telecommunication
- Community centre
- Places of worship
- Burial / Cremation ground

15. Other related details:
- Access to forest resources
- Access to irrigation facility
- Access to Anganwadi / School
- Access to Hospital
- Access to fare price shop
- Access to telecommunication facility

16. Details of livelihood support and handholding.

17. Grievance redressal system.

18. Monitoring and evaluation (State level).

19. Suggested implementation matrix:

Scale of nature of intervention → ↓	Relocation Site	Park/PA	District	State	National
Location and livelihoods	1. Overall site location and implementation of the R&R package 2. Ensuring basic infrastructure 3. Individual plots for housing and farming 4. Off-farm livelihood options 5. Demographic based specific inputs	1. Tiger Reserve planning for relocation 2. Ensuring biodiversity gains expected on relocation are actualized 3. Benefit sharing systems with hotel and tourism operators 4. Ensuring convergence with other programmes	1. Ensuring access to basic infrastructure 2. Linking relocated communities with district development programmes 3. Providing State support to the handholding agency	1. Enabling policies for land purchase 2. Linking State level financial and training institutions 3. Formalizing benefit sharing system	1. Set up institutional framework for enterprises. 2. Enabling financial decisions and transfers in time 3. Interface with all concerned institutions
Responsible person/ implementing agency	Coordinator, Handholding Institution	Field Director	District level Implementing Committee	Chief Wildlife Warden	NTCA
Management & Administration	1. Baseline establishment 2. Proper record keeping 3. Ensuring entitlements 4. Capacity building 5. Interface with various agencies	1. Land identification 2. Discharge of entitlements 3. Creating linkages for livelihood support 4. Establishing a grievance redressal system	1. Land acquisition for R&R 2. Ensuring integration with revenue and development administration	1. Ensuring time-bound completion of R&R tasks 2. Ensuring tenure continuity for officials involved in R&R	1. Trouble shooting 2. Sharing best practices 3. Introducing central schemes for community development
Monitoring & Evaluation	NTCA Monitoring Committee	NTCA	State level monitoring Committee	State level monitoring Committee	NTCA
Legal aspects	1. Providing information on legal situation – rights and duties 2. Highlighting discrepancies if any in the process.	1. Approval of land addition owing to relocation 2. Clearance under FC Act for relocation (if required) 3. Providing inputs for compliance under various relevant Acts and Rules	1. Conducting the LA process 2. Ensuring extinction of rights in PA and establishing rights in relocated area.	1. Ensuring compliance with Wildlife Act 2. Ensuring compliance with Tribals & OFD Act	1. Ensuring compliance with Wildlife Act 2. Ensuring compliance with Tribals and OFD Act

20. Cost table and phasing

***

ANNEXURE - VI

No. 3-1/2003-PT

National Tiger Conservation Authority

(Statutory Body under the Ministry of Environment and Forests, Govt. of India)

Annexe No. 5, Bikaner House,
Shahjahan Road, New Delhi-11.
E-mail: dirpt-r@nic.in
Telefax: 011- 2338 4428
Dated the March 19, 2008

To

The Chief Wildlife Warden(s)
All Tiger States

Sub: Revised guidelines of the ongoing Centrally Sponsored Scheme of Project Tiger.

Ref: Letters of even number dated 21-02-2008 and 25-02-2008 from this Ministry.

Sir,

I am directed to draw your kind attention to the correspondence cited above and to say that the definition of a "family" vis-à-vis the revised/enhanced village relocation package from core/critical tiger habitats may be adopted as below, as defined in the National Rehabilitation and Resettlement Policy, 2007:

"Family" includes a person, his or her spouse, minor sons, unmarried daughters, minor brothers, unmarried sisters, father, mother and other relatives residing with him or her and dependent on him or her for their livelihood; and includes "nuclear family" consisting of a person, his or her spouse and minor children".

This is in supersession of the reference second cited above, which were issued earlier in this regard.

Yours faithfully,

Rajesh Gopal

(Dr. Rajesh Gopal)
Member Secretary (NTCA)

ANNEXURE - VII

NATIONAL TIGER CONSERVATION AUTHORITY

Guidelines for Non-Governmental and Voluntary Organisations seeking NTCA assistance

October, 2009

National Tiger Conservation Authority
Annexe No. 5, Bikaner House,
Shahjahan Road,
New Delhi-110011.

Website: www.projecttiger.nic.in

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ELIGIBILITY CRITERIA

The eligibility criteria for NGO / Voluntary Organisations (VO) are as follows:

i) NGO(s)/VO(s) should have been registered under the Societies Registration Act, 1860 or a State amendment thereof or the Indian Trust Act, 1882 or the Religious and Charitable Institutions Registration Act, 1920.

ii) NGO(s)/VO(s) should have completed 3 years from the date of registration on the date of application filed with NTCA.

iii) NGO(s)/VO(s) should have a bank or post office account for atleast three years preceding the date of filing of application to NTCA for funding.

iv) NGO(s)/VO(s) should be working in the field of tiger related research /conservation activities.

v) NGO(s)/VO(s) should comply with the requirement of Income-Tax Department (PAN,12A) or should have at least applied for the same.

vi) NGO(s)/VO(s) should not have been put on the NTCA's list of organizations to which funding has been cancelled or suspended for acts of omission and commission.

vii) Members of the sanctioning committees of NTCA, namely National Tiger Conservation Authority, Technical Committee of NTCA and Administrative Committee of NTCA or their family members and/or relatives should not be the office bearers of the VOs/NGOs seeking assistance from NTCA.

viii) There should not be more than three ongoing projects under implementation by the NGO/VO with funding by NTCA on the date of application filed with NTCA.

DOCUMENTS TO BE SUBMITTED ALONG WITH THE PROPOSAL (COPIES SHOULD BE ATTESTED BY A GAZETTED OFFICER)

1. Registration certificate (authenticity of the registration certificate in case of amendments, if any, subsequent to the registration of the NGO/VO.)

2. Annual Report of the NGO/VO for the last 3 years.

3. Audited accounts, viz., Receipt and Payment Account, Income and Expenditure Account and Balance Sheet along with Auditor's certificate and report for the last three years.

4. Documents relating to PAN number and exemption order under 12A obtained from Income-tax Department or request letters sent to Income-Tax Authorities for obtaining these documents.

5. Bank/Post office pass book reflecting the transactions for the last three years.

6. Certificate from the Bank Manager/Post Master stating that the account is operative for the last three years.

7. The project proposal should be forwarded to NTCA accompanied by a resolution of the organisation duly signed by the sitting members of the NGO/VO.

8. Other documents relevant to specific project proposal.

9. Certificate that the concerned project has not received, is not receiving and will not receive or apply for receiving any funding, either completely or partially, from any other Governmental, non-governmental, international or any other agency, for the same project covering the same beneficiaries.

Organisational Profile of First Timer Organisations Applying for NTCA Assistance

(This Proforma is applicable for small Non-Governmental Organizations / Voluntary Organizations with annual turnover of less than Rs. 2 lakhs for submitting project proposals upto Rs. 1 lakhs).

1. Name of the Organisation _____

2. Address:

   a) Village _____

   b) Post Office _____

   c) Taluka _____

   d) Police Station _____

   e) District _____

   f) State _____

   g) Pin Code _____

   h) Telephone No. _____

   i) Fax No. _____

   j) E-mail _____

3. In how many villages does the NGO/VO operate?

4. Objective:

5. Details of Registration:

   a) Registration No.: _____Date_____

   b) Valid Upto _____

c) If registered under FCRA indicate the No.: _____
(Attested photocopy of the Registration Certificate to be enclosed)

6. Details of Members

Sl. No.	Name	Father's/Husband's/ Wife's name	Address with Telehone No.	If members are related to each other indicate relationship
1.				
2.				
3.				
4.				
5.				
6.				
7.				

If there is any change in the original executive / governing body of the organization, certified copy of the resolution passed by the Executive Body/Managing Committee of the NGO/VO should be enclosed or supporting evidence should be furnished.

7. Activities undertaken and Experience:

8. Whether the NGO/VO has implemented any project under NTCA assistance in the past. If so give details and status:

9. Main target group:

10. a) Number of Bank Account/Accounts _____

b) Name of Bank Branches _____

c) Account Number and type of Account(s) _____

d) Date of opening of account _____

e) Bank Balance(s) as on date of application _____

f) Name of the Signatory(ies) _____

g) Relationship of signatory(ies) if any with the Chief Functionary _____

_____

11. Has the NGO/VO ever been placed under funding restriction by any other Funding Agency:-

Certificate

All the above information is true to the best of my knowledge and belief. In case at any stage it is found that any of the above information(s) is incorrect, my application for grant of financial assistance may be liable to be rejected.

Place Seal of the Organisation Signature of Authorised Signatory

Name

Date Designation

_____

ORGANISATIONAL PROFILE OF APPLICANT FOR NTCA ASSISTANCE (OTHER THAN FIRST TIMER)

(PLEASE FILL IN BLOCK / CAPITAL LETTERS)

PART-A : ORGANISATIONAL DETAILS

1. Name of Organisation _____

2-1. Registered Address _____

Block _____

Police Station _____

District _____

State _____

Pin code _____

2-2. Details of Branch Office(s) if any. (Append details of Branch Offices on additional sheets, if required.)

Address _____

Block _____

Police Station _____

District _____

State _____

Pin Code _____

3. Contact Numbers

Phone No. (1) _____

Phone No. (2) _____

Mobile Number _____

Telegram _____

Fax _____

E-mail _____

Website _____

4. Name of contact person(s)

		Last Name	Middle Name	First Name
4.1	Name	_____	_____	_____
	Designation	_____	_____	_____
4.2	Name	_____	_____	_____
	Designation	_____	_____	_____

5. Details of Registration (Kindly enclose copy of relevant Registration Certificate(s) (Please put √ against applicable Act)

State _____

District _____

Societies Registration Act, 1860 _____

Indian Trust Act, 1882 _____

The Religious and Charitable Institutions Registration Act, 1920 _____

If Registered under any other Act, please specify

5-1. Registration No. _____Date of Original Registration _____

Registration valid upto _____

5.2 Details of Foreign Contributions Regulation Act, 1976
(If applicable, kindly enclose copy of certificate)

Date of Original Registration _____

Original Registration No _____Registration valid upto _____

6. Are there nay criminal cases pending against the organizations or office bearers _____(Yes/No). If yes, kindly append details.

7. Details of people's representatives of the target area (Full name and address to be provided)

7.1	Lok Sabha Member (MP)	i) _____
7.2	Vidhan Sabha Member (MLA)	ii) _____
7.3	Village Sarpanch / Gram Pradhan	iii) _____
7.4	The Collector & District Magistrate	iv) _____
7.5	Project Director, District Rural Development Agency	v) _____
7.6	Block Development Officer	vi) _____

8. INFORMATION REGARDING MEMBERS OF EXECUTIVE BODY

8.1

Sl. No.	Name/ Address	Category Code	Designation	Qualification	Whether related to other office bearers/NTCA employee is so whom?	Money value of all benefits from NGO/ VO (in Rs. per annum)	Age	Occupation	Office held in other NGO/ VOs with address
1	2	3	4	5	6	7	8	9	10

1. For Column 3: Category Code : Give SC for Scheduled Caste, ST for Scheduled Tribe and OBC for Other Backward Classes, D for Disabled and O for Others.

2. For Column 6: Give details in format at page 8-2-4.

3. For Column 7: Salary / Honorarium / any other perks / housing / transport

4. For Column 9: Write F for farmer / B for business / G for Govt., semi-govt. employee / H for housewife / P for professional / O for others.

8-2. DETAILS OF FUNCTIONARIES
(This item is to be filled for each office bearer. Kindly use photocopies of this page)

8-2-1. Name of Office Bearer: _____
_____

8-2-2. State whether Office held, in any Other NGO(s)/VO(s) : Yes / No

8-2-3 Details of the Offices held in Other NGO(s)/VO(s) (in case answer to 8-2-2, is Yes)

Name of the Organisation : _____

Address of the Organisation : _____

Name of the Organisation : _____

Address of the Organisation : _____

Name of the Organisation : _____

Address of the Organisation : _____

8-2-4. Details of Relationship with NTCA officials, if applicable.

Name of NTCA official : _____

Designation : _____

Office Address : _____

Name of NTCA official : _____

Designation : _____

Office Address : _____

Name of NTCA official : _____

Designation : _____

Office Address : _____

8-2-5. Are there any members of the family of the chief functionary who receive salary/ honorarium from the organizations? If yes, give details.

8-2-6 Please submit details of personal assets of chief functionary.

8-2-7 Is the chief functionary the founder of the organization? If not how many years has he been working in wildlife areas? (Kindly attach his bio-data).

Part-B : Details of Activities undertaken in past 3 years

PROJECT PROPOSAL WITH DETAILS

- Title of the project
- Objectives
- Names and Designation of investigators
- Place / location of study
- NOC from the CWLW of the concerned State
- Physical targets
- Financial projections
- Time frame
- Expected outcome of the project



GENERIC GUIDELINES FOR PREPARATION OF
SECURITY PLAN
FOR TIGER RESERVES

TRAFFIC
the wildlife trade monitoring network

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(STATUTORY BODY UNDER THE MINISTRY OF ENVIRONMENT & FORESTS, GOVT. OF INDIA)

Layout and Images: MKS Pasha/TRAFFIC India
Design and Printed by Impress, New Delhi



NATIONAL TIGER CONSERVATION AUTHORITY

(STATUTORY BODY UNDER THE MINISTRY OF ENVIRONMENT & FORESTS, GOVT. OF INDIA)

Bikaner House, Annexe-V,
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Dr. RAJESH GOPAL
Member Secretary

Tele Fax: 011-23384428
Email: dirpt-r@nic.in

PREFACE

The wild tiger continues to remain endangered in the tiger range countries, and India is no exception. The growing demand for the body parts and derivatives of tiger in some countries continue to foster trafficking across the borders of our country. This illegal demand is a threat to the endangered source population of tigers, necessitating enhanced intelligence based enforcement. The States have been advised to prepare reserve specific Tiger Conservation Plan with a primary focus on field protection, vis-à-vis the enabling provisions in the Wildlife (Protection) Act, 1972. These generic guidelines are being issued to strengthen field protection in a more professional manner.

Several individuals and professionals have contributed in the development of this document. Shri S.P. Yadav, DIG (NTCA) and Shri Samir Sinha, Head TRAFFIC-India in particular deserve all praise for their untiring efforts in giving shape to these guidelines. I wish to thank Shri P.K. Sen, Ms. Belinda Wright, Brig. (Retd.) Ranjit Talwar, Shri Ramesh Pandey, Deputy Director, Northern Region, Wildlife Crime Control Bureau, Shri Mukesh Jain, DIG (SSB) and Shri Dipesh Juneja, DIG, Saharanpur for their valuable inputs. Comments and suggestions are invited from field officers and experts for refining these guidelines.



(Dr. Rajesh Gopal)
APCCF & Member Secretary
National Tiger Conservation Authority

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A Security Plan for Tiger Reserves



Background:

The key to conservation success in a Tiger Reserve is the level of security enjoyed by the tiger and all other species that inhabit the area. Even if every other factor remains very favourable, lack of security can lead to irrevocable and sudden losses of the biodiversity wealth of the area. The case of Sariska Tiger Reserve losing all its tigers in a short span of time due to poaching is a grim case in point.

Given that a forest area has its own unique characteristics, it is important that any plan to address its security must comprehensively address these unique challenges presented by the terrain and other related factors.

Today, every living wild tiger is under threat, irrespective of where it is found. While the degrees of such threat may vary, the fact is any tiger bearing area must be considered as vulnerable to external threats. Species such as the leopard, elephant or rhino which are prized in the illegal wildlife trade or other prey such as spotted deer, Sambar and wild boar usually associated with tiger landscapes also add to the threat of poaching.

This document attempts to provide a roadmap at recognising and evaluating threats to any Tiger Reserve and formulating an appropriate response to such threats.



The Nature of threats:

The threats to a Tiger Reserve could be one or several of the following:

- Poaching
- Encroachments, including mining
- Fires
- Floods
- Electrocution,a ccidents and also as a poaching technique.
- Epidemics
- Insurgency
- Human-wildlife conflict
- Illicit timber/fuel wood/minor forest produce collection and grazing

In addition, many such areas attract large number of visitors who camp inside the forest or in its vicinity. Safety of such visitors, which may include many high profile VVIPs is an added responsibility of the PA Manager.

The basic strategy to ensure security will depend on appropriate answers to the following questions:

- Who can do what?
- When?
- Where?
- Why?
- How?

Based on the above, the cornerstone of effective security is five fold:

i Evaluation
ii Preparation
iii Prevention
iv Detection, and
v Response



This document will attempt to present a road map to an organised and strategic response to threats arising due to poaching. Many of the issues highlighted here can be used to respond to most other crisis and emergency situations also.

Evaluation of an Area:

The PA manager must be in complete knowledge of the terrain under his/her charge and its key features. This would need answers to the following key questions:

- What are the areas with higher spatial occupancy of tigers, co-predators, and prey in the area?
- What are the important human made features (Villages, tanks, roads, 11KV overhead electric lines, etc.) around such areas of high tiger, co predator and prey density?
- What are the main and secondary roads in an around the TR? Which roads are fair-weather and which are usable round the year? What are the alternate routes connecting key locations and the distances between them, important bridges etc. on the way etc. (important for emergency evacuations, sending in Strike Forces etc.)
- What other alternate routes of conveyance such as rivers, canals etc. are available in the area? Which areas do they connect? Are they seasonal or perennial?
- Which parts/routes on the TR boundary offer relatively easier chances of entry/ exit to or from the TR particulary if an inter- state boundary passes through a TR or close to it.
- Which areas have suffered poaching of important species of wildlife in the last five years? This should be done for ten years. Predators and prey spp cases must be segregated and plotted on a map with different color codes. Tiger poaching spots in the past, both within and in close vicinity of the TR, should be watched depending on the crime history of the area.
- Which areas inside the TR or in its vicinity have populations of traditional hunting communities or their temporary camps? OR past history of traditional poachers visiting such areas. Most traditional poachers love travelling by train, including narrow gauge, even if the journey takes longer. The nearest railway station from their camp could be as far as 50 + km. This vital information needs to be documented under this plan.
- Who are the well known poachers of the area and where do they live? Who are their key associates and where do they live in the vicinity of the TR? The best way to keep track of such poachers or potential poachers is to make a range-wise list of the accused and co-accused in poaching cases for the past ten years, and to keep a close watch on them.
- Which localities have a higher concentration of licensed firearms? What is the trend of consumption of cartridges in such areas? This data is available with

the DM /Collector and the Superintendent of Police. Form 3 of the Arms Act mentions all license holders for 12 bore guns and rifles, Form 5 lists all license holders for muzzle loading guns. Ammunition consumption data can be obtained from returns filed by dealers to the police dept.

- Which are the areas which suffer from high human-wildlife conflict, especially with respect to species like the tiger, leopard or the elephant? The croppping pattern of adjoining areas plays a major role in seasonal migration of prey spp followed by predators, who often walk into snares or live elctric wires set as a crop protection measure and also for poaching.
- Which are the water bodies, close to the periphery of the TR that attract wild animals especially during summer?
- Most tiger reserves have a daily monitoring system to follow the movement of tigers. Tigers often have a composite territory, which covers part of a TR and part of a territorial forest. They are most vulnerable when they are out of the TR. Such areas and all paths/waterholes therein should be patrolled with joint patrolling staff.
- Each of the above need to be plotted on a Map of the TR, preferably on a scale of 1: 50,000.



Security Map:

Based on the above, a clear picture of the threat perception and vulnerability of various regions in and around the TR is likely to emerge. Based on the evaluation of such threats, the TR may be divided into several regions, each of which would be depicted on the Map with a distinct colour:

- High Risk Areas: These are areas perceived to be under severe threat round the year- These should be coded in Red colour and called the Code Red Zone
- Seasonally High Risk Areas: These are areas perceived to be under high threat during specific times of the year, eg. areas where animals take shelter during a flood or which have a local tradition of organised hunts during a particular season- These should be coloured in Orange and called the Code Orange Zone
- Moderate Risk Areas: These are areas perceived to be under moderate threat round the year- These should be coloured in Light Brown and called the Code Brown Zone
- Low Risk Areas: These are areas perceived to be under low threat - These should be coloured in Light Blue and called the Code Blue Zone

Please note that the threat perception is variable and will keep changing, depending on the situation on the ground. This should necessarily be revisited and revised atleast once every calendar year.



Sample Map No-1



Preparation

Resource Mapping:

This will involve mapping Human and Physical Resources available with the TR Manager and other supporting agencies and will include:

- List, location and contact details of vital installations such as Police Station/ Customs Post/ Fire Stations etc. Also, an evaluation of human resources normally available there which could be requested for support in a crisis (eg: a section of Armed Constabulary in addition to 4 Constables at a local Police Chowki at location Bannerpet)
- List, location and contact details of hospitals/doctors and key life saving equipment, ambulance and drugs commonly available with them (eg. knowing which nearby hospital maintains a stock of anti venom could mean the difference between life and death for a field staff bitten by a poisonous snake)
- List, location and contact details of other important officials of the district including those of the District Magistrate / Deputy Commissioner, Superintendent of Police to the Sub Divisional Magistrate, Tehsildar/Talukdar, Thana Incharge etc.
- List, location and contact details of senior forest officials of the region including Range Officers, SDOs & DFOs of neighbouring Forest Divisions who can be directly approached for support in a crisis.
- List and location of electrical substations & transmission lines (along with their operating voltage) and contact details of officials in charge of their operation and maintenance: (Important in cases involving accidental or premeditated deaths or injuries to wild animals or human beings due to electrocution.)
- List, location and contact details of key officials of the Irrigation Dept. especially for areas which have reservoir or canal running through them. They may be needed to be contacted in an emergency involving regulating the flow of water to or from a water body.
- List, location and contact details of nearby important public transport installations such as Bus and Railway stations, Taxi stands etc. This information may be very handy when trying to follow up on escaped or fleeing suspects.
- Location and contact details of where heavy duty cranes and earth moving equipment can be available, for use in rescue of vehicles or for urgent repairs of washed away roads etc.
- List, location and existing resource details of Patrolling Camps and other Safety Installations such as barriers & watch towers, wireless and repeater stations etc. Wireless frequencies, both Rx and Tx for Duplex communication over different channels must also be recorded.

- List and location of key transport equipment such as 4 wheel vehicles, motor cycles, trucks, boats, elephants etc. available with the TR.

Prevention & Detection

Deployment of Resources: Based on an evaluation of the threat Perception of various parts of the TR and the resource available therein, a fresh look has to be taken at the deployment of resources at the disposal of the TR Manager.

The first charge of such resources must invariably be for the Code Red Areas. For Code Orange areas, the seasonal deployment of additional support staff must be planned and implemented well in time in a proactive manner rather than wait for accidents to happen.

Deployment of Strike Teams:

Each Tiger Reserve must have one or more Special Strike Forces deployed in the field. The deployment should be at locations where the strike force should be able to reach a given area within a reasonable amount of time to take charge of any crisis. In most situations, a Strike Force is best deployed along the periphery in the Code Red Zone. This will be in response to a threat perception.

The Special Tiger Protection Force should be preferably used as a Strike Force and deployed as such. Detailed guidelines on the establishment and use of the Tiger Protection Force are being issued separately by the NTCA.

Strike Teams should carry our regular mock drills to test their level of preparedness and their response time. Their visibility will also send out a strong psychological message to any intended poachers etc.





Planning a Patrol:

Based on the availability of field staff and the Special Tiger Protection Force (STPF), planning for foot as well as vehicular/elephant or boat patrolling can be carried out. The element of surprise is always very important in the patrol plans.

Foot Patrols are the best and most effective way of establishing command over an area. Foot Patrols must be regularly deployed. Each patrol must have a clear objective, which should be made clear to all staff by the designated Patrol Leader before the beginning of the patrol. Each patrol should be debriefed at the end of the patrol so as to record what was observed during the patrol. Each Range must have Patrolling Plan which should aim to cover the entire area of the Range atleast once every fortnight. Care should be taken to ensure that patrols should not fall into the routine of covering only the most convenient routes and that they should not follow a predetermined pattern or route (eg., if it is Friday then the Patrol will cover the Forest Road from Nasirpet to Rani Bennur).

A Patrol Party should ideally be atleast 4 persons with a minimum of two firearms and wireless sets. Patrols in an area should generally be a mix of short (1-2 days) and long term patrols(upto 6-7 days). Such patrols comprised of groups of staff drawn from different areas of the TR also bring about bonding and integration amongst the large number of staff in the TR.

Wherever possible, use of GPS by patrol parties should be encouraged. If plotted on a GIS domain, this can throw up interesting information on gaps in areas covered by patrols.

The use of **Deep Search Metal Detectors** (DSMDs) should be encouraged in areas where metal leg traps and snares are known to be used for poaching.

In areas which have a large water body, patrolling by motor boats or rubber dinghies should also be part of the patrolling plan.

Elephants in PAs are mostly used for tourism duties. However, occasionally, and especially during monsoons, elephants must be pressed into patrol duties as these can be the best All Terrain Vehicles in a forest.

Senior officials should also join foot patrols and other patrols periodically. This will give them a first hand experience of the area under their charge, as also to give a high degree of motivation to their first line of defence.

What to look for:

Patrols must actively look for signs of human presence which should ideally not be there. They must learn the art of moving slowly and silently in the forest, without advertising signs of their presence by smoking cigarettes or biris or walking on a hill crest with their silhouettes against the sky. They must check for human signs around waterholes or other water bodies, slat licks, forest trails, deserted camp sites etc. The party should be equipped with pH or Litmus paper to check for poisoning of waterbodies by urea. They should also look for machans on trees and ground hides near waterholes. If found the area near machans/hides should be searched for empty cartridges/ percussion aps or If any such trail or sign is seen, they must carefully trace and follow the same and try to surprise the infiltrators at their camp. Scan the hill sides and tall trees for any look outs/scouts who may be placed there to keep an eye on any approaching patrol. Surprise and swift action is the key in dealing with such situations. If is is assessed that the number of persons and their firepower is of an order that cannot be handled independently be the patrolling party, additional help should be summoned using the wireless, all the time keeping an eye of the offenders.

Full moon nights are generally known to be favoured by poachers. On and around such dates, special vigil must be mounted, especially around water holes and other water bodies. The units manning protection huts on elevated places must immediately report even the slightest flicker of light or any unusual tiger call at night.

Patrolling should be intensive during full moon bracket (5 days before and after full moon. During this time the patrolling party should look for these particular signs-

The units manning protection huts on elevated places must immediately report even the slightest flicker of light or any unusual tiger call at night.

If there are signs of the animal track being closed or narrowed down using twigs and branches or distractions in the form of cloth/flags being hung on branches.

If there are series of twin pits (one of 20+ cm diameter and another less than 10 cm diameter but 2-3 feet deep) on bridle paths indicating spring traps being set up and removed. Patrolling party should also keep a close watch on kills made by tigers.

Field staff regularly patrolling the forest areas should be aware of the presence and movement patterns of major species such as Tigers, Leopards and Elephants in such areas. They should actively look for direct and indirect evidences of such species' presence on a regular basis. Any inconsistencies should be immediately investigated.

Water bodies should be examined for signs of poisoning or of attempts of snaring or trapping around it. Sometimes, fishes are killed using chemical additives. This can be detected by telltale signs of small fish floating dead on the surface. Signs of poison such as sulphur and other chemicals ground on rocks near the water are also a pointer to such criminal activity.

The flight distance of animals and birds and their general demeanour in human presence is also an indicator of disturbance. In areas where hunting is common, animals are generally wary and keep a larger distance between them and humans. This is also true for areas which are have a more frequent human visitation and such these need to be factored in also. Thus, animals in the relatively undisturbed "Core Zone" of a Protected Area generally have a larger flight distance than those in the "Tourism Zone". An entire Forest Range must be comprehensively covered once a month by such patrols.

A comprehensive Patrolling Plan will lay out the key areas to be patrolled, routes to be followed, persons responsible for leading the patrols and those for debriefing them, frequency of such patrols and any other significant facts related to the patrol. A copy will be available at each Range HQ and the Range Officer will be responsible for random deployment of Patrols within his/her Range so that the area is effectively covered. Trans Range Patrols should be organised periodically.

Cattle kill evidences are important signs to be observed. Sometimes, the aggrieved villagers retaliate by poisoning the kill, hence resulting in the poaching of wild animals. Professional poachers also keep an eye on cattle kills for ascertaining presence of carnivores. Where ex-gratia schemes are in place, speedy disbursement of such money is the first step towards preventing retaliatory killings. When a tiger or leopard is located at such a kill, it should not be disturbed but allowed to feed on it as otherwise it will only go away to make another kill. Driving away the animal from such a kill only leads to another conflict situation at some other point in time and space.

Certain areas are prone to a particular modus operandi for poaching like snares, traps, use of hunting dogs, poisoning of kills and water holes, electrocution, shooting etc. Based on the crime/ poaching history. Patrolling parties should be aware of such local variations in poaching techniques and especially look out for these during patrols.



Intelligence Gathering:

Intelligence networking is a very important pre-requisite for prevention of crime as well as for follow up after the crime has taken place. Intelligence deals with all things, which should be known in advance for taking actions in the direction of crime prevention. In this process after gathering the information, it is evaluated, analysed and used in the decision making. Advance information is key to success for prevention of crime and this emanates from intelligence.

The key to successful intelligence gathering is by trying to understand what needs to be known and who can provide such information.

- Intelligence / information is gathered from CONTACTS and SOURCES.
- Contacts are those persons who pass on superficial information. This information comes casually if one is careful enough to extrapolate and interpolate. The contacts could be press/ media persons, ironsmiths, junk dealers, lawyers, doctors, waiters, tea stall owners, village grocers, taxi / auto rickshaw drivers, bus conductors, street vendors etc. Making contacts is easier than making sources. Contacts are usually paid on the basis of the information supplied.
- Source is a special kind of contact who possess the inside information on what is going on. Sources can be permanent, temporary or casual.
- The best source is the one who is either insider or about to be engaged in the unlawful activities. Though difficult to cultivate, such sources give accurate information about the crime.
- The source could be a member of the gang itself or could belong to the criminal classes or the underworld. These sources could be members who live or operate in the fringe of the underworld.
- Permanent long standing informers/ sources are paid regularly usually given a permanent code / number for identification. Apart from general information he should provide specific information, about a crime, on demand. He should be helped during period of his illness/ hardship as long as he is faithful. There should be periodic review of the utility of such permanent sources / informers.
- Temporary sources are those who have proved their worth as casual source and are willing to cooperate in the future. They should also be paid on regular basis. After few years of testing they could be converted in to permanent source.
- Casual sources are most prolific and serve as the recruiting ground for the permanent and temporary sources.
- Secrecy on the identity of the sources should be maintained and his physical safety should be ensured. He should also be warned of the dangerous consequences for betrayal.


heart of Corbett, poachers kill ranger
Skin trade l
roots in De
1,200 rare
birds seized
18,000 leopard claws stare in Govt face
Animal skins worth Rs 2 crore seized
The trade that
hurts wildlife
The bare bones of an illegal trade
Poachers cross state borders
to satisfy Sambhar meat lust
Skin traders using women as conduits: Official
THE SUNDAY TIMES

COMMUNICATION WITH SOURCES

- Establishment of an appropriate communication system with informers is extremely important. Direct contact with sources is the thumb rule. When a direct contact is not possible, telephonic or communication through letters may be resorted. In case of the telephone the source should always talk to the officer directly.
- On direct contact emphasis should be on secrecy and anonymity. The source could meet the officer at his residence under cover of darkness or at a lonely place. Payment to a source should be done directly.
- A system of should be also evolved to meet the source in emergency situations.
- A source should be briefed and debriefed suitably. It would be appropriate if a questionnaire is prepared before each briefing and debriefing.
- A separate file for each source should be maintained for the periodic review.
- Handing over and taking over of sources should be systematised, otherwise they will dry up. Proper introduction of the source to the new officer should take place.

Flow chart for intelligence gathering:

Collection--- Evaluation---Classification & Collation---Analysis-----Reporting---Dissemination & use---- Re-evaluation.





Running an Informer Network:

Careful selection should be done for posting of personnel in the sensitive areas of the PA as these are the persons on whom the mantle of security of the Tiger Reserve vests. They will also inspire confidence in people who want to provide information.

The motivation of persons providing intelligence information could be varied and needs to be treated accordingly. Usually, such persons respond best to contact with one person. This sometimes becomes a challenge in Govt. systems where length of an individual's tenure at a station may be limited. Sometimes the person providing the information chooses to remain anonymous and establishes contact on his own choice randomly. On several occasions such anonymous tip offs can be extremely valuable. Also, persons with a past history of indulging in poaching can also be motivated to turn informers.

In order to receive good information, the following must be ensured:

- The address/ Telephone contact numbers on which such information can be provided must be widely publicised and monitored regularly. This should be regularly verified by random checks by senior officers.

- All information received must be screened and acted upon without delay
- Identity of the informer must be concealed if so desired by him
- Resources MUST be available readily to buy the information/ provide reward whenever required
- A covert watch should be kept on the activities of known poachers and their key accomplices. If found missing from their normal place of residence, an alarm should be raised.
- Liquor vendors in the vicinity should be monitored regularly.
- Outlets for pesticide sales need to be monitored periodically.
- Please note that for undercover operations, disbursement of advances must be generally discouraged as it has the potential to actually encourage poaching in certain situations.
- Individuals and NGOs running undercover operations in and around a TR should be encouraged to keep atleast one link in the official enforcement hierarchy broadly informed of their role.

And finally, even the best of Intelligence, will be useful only if it brings about appropriate decisions. Thus, information from intelligence sources must be regularly checked, cross checked and ultimately acted upon within reasonable time, to have any meaningful impact.

Establishing a Criminal Profile Directory:

All TRs must maintain records of persons with a history of poaching and/or wildlife trade in their locality. This will include details about physical appearance, identification marks/signs, employment, family, key associates, criminal history, convictions if any, pending cases etc. Sudden and long absences of such persons from their normal place of stay must be investigated. Sudden acquisition of movable and immovable assets must also be investigated for possible sources of such transactions.

Photographic dossiers can be very useful in investigation. Maintenance of crime dossiers at the State level is very important. These dossiers can be collated with other states on a need base. In case of TRs located near international borders, such dossiers should have information about poachers from both sides of the border who are known to be active in the area.

In every case, the link of old crime to new offenders and old offenders to new crime should be regularly analysed.

Wireless Communication:

A dedicated wireless system is the backbone of security in a forest environment. In the present day, many forest areas are covered under the GSM or CDMA mobile telephony network of Govt. and private service operators and there is an increasing trend of communicating with field staff on mobile phones. Yet, the importance of wireless connectivity, especially in times of crisis cannot be overemphasised.

A list of wireless stations which have access to dedicated power supply and are working round the clock is to be maintained. Similarly, a list of other wireless stations and their working hours needs to be maintained. Call signs, preferably in code, should be given to key officials of the TR (eg. Alpha for Field Director, Delta for Deputy Director etc..)

The tendency of using wireless stations to primarily share information related to tourism and for visitor movement needs to be checked. This is primarily an enforcement tool and should be used as such. All wireless stations should convey a report, preferably twice a day at a predetermined interval, about activities in their area of command to a designated Control Room. This could include information about:



- Patrols conducted and Areas covered on that date
- Any signs of presence or movement of suspected poachers etc.
- Sighting or signs of wildlife such as tigers etc.
- Any wildlife mortality/kills etc.
- General welfare of staff

Even where there is nothing significant to report, the station should contact the Control Room with a Nothing to Report (NTR) message. If a station is not responding for a period of time, this should trigger a visit to the site to find about the welfare of local staff and possible reasons for the break in communications.

Use of modern gadgets like satellite phones & mobile phones etc may be explored for the purposes of communication. However, it is important that all such communication must be formally recorded/logged.

Firearms:

Several TRs provide official weapons such as rifles, double barrel guns, pistols and revolvers to field staff for discharge of their official duties in the protection of forests and wildlife. In many states, the use of such firearms is codified, clearly laying down conditions of use of such arms while in many other states, the use of such arms is under the general umbrella of "self defence". In such situations, if any person is injured or killed due to use of firearms by staff while on duty, there may be situations where such use of firearms could lead to criminal proceedings against the concerned Government official. This leads to a general reluctance of staff to carry, maintain or use guns, even in case where they are made available.

Field Directors and other senior officials of the TR should be able to explain to Field Staff, the conditions that govern the use of the official firearms provided to them. In case the regulations need to be modified, the matter may be taken up with the respective Forest Department Headquarters and the State Home department under intimation to the National Tiger Conservation Authority.

In the forest, cartridges are perishable commodities as they are exposed to the elements of nature all the time. As such, they must not be stored for long but should be fired occasionally to test the working conditions of the guns. All weapons in the field must be well oiled and cleaned regularly. Gun oil and cleaning rods etc. should be made available at all Patrolling Camps. If senior officials make it a point to check the general state of weapons with their field staff while on tour, they will be doing protection of the PA a huge service.

All field staff should be made to undergo firing practise atleast once a year at a regular firing range. Such an exercise can be easily carried out with support of the local police or Army unit who will also be happy to spare the services of their armourer to examine the general state of being of the weaponry.

All weapons should also be test fired atleast once or twice a year.

All official firearms must be issued to well recognised entities, i.e. at any point of time it should be possible to ascertain the person who is in custody of a particular weapon. Cartridges issued should be accounted for and empties returned to store.

A single firearm must never be carried in the field as it is liable to be targeted by miscreants. Guns are best sent out atleast in pairs. While walking, guns should be carried with the barrel pointing skywards or down and NEVER at chest level pointing ahead or backwards. A gun is not a walking stick and should not be used as one, as this could lead to the butt being damaged or dirt, water etc. entering the barrel and damaging it. In humid areas, it is advisable to plug the mouth of the barrel with a piece of cotton or cloth.

Response:

Despite best efforts, some times mortalities of important wildlife species are going to happen in the field. In many cases, this may be due to natural causes while in some, poaching for profit or human wildlife conflict may be the driving force.

The first step in such a situation is to ensure that there is no attempt to hide facts and the full details of the incident is brought out. If a cover up is attempted, it will only embolden poachers and also subordinate field staff who may fear to report such cases for fear of disciplinary action.

A Scene of Crime:

Significance of the Scene of Wildlife Crime

The scene of crime holds the key to successful investigation of the case. The offender is likely to leave behind vital clues at the scene of crime. Many critical evidences are likely to be lost if the place is overrun by a large number of people.

The quality and quantity of evidences available at the scene of crime are likely to change rapidly with the passage of time. Gathering of people at the scene, weather conditions, light conditions etc. are some of the important factors that contribute to



the destruction of many important evidences from the scene of crime. Delay in visiting the scene of crime might affect the quality of investigation drastically.

Prompt action at the scene of crime may also lead to the arrest of culprits. Promptness in reaching the scene of crime might lead to obtaining valuable information from the persons who may have information related to the offence. The first set of information received from such persons may be very valuable in establishing the direction of the investigation while the same version obtained at a later stage is likely to be modified or edited due to various other considerations. It is important for the investigating officers to understand that in many wildlife offences, the carcass may have been moved, often by other carnivores etc. to a place other than where the offence was actually committed, thus further complicating the scenario. As such, there can be a primary scene of crime and it is possible to have several extensions. In order to investigate a crime successfully, it is absolutely essential for the investigating officer to pay undivided attention to ***protect, observe, process and record*** the scene of crime properly. Any damage, or tampering of the scene of crime, whether intentional or otherwise, would adversely affect the quality of investigation.

It is important to establish linkages between the scene of crime and the suspect(s) through the circumstantial, corroborative and physical evidences. From the forensic point of view, it is only the physical evidences that provide the I.O. and the court the following information about the crime:

- Nature of crime
- Time and place of commission
- Targeted species
- Manner in which the crime was committed i.e. modus operandi
- Particular weapon/tool used
- Number and nature of persons involved (any specific group, tribe etc.)

The scene of crime should be thoroughly searched in a systematic matter so as to locate and collect all evidence linked to the crime. Access to the scene of crime should be carefully restricted so that evidence is not destroyed. Some of the things they may look for are:

- Weapons, bullets, empty cartridges.
- Blood stains, hair, bone pieces, vomits, saliva, glass, paint, finger prints.
- Shoes, tyre marks and tracks.
- Cloth or other fibres, caught on bushes
- faecal material.
- Footprints.

- Matchstick, matchbox, cigarette butts, gutkha pouches.
- Implements possibly used for carrying out the crime
- Places where the offender(s) may have stayed or sheltered or laid an ambush in the forest.

Forensic Tools such as fingerprinting, collecting of specimens of blood, footprints, examination of cartridges, weapons etc. should be made use of to strengthen the linking of the offenders with the crime.

When evaluating and examining such crimes, it is important to try and link such crimes to previously identified offenders. This linking of "New Crimes" to "Old Offenders" based on key evidences including modus operendi and forensic tools will go a long way in building the criminal Profile Directory of criminals in and around a given TR.

Flow Chart for Action When a Wildlife Crime/Mortality is Detected:

- Inform the concerned senior officer immediately.



- Reach the spot at the earliest possible time with basic tools & forensic kit.



- Cordon off the area with the help of rope or tape.



- To facilitate collection of evidence, divide the crime area in to grids or radial circles.



- Note down every bit of information on the spot in a notebook or in a recording device. Please note that the weakest ink is still stronger than the best of memories, which can fade with time.



- Do not disturb/ touch/ manipulate the evidences unless photographs have been taken and sketches prepared. Take photographs from different angles. Try to make a video recording of the crime scene.

- Record foot prints of animal(s), human beings, and tyre marks of vehicle if any. Plaster casts may also be prepared of these.
- Search and collect all possible evidences carefully in original condition with preservatives if needed. Search must be carried out at the eye level, ground and above eye level also. Properly pack and label the physical evidences.
- Make a note of names, addresses of witnesses and record their statements.
- Details of the crime scene like location, time, date, weather condition etc. may be recorded.
- Collect evidences from scene of crime, carcass of animal, body parts, and suspects on the spot.
- Surrounding area of the spot must be thoroughly searched.
- Route/ escape followed by the suspect(s) must be checked for evidences.
- After recording evidences from carcass for wounds, bullet injuries, symptoms of poisoning, seizure & labelling, the body should be sent for post mortem.

Please note that information about such mortality/crime/seizures should be brought to the notice of the Chief Wildlife Warden and NTCA at the earliest [possible.

Collaboration with other Enforcement Agencies:

Memorandums of Understanding with other enforcement agencies like Shashatra Seema Bal (SSB), Border Security Force (BSF), Central Reserve Protection Force (CRPF), Railway Protection Force (RPF), Indo- Tibetan Border Police (ITBP), Assam Rifles etc will prove to be a very useful strategy in combating poaching and illegal trafficking.

Media Management:

Wildlife crimes attract a lot of media attention. If not handled properly, Park Management authorities often face undue criticism. Efforts should be made to provide fair and accurate information to the media, without any attempt to hide or distort facts. A statement/press release should be made available, giving details of the incident for providing information to the media and public. If considered necessary, a Press Conference may also be organised. Only the authorised officer should talk to the media and sweeping statements should be avoided. In situations where the media persons want to visit the field, this can be facilitated after keeping into account other operational exigencies. Please note that the media is also performing its role in reporting such instances and if they are not provided the information, they may resort to reporting unverified and inaccurate versions of the incident, which can do greater damage.

And Finally….

A Security Plan is worth the paper it is written on, only if it is implemented in letter and more importantly in spirit. The key is to carry out regular security audits by senior officials, test preparedness and response times regularly so that in times of a real crisis, the entire system responds like a well oiled machine. As is often said in the Army, "Sweat hard in peace, so that you bleed less in war".

CONTINGENCY PLAN

Emergency situation of following type may take place:

- POACHING
- FIRE
- DISEASE
- FLOOD

To deal with any of the above situations, prescriptions are given in the Tiger Conservation Plan of the Tiger Reserve. However for quick planning and understanding following steps are suggested:



POACHING

- Information/seizure/ dead animal/ body parts at site
- Collection of evidences at the site
- With forensic tool kit, photographs etc
- Booking of offence and related prosecution process.
- *Supervision must be at the level of Range Forest Officer.*

FIRE

DISEASES-Epidemics

- Precautions- Treatment of water holes, vaccination of cattle of adjoining areas
- Proper disposal by burning of dead bodies
- Treatments

FLOOD

- Construction of mounds,
- Use of rafts
- Floaters,
- Drainage of excess water
- Pathway or elevation
- Vaccination for possible outbreak of diseases.

Notes

Notes

ANNEXURE - IX

No. 1-16/93-PT (Part-I) **Dated the 12th August, 2010**

To,

Chief Wildlife Warden(s),
All Tiger Range States.

Ref: 1. Directive of the Hon'ble Apex Court dated 25.11.2005 in I.A. No.1220 (Interim Report of CEC in I.A. No. 548) and I.A. No. 994 in W.P.C. No. 202/1995.
2. Section 38V of the Wildlife (Protection) Act, 1972.
3. Forest (Conservation) Act, 1980 and the Rules / Guidelines issued therein.
4. Letter No. PS-MS(NTCA)/2009-Misc. dated 22.4.2009.
5. Guidelines of CSS-PT No. 3(1)/2001-PT dated February, 2008.
6. Guidelines for preparation of Tiger Conservation Plan, Technical Document : NTCA/01/07.

Sir,

Reference is invited to the directive of the Hon'ble Apex Court, and the statutory provisions contained in the Acts alongwith advisory/guidelines cited above.

In this context, the following is stated:

(i) The patrolling camps / chowkis / watch towers inside a tiger reserve (core as well as buffer) should not be used for accommodating tourists or facilitating tourism. As these structures have been constructed under Project Tiger, for the sole purpose of accommodating the frontline field staff (at places with wireless), it needs to be ensured that they are solely used for patrolling / antipoaching work.
(ii) Tourists should not be allowed to patrol the core / critical tiger habitat owing to the risk involved vis-à-vis the intensive legwork in a formidable terrain with wild animals. Further, exposing tourists to sensitive patrolling routes / paths / spatial presence of animals,

besides the patrolling strategy would make the habitat vulnerable by exposing such details which may be confidential for apprehending the offenders / poachers. Besides, there can be no method by which a poacher entering a wildlife habitat under the garb of a tourist can be identified. Likewise, there is no mechanism available to ensure that sensitive information pertaining to wildlife protection is not advertently/inadvertently passed on to miscreants / poachers. The frontline staff would also be burdened with the task of acting as "caretakers" for the tourists, besides attending to their possible health related emergencies. Needless to point out, patrolling is effective and successful only if it is organized discretely. Patrolling is a technical / specialized task requiring considerable physical fitness and a knowledge of a terrain which by and large, is done at odd hours. While the tourists would not be in a position to undertake this task, there is also a risk of patrolling strategy and related details getting exposed to poachers.

(iii) Under no circumstances forest produce material should be used for making a temporary / permanent construction to facilitate tourists in the core / critical tiger habitat.

(iv) It is reiterated that provisions under section 38V of the Wildlife (Protection) Act, 1972 should be implemented in letter and spirit for ensuring the inviolate status of the core / critical tiger habitat.

(v) The guidelines / advisories issued from the Project Tiger/NTCA may be strictly followed for organizing intelligence based patrolling in tiger reserves.

Yours sincerely,

(Dr. Rajesh Gopal)
APCCF & Member Secretary (NTCA)

Copy to:

1. APS to MEF.
2. PPS to Secretary (E&F).
3. PPS to DGF & SS, MoEF.

Copy for information to:

1. PS to Chief Secretary(s) of all tiger States.
2. Additional Chief Secretary(s)/ Principal Secretary(s) of all tiger States.
3. PCCF(s) of all tiger States.
4. Field Director(s), All Tiger Reserves.

No. 15-3/2008-NTCA
Government of India
Ministry of Environment & Forests
National Tiger Conservation Authority
****

Annexe – V, Bikaner House,
Shahjahan Road, New Delhi – 110 011
Telefax : 011-23389883
E-mail: jdntca@gmail.com
Dated the 23rd September, 2010

To,

(1) The Chief Wildlife Warden
(All Tiger Reserve States)

(2) The Field Directors
(All Tiger Reserves)

Sub: Guidelines for use of State CAMPA NPV money forwards rehabilitation of people from forests/protected areas-reg.

Sir,

I am directed to forward herewith a copy of letter no. 15-1/2009-CAMPA dated 18th March 2010 issued by Ministry of Environment & Forests, regarding Guidelines for use of State CAMPA NPV money towards rehabilitation of people from protected areas for your information & necessary action.

Yours faithfully,

(S. P. Yadav)
Deputy Inspector General (NTCA)

OK issued Rodhs 24/9/10

F. No. 15-1/2010-CAMPA
Government of India
Ministry of Environment and Forests
(Ad-hoc CAMPA)

Paryavaran Bahwan,
CGO Complex, Lodhi Road,
New Delhi-110510

Ph. : 011-24362698
Fax : 011-24363868

Dated : 18 March 2010

To

The Principal Chief Conservator of Forests,
States/UTs.

Sub: Guidelines for State CAMPA Use of NPV money towards rehabilitation of people from forests/protected areas - regarding.

Sir,

During the meeting of the Principal Chief Conservator of Forests of all States/UTs, held on 3rd March 2010 in Vigyan Bhawan, New Delhi, various issues such as National Afforestation Programme (NAP)/Forest Development Agency (FDA), Joint Forest Management (JFM) and implementation of the Forest Rights Act, etc., including institutionalization of monitoring mechanism to monitor and evaluate programmes and activities being undertaken by the State CAMPAs were discussed. During interaction the issue of use of NPV money towards rehabilitation of people from protected areas was also discussed. The rehabilitation of the people from protected areas to outside the forests has assumed great significance in the overall interest of protection of forests, wildlife.

Keeping in view the above aspects, it was decided that the use of NPV money towards rehabilitation of people from protected areas can be allowed after approval of same by the competent authority as per the detailed Annual Plan of Operation.

Yours faithfully,

(Ansar Ahmed)
CEO, Ad-hoc CAMPA
& IGF (FC)

A PROTOCOL ON PHASE-IV MONITORING

(Continuous monitoring of tiger reserves / tiger source areas)

Technical Document No. 1/2011

NATIONAL TIGER CONSERVATION AUTHORITY

APRIL, 2012

A PROTOCOL ON PHASE-IV MONITORING
(Continuous monitoring of tiger reserves / tiger source areas)

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SECTION-1

SECTION-1

1. BACKGROUND

1.1 The Tiger Task Force constituted by the National Board for Wildlife (2005) has endorsed the revised methodology / approach propounded by the erstwhile Project Tiger Directorate (now the National Tiger Conservation Authority-NTCA) and the Wildlife Institute of India (WII) for country level estimation / monitoring of tiger / prey status and its habitat. The said approach, interalia, comprises of the following:

(a) Country level assessment of tiger, co-predators, prey and habitat in 17 tiger States once in every four years using the double sampling method having three phases (Phase-I: Spatial mapping and monitoring of tigers, prey and habitat; Phase-II: Assimilation of spatial and attribute data; and Phase-III: Estimating the population of tigers and its prey).

(b) Intensive monitoring of tiger source populations in tiger reserves and protected areas in each tiger landscape complex (Phase-IV), and maintenance of a centralized photo-database of tigers at NTCA obtained from camera traps deployed across all tiger reserves.

(c) Routine management-oriented monitoring, which, inter alia, comprises of regular monitoring of tiger signs at beat level, which can potentially be integrated with monitoring of law enforcement and patrolling.

(d) Survey Design (for all tiger reserves except Sundarbans) for spatially explicit mark-recapture study involving research workers / scientists is at Appendix-I.

1.2 The above endorsement of the Tiger Task Force is being implemented and has also been reiterated in the guidelines issued by the NTCA (Technical Document: NTCA/01/07). In a country level meeting of Chief Wildlife Wardens / Field Directors held in May, 2011, it was decided to taken to implement the Phase-IV monitoring from

November, 2011. This was followed by a discussion with experts / NTCA members and a meeting with Chief Wildlife Wardens / Field Directors in October, 2011.

As per the decision taken, the minimum standards for the Phase IV protocols were:-

(1) Camera trap density one pair per 4-5 sq.km.
(2) Minimum trap nights of a 1000 per 100 sq.km. (i.e. 25 pairs of cameras in 100 sq.km. for 40 days)
(3) Minimum area coverage of 400 sq.km.
(4) Closure period of 40 to 60 days
(5) Minimum of 20 spatial replicates of line transects each of a minimum of 2 km length (for the entire reserve)
(6) Entire reserve needs to be sampled. Each sampling occasion should cover minimum area of 400 sq.km (100 pairs of cameras) and in case of larger reserves, the area should be covered by dividing the area into 400 sq.km blocks and camera trapping should be done successively, within the closure period of 60 days.

The objective of the NTCA exercise is to, at the least, obtain a minimum number of tigers in a Tiger Reserve (Section-2), but aims to estimate the tiger population size and prey densities (Section-3) in a reserve using spatially-explicit capture-recapture approaches using software tools such as SPACECAP / DENSITY for estimating tiger population size & DISTANCE for estimating densities of prey.

In brief, the Phase-IV protocol of NTCA contains six components:

(a) Maintaining daily patrolling log (described in Section-2)
(b) Carrying out beat-wise monitoring of sign encounters twice a year (described in Section-2)
(c) Recording from PIP (described in Section-2)
(d) Obtaining minimum tiger number using camera traps (described in Section-2)
(e) Obtaining tiger numbers using camera traps (40-60 days closure period) (described in Section-3)
(f) Obtaining minimum tiger numbers through DNA analysis from Scats (described in Section-3)

The field managers are familiar with some of these components. Under Phase-IV monitoring, emphasis have been given on the use of camera traps for obtaining minimum tiger numbers or preferably, tiger population size estimation and using line transect sampling for estimating prey densities. It must be borne in mind that for data analysis using camera trap data in a mark recapture framework as well as in DISTANCE sampling, the 'detection probability' or 'probability of detecting animals' is important. Further, it is important to note that more animals in an area may not result in enhanced detection probability, since the latter is governed by terrain features, cover, visibility etc. However, more animals in an area may result in more detections on a line transect or more captures during a camera session.

The phrase 'detection probability' is used in line transects, whereas 'proportions of animals captured' is used in the context of camera traps. The 'proportion of capture' or 'capture probability' facilitates estimation of true population size. To illustrate the importance of a detection probability, a simple example is given below:

- 100 spotted deer were introduced in a known area
- The same area was traversed by a team of two persons six times resulting in a count of 62 spotted deer (mean)

- Here, the detection probability = $\hat{p} = 62/100 = 0.62$
- After a year, the area was again counted along the same trail resulting in a count of 90 spotted deer
- The population estimation is done as below:
  90/0.62 = 145 spotted deer, with the assumption that detection probability has remained constant over the two years.

Thus a generic formula is given for population estimation:

$$\hat{N} = \hat{C} / \hat{P}$$

where, $\hat{N}$ = population

$\hat{C}$ = count / index

$\hat{P}$ = probability of detection

In the above example, the initial figure of 100 spotted deer was known, which is not the situation under wild conditions. Further, two counts / indices can be compared only if we know the probability / estimate the probability of detection. Thus, both in camera trap as well as distance sampling, the analysis part requires estimation of the probability of detection / capture.

QuickReferenceGuide

Phase IV involves monitoring of Tiger and its prey on annual basis at Tiger Reserve level, while Phase I to III is done at every 4 year interval for country level monitoring. The following needs to be kept in mind while planning the Phase IV:

Carnivore population estimation
1) Camera trap density one per 4-5 sq km
2) Minimum trap nights of a 1000 per 100 sq km
3) Minimum area coverage of 400 sq. km or whatever is the reserve size
4) Closure period of 40 to 60 days
Trap night are number of days of operation multiplied by number of pair of cameras. Closure period is time frame within which animal movement in and out of study area, birth and death are going to have no or negligible effect.

Given the importance of estimating detection probability as outlined above, this concept is central to intensive monitoring under Phase IV, unlike in Phases I, II, and III where 'encounter rates and indices' were employed more prominently.

However, since at the reserve or source population level tiger and prey density estimation methods which can rigorously deal with detection probability require substantial scientific expertise to design and deploy, it may not always be possible for reserve managers to have access to and be guided by adequately qualified scientists. Therefore, Phase IV intensive monitoring is being seen as a "ladder process" in which tiger reserves will gradually move up the ladder from routine management oriented monitoring to the intensive scientific monitoring scheme.

States/Reserve managers who do not have ready access to trained scientists with expertise in design and deployment of intensive scientific methods may use the first step of the ladder described here under Section-2, as routine management oriented activities. These routines will involve a wide range activities covered under parts A, B, C, D under Section 2 of this protocol and will be generally helpful in management of reserves. One aim of this is to generate minimum number of tigers in each reserve, each year without violating important closure assumptions described later. This routine management oriented monitoring is described in Section 2 of this document.

The next step in the “ladder process” involves use of rigorous distance sampling (for prey) and capture-recapture sampling (for tigers). These may require collaboration with adequately qualified scientists in survey design, implementation and data analysis stages. Here the goal is to generate valid estimates of population density and population size for tigers and important prey species in each reserve, fully meeting all the minimum standards and approaches described in Section 3 of this document.

Where such intensive scientific monitoring of tiger and prey populations is undertaken as described in Section 3, there may be no need for deploying other kind of line transect or camera trap surveys, to avoid unnecessary duplication of work.

SECTION-2

SECTION-2

PHASE-IV MANAGEMENT-ORIENTED MONITORING

I. For all tiger reserves except Sundarbans

Part-A Maintaining daily patrolling log in patrolling camp / chowki registers

While on regular or targeted patrolling duties the personnel shall record the following information:

1) Each patrolling team shall be equipped with a GPS unit and a digital camera besides the regular equipment (e.g. firearms, wireless, torch, etc).
2) The date, time and GPS coordinates of the beginning of the patrol recorded.
3) Preferably the GPS unit shall be switched on throughout the patrol in a track log mode. However, due to constraints of technical knowhow or other issues if this is not possible then a GPS coordinate recorded and written down in the record form every 30 min or at major deviations from a straight line path.
4) The total number of persons on the patrol are recorded along with number of armed personnel and type of arms. The mode of patrol is also recorded, e.g. on foot, bicycle, motorcycle, 4WD, elephant, boat, etc.
5) A record of all illegal activities is entered in the data sheet along with time, date and coordinate stamp. A photograph is also taken of the site with a time date stamp.
6) A record of signs and sightings or highly endangered species while on Patrol is also maintained by entering the GPS coordinate, date and time of the sighting /sign as well as recording a digital picture of the same if possible.
7) After the end of the Patrol, the GPS track log is either downloaded onto a computer (in MSTrIPES program if this is applicable at the site) or the datasheet with the recorded information deposited at the Range Head Quarters. Data formats for recording Patrol data are provided in Annexure-I.

Part-B Carrying out beat-wise monitoring of signs and encounters of animals/vegetation/habitat disturbances following Phase-I protocols twice a year

The entire tiger reserve would be covered at the beat level, by considering the latter as a sampling unit, as done in Phase-I of the country level assessment by following the standardized eight day protocol (the data collection needs to be done twice a year in the formats provided at Annexures-VII, VIII, IX and X). This would involve beat wise collection of data (in the standardized formats) twice a year relating to tiger / carnivore signs survey, ungulate, encounter rates, habitat status, human presence and pellet / dung counts. Based on such data, beat level maps indicating the spatial presence / relative abundance (index) of prey / predators species should be prepared in the GIS domain for record.

(i) Beat-wise collection of data in the standardized formats of Phase-I country level assessment process.
(ii) The data collection should be done twice a year (summer and winter).

(If the tiger reserve is following advanced protocols as described in Section-3 in collaboration with scientific institutions, then the routine monitoring of prey animal signs/encounters, vegetation features and habitat disturbance features should be carried out along transect lines designed based on protocols described in Part-E of Section-3. There may be no need for laying of transect lines in each beat as per Phase-I protocol.)

Part-C Recording data from 'pressure impression pads' (PIP)

As a part of intensive monitoring of source populations of tigers, data will be recorded from pressure impression pads (PIP's, track plots) in every beat.

- A minimum of 5 PIPs will be permanently maintained in each beat. The dimension of the PIP shall not be less than 6m in length the width of the PIP should equal the foot path, jungle trail or dry nullaha's width on which the PIP is made. GPS coordinates of all PIP's need to be recorded.

- The location of the PIPs within the beat should be such that they maximize the possibility of recording carnivore tracks. Minimum distance between any 2 PIPs should be more than 1.5km.
- The PIPs should be cleaned of debris, leaf litter, gravel and covered with fine dust of about 0.5cm depth. After preparing the PIP, data should be recorded the next morning and the PIP cleared of all tracks. The PIPs should be sampled thrice every month during summer and winter. In case a prepared PIP is disturbed due to rain, traffic etc. then it should be set again before data is collected. The topography and forest type should be recorded for each PIP.

- Trails of all carnivore and mega herbivores species should be recorded e.g. tiger one track set, leopard two track sets, several dhole track sets (as it may not be possible to identify individual track sets due to many tracks by a passing dhole pack), one small cat track (as species level identification may not be possible).
- It is important to note that a track set is constituted by one to many pugmarks made by a single animal traversing the track plot (PIP). One need not identify the gender or individual animal (tiger), but if this information is known, it should be entered in the remarks column. If there are more than one track sets of "same" animal eg. a tiger moving up and down the trail several times, they should be recorded as separate track sets. Data sheet for recording are provided in Annexure-III.

Part-D Obtaining the minimum number of tigers in the tiger reserve

(i) Three pairs of camera traps to be deployed per beat and should be left open within a closed period of 40-60 days depending on the reserve.

(ii) The period of leaving the camera traps open (closure period) is important owing to the fundamental assumption of "population closure" (no deaths / births / immigrations / emigrations in the population). Leaving the cameras open for longer duration will lead to over estimation of tiger numbers.

(iii) The photographs obtained from camera trapping should be submitted to NTCA for analysis for fixing individual IDs of tigers.

(iv) A digital camera trap tiger photo database should be prepared for the reserve with location ID, Date and Time Stamps as per format to be provided by NTCA.

(v) The minimum number of tigers should be ascertained based on individual camera photo traps of tigers obtained within the closure period specified to be 45-60 days.

(vi) Details of new captures / missing tigers should be recorded.

(vii) The format for recording the camera trap capture data will be provided by NTCA

SECTION-3

SECTION-3

(Advanced protocol involving scientists)

PHASE-IV INTENSIVE MONITORING OF SOURCE POPULATIONS AND TIGER RESERVES

Part-E Obtaining tiger population size for the reserve using spatially-explicit capture recapture framework and Obtaining prey population size using line transect sampling.

(A) Obtaining tiger population size.

(i) The camera traps deployed as per the survey design in Appendix-1. should be left open for a period of 40-60 days (depending on the areas). Where possible the entire Tiger Reserve must be surveyed. If the survey area is very large, tiger population size can be obtained by sampling a minimum block of 400 square kilometers at a time, but following all other minimum standards in section 3. If deployment of camera traps in an entire reserve or parts of it is not feasible for any reason, fecal DNA samples may be collected over the entire Tiger Reserve for Capture-Recapture analysis. The tiger population size may then be estimated over the entire Tiger Reserve using Mark-recapture methodology.

(ii) The analysis of the data needs to be done in collaboration with a technical expert / scientist conversant with spatially-explicit capture-recapture process / analysis.

(iv) The period of leaving the camera traps open (closure period) is important owing to the fundamental assumption of "population closure" (no deaths / births / immigrations / emigrations in the population). Leaving the cameras open for longer duration may lead to over estimation.

(v) The format for summary record of camera captures and the basics of mark recapture process using camera traps are provided at Annexures-V & VI.

(vi) The analysis of capture data between years (using open population models) should also be done in collaboration with technical experts / scientists/ WII.

(B) Obtaining prey densities

(i) Line transects must be systematically placed with a random start according to the survey design mentioned in Appendix-1 and implemented in program DISTANCE.

(ii) The line transect data should be analysed using the "DISTANCE" software for prey density. The analysis of the data needs to be done in collaboration with a technical expert / scientist conversant with the DISTANCE SAMPLING analysis.

(iii) The format for collecting line transect data to facilitate analysis using "DISTANCE" software and the basics of DISTANCE sampling using line transects are provided at Annexure-II.

Part-F Using scats for DNA analysis to obtain the minimum tiger numbers in reserves where camera trapping is not possible

(i) Collection of tiger scat samples: a) Use disposable surgical gloves to handle scat samples, b) for each scat a new set of gloves should be used to avoid cross contamination, used gloves should be discarded in an environmentally friendly way c) about 20 gms of fresh scat sample should be taken and stored in a vial/tube containing buffer & / or 70% alcohol. Tubes should be prepared in duplicate with GPS coordinates and date clearly recorded on the tube (alcohol erases permanent marking pens).

(ii) Obtaining the minimum number of tigers in the area through DNA analysis of tiger scats involving an institution having the domain expertise.

APPENIDCES

Appendix-I

SURVEY DESIGN (For all tiger reserves except Sundarbans) for spatially explicit mark-recapture study involving research workers / scientists

Minimum Standards for monitoring tiger source populations were: Sampling area: Minimum area of 400 km^2 or entire Tiger Reserve, if area is smaller than 400 km^2.

(i) Tiger monitoring by camera trap sampling:

Camera density = 25 double-sided cameras per 100 km^2.
Sampling effort = 1000 trap nights / 100 km^2.
Closure period = 40-60 days

NOTE: The period of leaving the camera traps open (closure period) is important owing to the fundamental assumption of "population closure" (no deaths / births / immigrations / emigrations in the population). Leaving the cameras open for longer duration may lead to gross over estimation.

(ii) Prey monitoring by line transect sampling:

1) Straight or square line transects will be systematically placed with a random start over the study area. These designs must be generated using program DISTANCE.

2) At least 20 spatial replicates must be laid out.

3. Each transect must be walked at least 4 times during sampling to generate >40 detections for each important prey species.

DESIGN OF SURVEYS ANALYSES OF DATA

(i) The survey design and analysis of these data needs to be done in collaboration with a technical expert / scientist conversant with the advanced open and closed model mark-recapture and advanced distance sampling methodologies.
(ii) The format for recording camera capture data and the basic ideas of the mark-recapture process using camera traps are provided at Annexures-V & VI and in published scientific literature.

***

Data Sheet-6

Patrol Form

Name of Guard: ... ... Date: ... ... Forest Division ... ... Range: ... ...

Beat: ... ... No. of Persons on Patrol: ... ... Armed ... ... Unarmed ... ...

Patrol Type: General Duties, Investigations, Surveillance, Others Patrol Method: Foot, Jeep, Motorbike, Bicycle, Elephant and Others

Dt	Tm	L			L g			Pl	Anml n	G Fn	Illg l A				Anml M l y R l					
		Dg	M	S	Dg	M	S				Ty F	Tm l p l	D t l	A t t k	S t	G l (M/F/U)	Ag (Y/A l/U)	C t t	C l f th	S mpl t k

M – Male, F – Female, Un – Unknown, Y – Young, Ad – Adult.

Annexure-II

Field formats for data collection in distance sampling

I. Line Transect Data Sheet for monitoring of ungulate population by DISTANCE sampling:

Observer name: ..... Start time: ..... Date: .....
End time: ..... ID no. of line transect: .....Total length: ……km
TR / Forest division: ..... Range: ..... Beat: .....
Weather condition: Cloudy/Clear sky
Beginning GPS Lat: .....N; Long: …….....E
End GPS Lat: .....N; Long: .....E

Sighting No	Time	Species*	Total Nos. (Adults & Young)	Young	Sighting Distance	Compass Bearing	Forest Type	Terrain Type	Remarks
1									
2									
3									
4									
5									
6									
7									
8									

*Species that need to be recorded on the transect: chital, sambar, nilgai, gaur, barking deer, elephant, rhino, wild buffalo, swamp deer, hog deer, chowsingha, blackbuck, chinkara, wild pig, langur, peafowl, hare, cattle (live stock), and other mammalian species seen.

II. Location of transects in relation to Vegetation and Terrain features

Transect No.	Total length (km)	Name	Bearing	GPS location		Vegetation type	Terrain category
				Start	End		
T1							
T2							
T3							
T4							
T5							
T6							
T7							

Annexure-II
(Basic Information)

Assessment of prey using line transects following survey design as described in Part-E of Section-3 and analyzing the data with DISTANCE Software

(i) The use of line transect in estimation of prey density is known as 'line transect sampling'. This technique of abundance estimation is included under 'distance sampling'.

(ii) It provides a direct estimate of density, provided its assumptions are met.

(iii) It also accounts for the probability of detection.

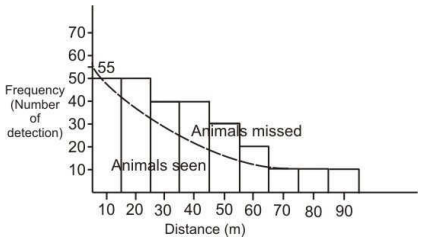
(iv) In 'Distance Sampling', the fact that the 'probability of detection decreases with increasing distance from the observer' is modelled by developing a function, which is used to estimate the 'probability of detection' ($\hat{\beta}$). The density ($\hat{D}$) is estimated as below:

$$\hat{D} = \frac{n}{\alpha\hat{\beta}}$$

where, n= total number of detections
α = total area sampled

(v) The observer travels along a line of length 'L', located randomly in the study area, and counts all the animals which are seen. There is no assumption that all animals are counted, and the counts are assumed to be incomplete. More often, a maximum observation distance 'w', which is perpendicular to the transect line on each side, is established. Beyond this distance, no count is made. In some cases, counting of all animals is done without establishing a distance.

(vi) Let us consider the common approach of establishing the 'maximum observation distance' (w). Here, it is important to estimate the 'detection probability' or the proportion of animals that are actually seen (β). This is required to correct the actual counts.



(Hypothetical from the transect line histogram plot of the number of detections against the distance from the transect line, with a smooth function fit.)

(vii) If the number of detections are plotted against distance from the transect line, a smaller number of detections are seen as the distance increases. The detection function to the observed distances is fitted to estimate the detection probability '$\hat{\beta}$':-

$$\hat{\beta} = \frac{\text{Area under the curve}}{\text{Total area}} = \frac{3500}{4950} = 0.70$$

(viii) Once the detection probability ($\hat{\beta}$) is computed, animal abundance in the survey area can be calculated, as in the case of the strip sampling, using the canonical estimator as before:

$$\hat{N} = \frac{An}{2wL\hat{\beta}}$$

(ix) For animal density ($\hat{D}$), the abundance needs to be divided by area, resulting in:

$$\hat{D} = \frac{n}{2wL\hat{\beta}}$$

(x) The salient features of this estimation technique are as below:-

a. From the transect line, the perpendicular distances (x) to each detected animal of interest are computed by measuring the detecting angles 'M' and detection distances 'r'.
b. This computation is done as x = r sin M.
c. Imagine a situation where 'k' transect lines have been laid

in some randomized design, having lengths l_1.....l_k, with a total length 'L'.

d. Further, suppose that 'n' animals are seen at perpendicular distances x_1, x_2.....x_n, and animals beyond a distance (w) from the transect (truncation distance) are not taken into account.

e. In the above situation, the area surveyed (a) is given by : $a = 2wL$.

f. Say 'n' animals are seen/detected within this area.

g. Estimation of animal density (D) is given by:

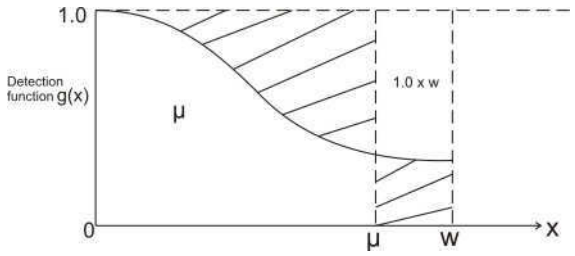
$$\hat{D} = \frac{n}{cwLP_a}$$

where, P_a = probability of detection of a randomly chosen animal within the area surveyed;
P_a = estimate of P_a

h. Thus, it becomes necessary to give a framework to estimate P_a. In this context, the 'detection function' 'g(x)' is defined as the probability of an animal at distance x from the transect line being detected, given that x is between w and 0 (i.e. $0 \leq x \leq w$). Further, it is also assumed that animals on the transect are certainly detected (i.e. g (0) =1).

i. A new parameter 'μ' is now defined, which is known as the 'effective strip (half) width'. It is the distance from the transect 'for which as many objects as are detected beyond μ as are missed within μ '.
(Defining a detection function g(x), where g(0) = 1; μ = the effective strip width).

j. If the detection function g(x) is plotted against perpendicular distances 'w' as a histogram, a model for g(x) needs to be specified, and fitted to the distance data.

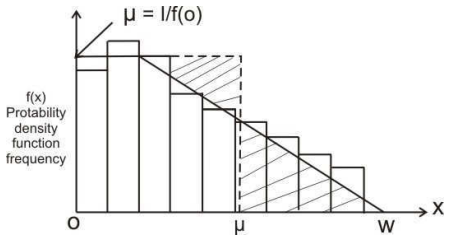


P_a is related to μ. If the definition for $\mu = \int_0^w g(x)dx$, then $P_a = \mu/w$.

Thus, $\hat{D} = \frac{n}{aP_a} = \frac{n}{2wL\hat{\mu}/w} = \frac{n}{2\hat{\mu}L}$

k. Now μ(hat), an estimate of μ is required. For this another function known as the 'probability density function' (pdf) of perpendicular distances f(x) to detected animals is used. This is the rescaled detection function g(x) for integrating into unity; i.e. f(x) = g(x)/ μ. Since it is assumed that g(0) = 1, hence f(0) =1/ μ.

Thus, $\hat{D} = \frac{n}{2\mu L} = \frac{n\hat{f}(0)}{2L}$



[Fitting the probability density function (pdf) to the data. The area under this function is 1].

f(x) is the pdf of perpendicular distance p frequencies, plotted on a histogram of perpendicular distance frequencies. These are scaled so that the area of the histogram is 1. By definition, the area below the curve is unity (1). The two shaded areas in the above curve are equal in six, hence the area of the rectangle, μf(0) is also unity, resulting in μ=1/f(0).

l. Thus the pdf of perpendicular distances are modeled, and

the fitted function is evaluated at x=0. The DISTANCE Software address this standard statistical issue. A parametric 'key' function is selected. However, if the fit provided by it is not adequate, adjustment are done using polynomial or cosine series, till the fit is judged satisfactory by one or more criteria.

m. Usually, the data are grouped into distance categories before analysis and such grouped data is fitted using standard likelihood methods from the multinomial data.

(xi) The distance software calculates variance and confidence in interval inherently and also besides addressing the estimation of cluster size.

(xii) The data from a line transects includes: (a) number of individual animals / number of individual animals in a cluster, (b) the perpendicular distance of the animal / centre of the cluster from the transect, (c) name / identity of the transect line where count was made / detected, (d) total length of the transect line.

(xiii) The transects should be made in all the beats (at least two line transects of 2 km each per beat).

(xiv) The transect lines may be straight lines or conforming to a continuous shape leading to the starting point. The transects should be randomly laid, separated by at least a distance of 2 to 3 km. and physically marked using GPS for replication.

(xv) The total walks on a transect (total effort) is computed by adding all the walks done on a transects, and totaling up such walks on all the transects laid in the area.

(xvi) For low density areas, more efforts may be required on the transects.

(xvii) Laser range finders and compass should be used for measuring distance and angle respectively.

Assumptions in line transect sampling:

The critical assumptions in line transect sampling, which should be met for a reliable density / abundance estimation are as below:

A. Random location of transect lines with respect to distribution of animals:

This assumption helps in estimating the detection function from the observed distribution of perpendicular distances, leading to the average probability of detection (p). To ensure this assumption, the transect lines should be laid randomly, causing minimum disturbance to the habitat.

B. Detection of animals with certainty on the transect line :

This assumption is fundamental for deriving the density estimator, wherein detection of all objects at 0 perpendicular distance are assumed (i.e. g(o) = 1). The density would be under estimated if objects / animals falling on the transects are missed, since bias is a simple function of g(o). Thus, by missing 15% of the animals on the transect line, the density estimate on an average would be less by 15%.

C. Detection of animals at their initial location:

This assumption can be easily met for stationary objects like plants or dung piles of wild animals, but it is difficult to meet for moving animals. It has been pointed out that movement does not create much problem provided it is not in response to the observer. Further, comparatively faster movement of observers also reduces the problem. However, the observers should move as silently as possible to avoid evasive movement of the animals before detection, while trying to detect them. A considerable evasive movement of animals would lead to under estimation.

D. Exact measurements are made:

Proper field measurements are essential to record reliable measurements. Erroneous recordings relating to animals on transect line from a distance makes analysis difficult.

Apart from the above, the other assumptions include :

(a) Detections are independent events.
(b) Animals should not be counted twice on the same line.

Hypothetical example of distance sampling:

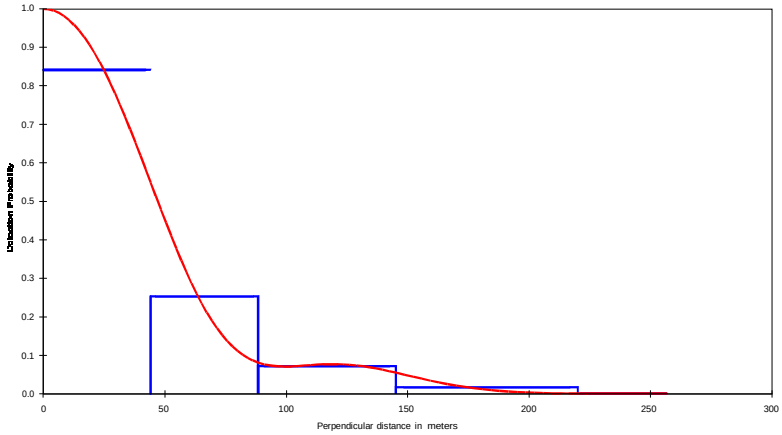
```
Effort        :    126.0000
 # samples     :     42
 Width         :    256.0000
 Left          :       0.0000000
 # observations:    447

 Model
    Half-normal key, k(y) = Exp(-y**2/(2*A(1)**2))
    Simple polynomial adjustments of order(s) :  4, 6
```

Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95 Percent Confidence Interval	
A(1)	43.57	1.680			
A(2)	-115.6	34.19			
A(3)	755.9	242.4			
f(0)	0.18600E-01	0.77638E-03	4.17	0.17136E-01	0.20190E-01
p	0.21001	0.87661E-02	4.17	0.19348	0.22796
ESW	53.763	2.2441	4.17	49.531	58.358

Sampling Correlation of Estimated Parameters

	A(1)	A(2)	A(3)
A(1)	1.000	0.427	-0.742
A(2)	0.427	1.000	-0.886
A(3)	-0.742	-0.886	1.000



Cell i	Cut Points		Observed Values	Expected Values	Chi-square Values
1	0.000	44.2	309	308.43	0.001
2	44.2	88.3	93	93.78	0.007
3	88.3	145.	34	34.07	0.000
4	145.	220.	11	10.67	0.011
5	220.	240.	0	0.05	0.054
6	240.	256.	0	0.01	0.007

Total Chi-square value = 0.08 Degrees of Freedom = 2.00

Probability of a greater chi-square value, P = 0.96098

The program has limited capability for pooling. The user should judge the necessity for pooling and if necessary, do pooling by hand.

There is a need for some pooling to achieve a reliable chi-square test However, the pooling algorithm built into this program would result in no degrees of freedom left. Therefore pooling is left to the user.

One or more expected values is < 1.
Try pooling some some cells by hand to obtain a more reliable test.

Model
Half-normal key, k(y) = Exp(-y**2/(2*A(1)**2))
Simple polynomial adjustments of order(s) : 4, 6

Parameter	Point Estimate	Standard Error	Percent Coef. of Variation	95% Percent Confidence Interval	
f(0)	0.18600E-01	0.77638E-03	4.17	0.17136E-01	0.20190E-01
p	0.21001	0.87661E-02	4.17	0.19348	0.22796
ESW	53.763	2.2441	4.17	49.531	58.358
n/L	3.5476	0.39480	11.13	2.8355	4.4386
DS	32.993	3.9214	11.89	26.017	41.839
E(S)	3.7964	0.22495	5.93	3.3794	4.2649
D	125.26	16.635	13.28	96.287	162.94
N	125.00	16.601	13.28	96.000	163.00

Measurement Units

Density: Numbers/Sq. kilometers
ESW: meters

Component Percentages of Var(D)

Detection probability : 9.9
Encounter rate : 70.2
Cluster size : 19.9

Annexure-III

Data Sheet-5
Track Plot for Carnivores and Mega Herbivores
(Pressure Impression Pad)

Name of Observer: …… Date: …….Forest Division ……Range: ……...

Beat: …….....

PIP No.	Forest Type	Terrain Type	Tiger		Leopard		Sloth Bear	Dhole	Hyena	Jackal	Small Cat	Gaur	Elephant	Rhino	Water Buffalo	Others	Others	Deg N	Min N	Sec N	Deg E	Min E	Sec E
			Adult	Cub	Adult	Cub																	
1																							
2																							
3																							
4																							
5																							

If track of young carnivores (eg. tiger cubs) are observed, please mention in remarks.

Remarks: ……
……

Details of Digital Photographs taken ……..

Annexure-IV

Format for recording camera trap capture data to obtain tiger numbers at the reserve level

1) Place double-sided camera traps at the best locations within a beat to photograph tigers.
2) The distance between camera traps within and between beats should be over 1.5 km.
3) A minimum of 3 camera traps (consisting of double sided cameras) per beat should be deployed. The number of camera trap will increase as the size of the beat increases, keeping the strategy of one pair of camera traps for 4 sq.km. area (2 km x 2 km).
4) The GPS coordinates of each camera location and the dates of deployment should be recorded as given below:

Camera Trap Station ID	Degree, Min, Sec North	Degree, Min, Sec South	Dates deployed	Dates not operating
1 – main Rd nalla				
2- River Junct				
3- temple jnct				
4-.....				

5) Format for daily monitoring of camera traps (beat-wise)

Date	Camera Unit	Camera Trap Station 1			Camera Trap Station 2			Camera Trap Station 3			Remarks*
		Tiger	Leopard	Other	Tiger	Leopard	Other	Tiger	Leopard	Other	
	A – Right Side Camera										
	B – Left Side Camera										
	A – Right Side Camera										
	B – Left Side Camera										
	A – Right Side Camera										
	B – Left Side Camera										
	A – Right Side Camera										
	B – Left Side Camera										

	A – Right Side Camera										
	B – Left Side Camera										
	A – Right Side Camera										
	B – Left Side Camera										
	A – Right Side Camera										
	B – Left Side Camera										
	A – Right Side Camera										
	B – Left Side Camera										

* Non-functioning of camera traps or missing of tiger capture, etc. to be recorded in the Remark column.

6) Photographs of tigers, leopards and all mammal species should be downloaded and saved as folders for each species. Each photograph should have a time and date stamp recorded digitally, the camera trap station identity stored in the file name. An appropriate format is to have a species folder e.g. tiger, sub folder for camera trap station id, within which photographs of each of the cameras (from the double sided camera traps) is stored as separate folders. A CD with the above data (points 4, & 5) should be sent to NTCA every 2 months.
7) All Photographs of tigers and leopards should be printed and compared visually based on their stripe and spot patterns to identify individuals. In case of >15 tigers/leopard captures the need of software assisted identification may become essential.
8) For estimation of the tiger/leopard population after individual identification using closed capture estimators the data needs to be arranged in the format given below:

Trap Occasion (Day)

Tiger / Leopard ID	Day 1	Day 2	Day 3	.....	Day 35	.....	Day 48....
T-1							
T-2							
T-3							
T-4-.....							

CAMERA TRAP: CAPTURE DATA (Range Level)

Division…… Range……Species: Tiger / Leopard ……..

Sl.No.	Beat Name	Observer Name	Camera ID	Tiger ID / Leopard ID	Date of Capture	Remarks

Annexure-V

(Basic information on mark recapture)

Assessment of tiger population at beat level using photographic mark-recapture camera trapping while analyzing the data with an appropriate softwares like MARK, CAPTURE and CARE. This should result in the preparation of a reserve-level photo-capture database of individual tigers, to be shared with the Chief Wildlife Warden / NTCA / WII.

(I) The capture–recapture methodology is largely derived from the classical Peterson-Lincoln Estimator which is highlighted below:

Peterson Estimate (Lincoln Index)

The mark-recapture methods based on Peterson Estimate constitute the most important pseudo-sample methods. A large number of variations of this basic method have been evolved, which have been further complicated since the technique is simultaneously utilised to measure movement or mortality.

Here the sample of a population is marked after it is caught and then released; subsequently, samples are again taken from the population after recapturing and the proportion of marked individuals are recorded. Using the proportion of marked individuals in the subsequent samples, the total population is estimated. The capture-recapture sampling facilitate estimation of the 'proportion' of animals captured which facilitates estimation of true population size.

The simplest form of the mark-recapture estimator is the Lincoln-Peterson estimator; this is known variously as 'Peterson index', 'Lincoln index' or 'the Peterson estimate'. This method gives an estimate of actual numbers and hence it is a sample census rather than an index. Peterson, in 1896, described this method for fish populations; however it was first applied for wildlife in 1930 by F.C. Lincoln, for populations of waterfowl.

The model can be derived from the ratio: $\frac{M}{\hat{N}} = \frac{m}{n}$

where, M= total number of individuals marked and released during the first capture period;

$\hat{N}$ = estimated population size (unknown);

n = total sample taken during the second capture period;

m = number of individuals captured in the second capture which were marked.

The above ratio can be rewritten as an estimator:

$$\hat{N} = \frac{Mn}{m}$$

Theoretically this is a very elegant and simple method and can be applied to any vertebrate which can be captured, viz. from fish to cats. However, it is time consuming, laborious and costly and becomes impractical for large areas. Apart from this, several critical assumptions of this method act as constraints:—

1. Each animal has an equal chance of being captured.
2. The behaviour of animals is not influenced by marking.
3. No marks are lost.
4. The individuals which are marked mix randomly in the population after release.
5. There are no immigrations or births in the area under study between the first and second trapping seasons.
6. There is no emigration or differential mortality between the marked and unmarked members of the population.
7. The population is closed; if mortality occurs, then the estimate of N is valid for the initial size of the population. If recruitment occurs then N is valid for the time of recapture.
8. The time spent in sampling is small relative to the inter-sampling period.

The model assumptions can be re-written concisely as follows:

Assumption 1. A well defined population of animals having N individuals exists.

Assumption 2. M of these individuals are marked.

Assumption 3. There exists a sample of n 'observations' of animals from the population, having x 'observations' marked animals.

Assumption 4. The average probability $\overline{p_m}$ of observing an animal that is marked is equal to $\overline{p}_u$ which is the average probability of observing an unmarked animal.

i.e. $\overline{p}_m = \overline{p}_u$

The formula $\hat{N} = \frac{nM}{m}$ can be used satisfactorily with appropriate assumptions.

Use of Lincoln-Petersen Sample Estimator in camera trapping of tigers

The sample periods can be aggregated into two groups – viz. in a session of 30 days, the first 15 days can be denoted as 'occasion-1' and the next fortnight as 'occasion-2'.

In general, for photo trapping of tigers, the camera traps are set in the study area, covering the animals so that the tigers in the area can encounter the traps at least once (preventing 'holes' so that tigers are not missed). The traps are set for several days in succession, and each day is considered as a 'sample period'. In large areas, the traps can be 'rotated' over the area as per a prescribed scheme, and the data collected over the number of days taken to cover the entire area defines the sampling period.

The camera trap data is summarised in 'capture-history' data sheets, consisting of rows of 'i' and 'o', which indicate the periods when an animal was camera trapped. Thus, a history of '100101', indicates that a tiger was trapped in periods 1, 4 and 6 of a study having 6 periods.

Example

m_1 = number of tigers, with known identity, trapped on occasion 1
m_2 = number of tigers trapped and released on occasion 2
m = number of tigers recaptured in period 2 (i.e. trapped at both occasions 1 and 2)

1. The unknown quantity of interest (total number of tigers in the sampled population) is defined as 'N'.

2. The model parameters are then defined as:
   p_1 = probability of a tiger exposed to sampling efforts in the sampled area is trapped on occasion i (i = 1, 2)

3. $p=1-(1-p_1)(1-p_2)$ = the probability that a tiger, from the total number of tigers in the sampled population N, is trapped at least once during the study.

4. The 'detection probabilities' for the two sampling periods are estimated, by ascertaining the proportion of tigers which were trapped in one occasion are also trapped in the other occasion. Since the population is "closed", it can be said that the tigers caught during occasion 1 are also present during occasion 2. Thus by "conditioning" tigers trapped in occasion 2, and ascertaining the number of these tigers which were also trapped during occasion 1, p_1 and p_2 can be estimated:

$$\hat{p}_1 = \frac{m}{n_2}, \quad \hat{p}_2 = \frac{m}{n_1}$$

$$\hat{p}=1-(1-\hat{p}_1)(1-\hat{p}_2)$$

The general equation for estimating abundance is:

$$\hat{N} = \frac{C}{\hat{p}},$$

where, $\hat{N}$ = estimate of abundance N (true number of tigers)
C = Number of tigers counted
p = estimate of capture probability 'p' (probability that a tiger exposed to sampling efforts in the sampled area is captured on occasion i (i=1, 2)

For period 1, the following estimator is obtained:

$$\hat{N} = \frac{n_1}{\hat{p}_1} = \frac{n_1}{m/m_2} = \frac{n_1 n_2}{m}$$

For period 2, the following estimator is obtained:

$$\hat{N} = \frac{n_2}{\hat{p}_2} = \frac{n_2}{m/m_1} = \frac{n_1 n_2}{m}$$

The assumptions of the Lincoln-Peterson model are again stated below:-

1. The population is a 'closed' one.
2. It is likely that all animals are equally captured in each sample (equal probability of capture).
3. The marks are not overlooked, gained or lost.

A short interval between samples can meet the first assumption. The second assumption is often relaxed, while the last one can be met with proper marking techniques.

Example of Lincoln-Peterson estimate

(camera trapping exercise)

50 camera traps are placed in a tiger habitat along trails, and for two consecutive nights photographs are taken, resulting in the following data:

n_1 = 10 tigers camera trapped during the first night
n_2 = 8 tigers camera trapped during the second night
m = 2 tigers camera were photographed on both the nights

Estimation of capture probabilities and abundance

Capture probabilities of each night (sampling occasion) and for both nights (combined) are calculated as below:

$$p_1 = \frac{2}{8} = 0.25$$

$$p_2 = \frac{2}{10} = 0.20$$

$$\hat{p} = 1-(1- p_1)(1- p_2)$$

i.e. $\hat{p} = 1-(1-0.25)(1-0.20)$

$= 1-(0.75)(0.80)$

$= 0.40$

Using the Chapman estimator for abundance:

$$\hat{N}_c = \frac{(n_1+1)(n_2+1)}{(m_2+1)} - 1$$

$$= \frac{(10+1)(8+1)}{(2+1)} - 1$$

$= 32.$

The Variance and Standard Error for the estimate are as below:

$$Var(\hat{N}_c) = \frac{(10+1)(8+1)(10-2)(8-2)}{(2+1)^2(2+2)}$$

$$= \frac{(11)(9)(8)(6)}{(3)^2(4)} = \frac{4752}{36} = 132$$

$$= \quad \widehat{SE}(\hat{N}) = \sqrt{132} = 11.49$$

Thus, the estimated number of tigers in the sampled area is 32.

An approximate 95% confidence interval for this estimate is given by:

$$\hat{N} = \pm 1.96 \ SE(\hat{N}) = 32 \pm 22.52 = (54.52, \ 9.48)$$

The above estimate is not precise and is highly uncertain, perhaps owing to small sample size in studies of elusive animals like the tiger.

(II) Broadly, the mark recapture methods have been categorised on the basis of population 'closure' as below:-

(1) Closed Population Models – Where the total number of individuals in a population does not change due to birth, deaths, immigration or emigration. There are no 'gains' or 'losses' in the population between sampling occasions. Hence, these are most suitable for short-time period estimators like abundance estimation.

(2) Open Population Models – Where the population is changing during the study due to births, deaths, immigration or emigration. These gains or losses or both occur between the sampling periods. The time interval between sampling occasions is longer. These models provide scope for estimation of abundance, survival rate and recruitment.

(III) In the Indian context, both models are applicable. The closed population models are good for abundance estimation of tigers and its prey in the country level estimation was carried out after every four years. The open population models are suitable for long term studies (e.g. Phase IV of the new methodology at source sites for monitoring tiger and its prey). In this chapter, the focus would be on the 'closed population model' owing to their relevance in the context of tiger estimation.

Capture-Recapture Models for closed population

Capture-Recapture Data

In the capture-recapture approach, the capture history of the individual animal is maintained as a series of "non-captures" (0's) and "captures" (1's).

Hypothetical Individual Capture history of 10 tigers with four capture (camera trap) occasions

Tiger	Occasion 1	Occasion 2	Occasion 3	Occasion 4
1	1	1	1	1
2	1	1	0	0
3	1	1	1	0
4	1	1	1	1
5	0	1	0	0
6	0	0	1	0
7	0	0	0	1
8	0	0	0	1
9	0	0	1	0
10	0	1	0	0

The first tiger has a capture record of (1111), and was photo captured on all four occasions. The second tiger, having a photo capture record of (1100), was captured on occasions 1 and 2. Rest of the capture history data can be interpreted similarly. Since the capture-recapture data involving a number of animals becomes large, it is usually represented in the form of summary statistics for statistical analysis:-

k = number of capture occasions;
n_j = number of animals captured on the j^{th} occasion (j=1,.....k);
u_j = number of unmarked animals captured on the j^{th} occasion (j=1, ...k);
m_j = number of marked animals captured on the j^{th} occasion (j=1, ...k);
M_j = number of district animals captured before the j^{th} occasion (j=1, ...k);
(M_1=0, and M_{k+1} is the total number of distinct animal captured in the exercise);
f_j = number of animals captured exactly j times (j=1, ...k);

The statistics pertaining to the hypothetical capture history data is provided as a summary below:

Summary Statistics for the Capture history of tigers

J	n_j	m_j	u_j	M_j	$f1_j$
1	4	0	4	0	6
2	6	4	2	4	1
3	5	3	2	6	1
4	4	2	2	8	2
				10 (M_5=10)	
TOTAL	19	9	10		10

Description of the statistics:

n_j = column sum for the j^{th} occasion (column) in the capture data (history matrix), with (n_1, n_2,.....n_4).

u_j = first captures out of n_j animals, with (u_1, u_2,.....u_4)=(4,2,2,2).

m_j = recaptures out of n_j animals, with (m_1, m_2,.....m_4)=(0,4,3,2). ($u_j + m_j = n_j$ i.e. 19)

M_j = cumulative number of first recaptures on the first j-1 occasions, thus $M_j = u_1+u_{2+}.....u_{j-1}$) and ($M_1$, M_2,....., M_5)=(0,4,6,8,10); i.e. there is a progressive increase of marked animals in the population from $M_1 = 0$ to $M_5 = 10$.

The capture frequency of an animal is denoted by its row sum. Thus (f_1, f_2, ..., f_k) denote the frequency counts of all the animals which were capture (6, 1, 1, 2). Thus, 6 tigers were photo captured once, one tiger photo captured twice, one tiger photo captured thrice and two on all the four occasions.

The number of animals which are never captured is represented by 'f_0', so that $f_1 + f_2 + ..., f_k = M$ and $f_0 + f_1 + ..., f_k = N$. Thus estimation of population size 'N' becomes equivalent to estimation of f_0, the number of missing animals ($N=M_{t+1} + f_0$).

(IV**)** There are a number of models to address different sources of variation in capture probabilities, which are available in the software (CAPTURE):

1. M_o: equal probability of capture model
2. M_h: Heterogeneity Model
3. M_{bh}: Behaviour-heterogeneity Model
4. M_t: Time Variation (Schnabel) Model
5. M_{th}: Time-Heterogeneity Model
6. M_{tb}: Time-behavioural Response Model
7. M_h: Heterogeneity Model

(V) Issues relating to survey design (for camera trapping of tigers)

Some general considerations are as below:

1. The sampling time in camera trapping of tigers should be 'short' vis-à-vis the tiger populations turn over for meeting the assumptions relating to 'close models'. It has been stated that four to six weeks of sampling through camera trapping may be needed which may be stretched to eight to twelve weeks. Experience in general indicates that a period of six to eight weeks of sampling may be required.

2. The space should provide scope for every animal in the study area to have some chance of being captured.

3. The camera traps should be adequately spread through out the study area and should be checked each day during the sampling period to get a good capture history data.

4. The study area may be divided into a number of potential sampling units, whose size should be just sufficient to set up a single camera trap. Each sampling unit can be considered as a 'grid cell' which can be randomly selected to place camera traps at sites which are promising. In the following day, the camera can be moved to other such sites in the grid cell and the process can be repeated between five to thirty days to get a standard capture history data.

5. If the area is difficult or the number of camera traps are not adequate, then smaller portions of the area can be covered (block-wise) for camera trapping for a short period of time before moving successively to other portions. The total number of days used for camera trapping to cover the entire area (all

blocks) is denoted as sample occasion 1. The procedure is repeated to get the capture occasion 2.

The other considerations in camera trapping of tigers include choice of the equipment (camera and the tripping device), choice of sites to set up the traps, spacing of traps and a standard data collection protocol. The tigers are identified visually from photographs using their unique stripe patterns:



Hiby et. al. have used a three dimensional model to match images of living tigers and tiger skins.

The identified individual tigers are numbered and every capture of an individual tiger is assigned to a particular secondary sampling occasions.

The capture history of individual tigers consist from the database in the standard history matrix and are analysed through a suitable computer program CAPTURE or MARK. During analysis, the results are checked to ascertain the violation / non-violation of the closure assumption and finally the statistical tests 'between models' is done to indicate the best fitting model vis-à-vis the data, from which the parameters are obtained. Since tigers are territorial, models which address heterogeneous capture probabilities (like M_h) should be used for tigers.

Hypothetical Data relating to individual capture history of 10 tigers with 6 camera trap (capture) occasions: Analysis with software CAPTURE

Tiger	Occasions
1.	100101
2.	101001

3. 010110
4. 100010
5. 101010
6. 101101
7. 001010
8. 101101
9. 010101
10. 101001

Program version of 16 May 1995 9-Dec-2010

Input and Errors Listing

Input---title='rg2'

Input---task read captures x matrix occasions=6 captures=6

Input---data='Group 1'

Input---format='(a6,6f1.0)'

Input---read input data

Summary of captures read

Number of trapping occasions	6
Number of animals captured	10
Maximum x grid coordinate	1.0
Maximum y grid coordinate	1.0

Input---task model selection

Input---task population estimate appropriate

** Warning ** Appropriate model has been selected,
but no estimator is available.
Processing will be attempted.

*** ERROR *** Population estimator was not specified.
Scanning for a new task card.

Input---task population estimate null

Input---task population estimate darroch

Input---task population estimate zippin

Input---task population estimate jackknife

Input---task population estimate mh-chao

Input---task population estimate mth-chao

rg2

Model selection procedure. See this section of the Monograph for details.
Group 1

Occasion	j=	1	2	3	4	5	6
Animals caught	n(j)=	7	2	6	5	4	6
Total caught	M(j)=	0	7	9	10	10	10	10
Newly caught	u(j)=	7	2	1	0	0	0
Frequencies	f(j)=	0	2	6	2	0	0

1. Test for heterogeneity of trapping probabilities in population.
Null hypothesis of model M(o) vs. alternate hypothesis of model M(h)

Expected values too small. Test not performed.

2. Test for behavioral response after initial capture.
Null hypothesis of model M(o) vs. alternate hypothesis of model M(b)

Chi-square value = 3.819 degrees of freedom = 1
Probability of larger value = 0.05068

3. Test for time specific variation in trapping probabilities.
Null hypothesis of model M(o) vs. alternate hypothesis of model M(t)

Chi-square value = 8.687 degrees of freedom = 5
Probability of larger value = 0.12223

4. Goodness of fit test of model M(h)
Null hypothesis of model M(h) vs. alternate hypothesis of not model M(h)

Chi-square value = 5.581 degrees of freedom = 5
Probability of larger value = 0.34910

rg2

Model selection procedure. See this section of the Monograph for details.
Group 1

5. Goodness of fit test of model M(b)
Null hypothesis of model M(b) vs. alternate hypothesis of not model M(b)

Chi-square value = 7.262 degrees of freedom = 4
Probability of larger value = 0.12265

5a. Contribution of first capture homogeneity across time

Expected values too small. Test not performed.

5b. Contribution of recapture homogeneity across time

Chi-square value = 7.252 degrees of freedom = 4
Probability of larger value = 0.12316

6. Goodness of fit test of model M(t)
Null hypothesis of model M(t) vs. alternate hypothesis of not model M(t)

Expected values too small. Test not performed.

7. Test for behavioral response in presence of heterogeneity.
Null hypothesis of model M(h) vs. alternate hypothesis of model M(bh)

Chi-square value = 0.667 degrees of freedom = 1
Probability of larger value = 0.41422

Model selection criteria. Model selected has maximum value.

Model	M(o)	M(h)	M(b)	M(bh)	M(t)	M(th)	M(tb)	M(tbh)
Criteria	0.89	0.68	0.44	0.91	0.00	0.75	0.43	1.00

Appropriate model probably is M(tbh)
No estimator results from this model.

rg2

Population estimation with constant probability of capture.
See model M(o) of the Monograph for details.
Group 1

Number of trapping occasions was 6
Number of animals captured, M(t+1), was 10
Total number of captures, n., was 30

Estimated probability of capture, p-hat = 0.5000

Population estimate is 10 with standard error 0.4189

Approximate 95 percent confidence interval 10 to 10

Profile likelihood interval 10 to 11

Population estimation with time specific changes in probability of capture.
See model M(t) of the Monograph for details.
Group 1

Occasion j= 1 2 3 4 5 6
Animals caught n(j)= 7 2 6 5 4 6

Total animals captured 10

p-hat(j)= 0.70 0.20 0.60 0.50 0.40 0.60

Population estimate is 10 with standard error 0.0053

Approximate 95 percent confidence interval 10 to 10

Profile likelihood interval 10 to 11

Histogram of n(j)

```
Frequency      7    2    6    5    4    6
-----------------------------------------------
      7        *
      6        *         *              *
      5        *         *    *         *
      4        *         *    *    *    *
      3        *         *    *    *    *
      2        *    *    *    *    *    *
      1        *    *    *    *    *    *
-----------------------------------------------
```

rg2

Population estimation with constant probability removal estimator.
See model M(b) of the Monograph for details.
Group 1

Occasion	j=	1	2	3	4	5	6
Total caught	M(j)=	0	7	9	10	10	10	10
Newly caught	u(j)=	7	2	1	0	0	0	

Estimated probability of capture, p-hat = 0.714281

Estimated probability of recapture, c-hat = 0.434783

Population estimate is 10 with standard error 0.0751

Approximate 95 percent confidence interval 10 to 10

Profile likelihood interval 10 to 10

Histogram of u(j)

Frequency 7 2 1 0 0 0

```
-----------------------------------------------
      7       *
      6       *
      5       *
      4       *
      3       *
      2       *    *
      1       *    *    *
-----------------------------------------------
```


rg2

Population estimation with variable probability of capture by animal.
See model M(h) of the Monograph for details.
Group 1

Number of trapping occasions was 6
Number of animals captured, M(t+1), was 10

Total number of captures, n., was 30

Frequencies of capture, f(i)

i=	1	2	3	4	5	6
f(i)=	0	2	6	2	0	0

Computed jackknife coefficients

	N(1)	N(2)	N(3)	N(4)	N(5)
1	1.833	2.500	3.000	3.333	3.500
2	1.000	0.467	-0.233	-0.833	-1.167
3	1.000	1.000	1.225	1.542	1.750
4	1.000	1.000	1.000	0.956	0.914
5	1.000	1.000	1.000	1.000	1.001

The results of the jackknife computations

i	N(i)	SE(i)	.95 Conf. Limits		Test of N(i+1) vs. N(i)
0	10				Chi-square (1 d.f.)
1	10.0	0.00	10.0	10.0	2.250
2	8.9	0.00	8.9	8.9	0.002
3	8.9	1.49	6.0	11.8	0.261
4	9.5	2.83	4.0	15.0	0.488
5	10.0	3.57	3.0	17.0	0.000

The data are ill-conditioned. As a best guess, use

Average p-hat = 0.5000

Interpolated population estimate is 10 with standard error 0.4567

Approximate 95 percent confidence interval 10 to 10

Histogram of f(i)

```
Frequency     0   2   6   2   0   0
-----------------------------------------
      6           *
      5           *
      4           *
      3           *
      2       *   *   *
      1       *   *   *
-----------------------------------------
```


rg2

Population estimate under individual heterogeneity in capture probabilities.

See model M(h) of Chao (1988).
Group 1

Number of trapping occasions was 6
Number of animals captured, M(t+1), was 10
Total number of captures, n., was 30

Frequencies of capture, f(i)

i=	1	2	3	4	5	6
f(i)=	0	2	6	2	0	0

Average probability of capture = 0.5000

Population estimate is 10 with standard error 0.0000

Approximate 95 percent confidence interval 10 to 10

rg2
Population estimate under time variation and
individual heterogeneity in capture probabilities.
See model M(th) of Chao et al. (1992).
Group 1

Number of trapping occasions was 6
Number of animals captured, M(t+1), was 10
Total number of captures, n., was 30

Frequencies of capture, f(i)

i=	1	2	3	4	5	6
f(i)=	0	2	6	2	0	0

Estimator	Gamma	N-hat	se(N-hat)
1	0.0000	10.00	0.00
2	0.0000	9.74	0.00
3	0.0000	10.34	0.67

p-hat(j) = 0.70 0.20 0.60 0.50 0.40 0.60

Bias-corrected population estimate is 10 with standard error 0.6687

Approximate 95 percent confidence interval 10 to 13

rg2

S u c c e s s f u l E x e c u t i o n

Capture Matrix of the tiger capture data analysed above:

Tiger	Occasions					
	1	2	3	4	5	6
1	1	0	0	1	0	1
2	1	0	1	0	0	1
3	0	1	0	1	1	0
4	1	0	0	0	1	0
5	1	0	1	0	1	0
6	1	0	1	1	0	1
7	0	0	1	0	1	0
8	1	0	1	1	0	1
9	0	1	0	1	0	1
10	1	0	1	0	0	1

(VI) Analysis

- Every tiger captured was given a unique identification number viz. (MT-002), after examining stripe pattern on flanks, limbs, forequarters
- Following tiger identification, capture histories (X matrix) were developed and analyzed using the program MARK, CAPTURE and CARE.
- CAPTURE gives various probabilities models of the underlying capture-recapture process, that are likely to have generated the observed capture histories
- Analysis of capture history involves comparison between competing models using a series of hypothesis tests and results of an overall discriminant function test, in order to select the most appropriate abundance estimation model
- Assumption: sampled population was demographically and geographically closed during the sampling period

- Since the entire tiger reserve is camera trapped the total population within the reserve is estimated. Also the same area is camera trapped in consecutive years therefore the population is directly comparable and there is no need to compute density of tigers which adds variability and loss of precision to detect trends.

Annexure-VI

Capture-recapture Sampling using Camera Trapping [Mark Software Format]

Tiger ID	Trap Occasion (day)						
	1	2	3	4	5	6	n
1							
2							
3							
4							
5							
6							
7							
N							

Data to be entered as 01 format.

Data Sheet for Tiger, Other Animals & Human Sign Encounter Rate

Observer Name: _____ Date: _____ Start Time: _____ End Time:_____
Begin GPS: Lat: _____N, Long: _____E End GPS: Lat: _____N, Long : _____E
Forest Circle_____ Forest Block & Range: _____ Beat _____
Approx. Kms. travelled: _____Km. Time Spent in any other activity_____Min.

SL No	Time	GPS Location (only for tiger sign)						*Animal Species	^Sign Type	Mangrove Type			Creek Bank Type			Sign		Width of mud flat (water to Mangrove edge)
		Lat.			Long.					Tall >10'	Medium 4-10'	Small <4'	Steep	Moderate	Gentle	Fresh	Old	
		D	M	S	D	M	S											
1.																		
2.																		
3.																		
4.																		
5.																		
6.																		
7.																		
8.																		
9.																		
10.																		
11.																		
12.																		
13.																		
14.																		
15.																		

* Animal species to be recorded: tiger, fishing cat, jackal, monitor lizard, crocodile, chital, wild pig, rhesus macaque, humans and others.
^ Sign types to be recorded are pugmark/hoof mark/foot print, scat/pellet (with condition), vocalization and direct sighting.

Data sheet 1 ctd…

1) Has any tigress with cubs been reported during the past 12 months?
Yes____No_____Approximate date/month_____
a) Seen by staff, b) Pug Marks,
c) Reported by local persons, d) Seen by officials (√ the appropriate)
How many cubs _____, approximate age of cubs _____.

2) In case tigers are known to be present in the beat, but no sign was obtained during the sampling period then mention on what evidence was this conclusion made (pugmark, direct sighting, scat, other sign) _____.
Approximate date/month_____Tiger presence was last recorded in the beat.

3) How many livestock predation events have been recorded in the past 3 months, _____by tigers, which carnivores if known_____, _____, _____.

4) GPS Coordinates at all creek/channel junctions in serial order of survey

Sl.No.	Time	Lat			Long		
		Degree	Minutes	Second	Degree	Minutes	Second
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

5) Comments & Remarks:

_____

_____

Encounter Rate on Line Transects

Observer Name: _____ Date: _____ Start Time: _____ End Time: _____

Begin GPS: Lat: _____N, Long: _____E End GPS: Lat: _____N, Long : _____E

Forest Circle_____ Forest Block & Range: _____ Beat _____

Approx. Kms. Travelled: _____Km.

S. No	Time	Species*	Total Number (Adults & Young)	Young	Mangrove Type			Bank Type			Perpendicular Distance of animal from water's edge	Activity of the animal(s) Basking, foraging, moving, etc.
					Tall >10'	Medium 4-10'	Small <4'	Steep	Medium	Gentle		
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												

*Species that need to be recorded on the transect: chital, rhesus, macaque, wild pig, monitor lizard and estuarine crocodile and other mammalian species seen.

VEGETATION

(To be recorded at every 15 minute travel interval)

Name of Observer: ……. Date: …… Forest Circle: …… Forest Division……

Range: …….. Beat: …… ID No. of Line Transect: ……

Sl No	GPS Reading at every plot from beginning of creek transect						Location of Plot- Left side/ Right side	Tree Species (Descending Order of Abundance, (Give Names)					Grass/Herbs/Sedges Species (Descending Order of Abundance including reg. mangroves, all vegetation < 4 ft.)					Density of Vegetation 0 to 4 0- Open 4- very dense	Remarks
	Lat			Long															
	Deg	Min	Sec	Deg	Min	Sec		1	2	3	4	5	1	2	3	4	5		

Human Disturbance

Name of Observer: ……. Date: …… Forest Circle: …… Forest Division……
Range: ……. Beat: …… ID No. of Line Transect: ……

Sl No	GPS locations of the beginning of creek transect and at every 15 min. travel interval thereafter						Human Disturbances 0-4 Rating, 0-None, 4-Very high			
	Lat			Long			Wood Cutting 0-4	Lopping 0-4	Fishing evidence seen from the vegetation plot Y/N	People Seen from the plot Y/N
1	Deg	Min	Sec	Deg	Min	Sec				
2										
3										
4										
5										
6										
7										
8										
9										
10										

Are there any permanent human settlements in the beat? *(Yes/No)*. If Yes, how many? _____. Approximate human population_____,

Is there NTFP collection in the beat_____*(Yes/No)*. If yes, what NTFP is collected_____, _____, _____, _____,

Rate NTFP collection on a scale of 0-4, 0-No to 4-Very high _____, _____, _____, _____.

Intensity of fishing .....and tiger prawn seed collection ..... in the beat at 0-4 scale (*0 is nil, 4 is very high)*

NATIONAL TIGER CONSERVATION AUTHORITY

(STATUTORY BODY UNDER THE MINISTRY OF ENVIRONMENT & FORESTS, GOVT. OF INDIA)

Bikaner House, Annexe-V,
Shahjahan Road, New Delhi-110011
Tele Fax : 011-23384428
Email : dirpt-r@nic.in

Dr. RAJESH GOPAL
Addl. P.C.C.F. & Member Secretary

No. 15-17/2011-NTCA **Dated the 21st May, 2012**

To,

The Chief Wildlife Warden(s)
All Tiger Range States.

Sub: Reporting tiger deaths.

Sir,

Any incident of tiger death requires detailed field investigation vis-à-vis the advisories issued in this context from this end. While natural mortality owing to density related stress and other causes do occur in a tiger habitat, there is a need to establish this based on categorical evidences.

As tiger source areas are targeted by poachers and tigers also become victims of non-targeted killings due to sensitive human-tiger interface conflicts, there is a need to ensure adequate caution while classifying tiger deaths as occurring due to 'natural' causes. The area where tiger death has been reported should be thoroughly scanned / combed to rule out metal traps / snares / evidences relating to unauthorized vehicular movement / use of fire arms / poisoning near water points / natural salt licks and poisoning of livestock kills made by tiger / leopard. Besides, any history of recurring livestock depredation / human death / human injury due to wild carnivores in the area should also be taken into account alongwith pendency, if any, relating to payment of compensation / ex-gratia in this regard. The day-to-day patrolling by field staff and supervisory checks at senior levels should ensure preventive actions as well as proactive detection, rather than retroactive actions. This would also facilitate retrieval of carcasses before their putrification, thereby facilitating forensic examination in a laboratory.

In this context, to ensure proper due diligence and topmost priority, every case of tiger and leopard death would be henceforth treated as a case of 'poaching', unless otherwise proved beyond reasonable doubt. Therefore, if a tiger death is classified as occurring due to natural causes, the same should be substantiated by adequate supporting field evidences and factual details, as indicated above, while reporting to this Authority.

It is requested that the field officers may please be appropriately directed in this regard.

Yours sincerely,

Rajesh Gopal

(Dr. Rajesh Gopal)
APCCF & Member Secretary (NTCA)

Copy to:

1. The Addl. Chief Secretary / Forest Secretary, Forest Department, All Tiger Range States.
2. The Principal Chief Conservator of Forests, All Tiger Range States.
3. The Field Director(s), All Tiger Reserves.
4. Regional Offices of NTCA, Nagpur, Bangalore and Guwahati.

No. 15-37/2012-NTCA
Government of India
Ministry of Environment and Forests
National Tiger Conservation Authority
***

Annexe No. 5, Bikaner House,
Shahjahan Road, New Delhi-110011.
Telefax: 2338 9883
E-mail: jdntca@gmail.com

Dated the 30th January, 2013

To,

1. The PCCF/HOFF(s),
   Tiger Range States.

2. The Chief Wildlife Warden(s)
   Tiger Range States.

Sir,

As you are aware, advisories have been issued by the Project Tiger / National Tiger Conservation Authority, time and again, for dealing with emergency arising due to straying of tigers in human dominated landscapes. Based on inputs from field officers, experts vis-à-vis the said advisories, a Standard Operating Procedure has been developed after fine tuning to meet the present challenges.

In this context, I am directed to forward herewith a copy of the said Standard Operating Procedure (SOP) for dealing with emergency arising due to straying of tigers in human dominated landscapes, duly approved by the competent authority, for implementation.

The SOP may please be translated in vernacular and widely circulated amongst the field staff for guidance.

Yours faithfully,

Encl: As above

(S.P. Yadav)
Deputy Inspector General (NTCA)

Copy for information to:

1. PS to MEF.
2. PPS to Secretary (E&F).
3. PPS to DGF & SS, MoEF.
4. PPS to ADG (WL).

Copy for information to:

1. Additional Director, WCCB, New Delhi.
2. IGF, Guwahati.
3. AIGs, Nagpur and Bangalore.

STANDARD OPERATING PROCEDURE TO DEAL WITH EMERGENCY ARISING DUE TO STRAYING OF TIGERS IN HUMAN DOMINATED LANDSCAPES

MINISTRY OF ENVIRONMENT AND FORESTS

GOVERNMENT OF INDIA

NATIONAL TIGER CONSERVATION AUTHORITY

STANDARD OPERATING PROCEDURE TO DEAL WITH EMERGENCY ARISING DUE TO STRAYING OF TIGERS IN HUMAN DOMINATED LANDSCAPES

1. **Title:** Standard Operating Procedure to deal with emergency arising due to straying of tigers in human dominated landscapes

2. **Subject:** Dealing with emergency arising due to straying of tigers in human dominated landscapes

3. **Reference:** Advisories of National Tiger Conservation Authority /Project Tiger on the subject

4. **Purpose:** To ensure that straying tigers are handled in the most appropriate manner to avoid casualty / injury to human beings, tiger, cattle and property.

5. **Short summary:** This Standard Operating Procedure (SOP) provides the basic, minimum steps which are required to be taken at the field level (tiger reserve or elsewhere) for dealing with incidents of tiger straying in human dominated landscapes.

6. **Scope:** The SOP applies to all forest field formations including tiger reserves besides other areas where such incidents occur.

7. **Responsibilities:** The Field Director would be responsible in the case of a tiger reserve / fringe areas. For a protected area (National Park / Wildlife Sanctuary), the concerned protected area manager would be responsible. In the case of other areas (revenue land/conservation reserve/community reserve/village/township) the Wildlife Warden, as per the Wildlife (Protection) Act, 1972, or Divisional Forest Officer/ Deputy Conservator of Forests (under whose jurisdiction the area falls), would be responsible. The overall responsibility at the State level would rest with the Chief Wildlife Warden of the concerned State.

8. **Suggested field actions to deal with strayed wild carnivores (tiger / leopard)**

(a) 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

(b) 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.

(c) 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.

(d) 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.

(e) 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.

(f) Set up camera traps near kill site to confirm / establish the ID of the animal.

(g) 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).

(h) 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).

(i) 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.

(j) 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.

(k) 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**.

(m) 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).

(n) 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)**.

(o) 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.

(p) 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.

(q) 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.

(r) 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.

(s) It is important to have properly designed suitable cages and transport mechanism which cause least stress to the captured carnivore.

9. **Preventive / Proactive Measures** to be followed in tiger straying incidents / areas prone are at **Annexure-III.**

10. Guidelines for prioritizing areas for tiger monitoring are at **Annexure-IV.**

*****

PROTOCOL ON IMMOBILIZATION AND RESTRAINT OF TIGERS

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 immobilizes 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/CO_2 to propel the dart should be selected. Light weight plastic darts of 3-5 ml. capacity should be used for remote injection using air powered/CO2 tele-injection projector. Needle length is critical factor while darting tigers. The outside diameter of the needle should be 1.5- 2.0 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.

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.

Recommended drug/ dosages for immobilization of adult tiger

Sr. No.	Drug(s) for immobilization	Male	Female	Rreversal drugs (antidote)
1.	**Hellabrunn mixture (HBM)** [Xylazine (XYL) and Ketamine (KET)] mixture in a ratio of 1.25:1	**3.0 ml** (375 mg XYL & 300mg KET) **to3.5 ml** (437.5 mg XYL & 350 mg KET)	**2.5 ml** (312.5 mg XYL & 250 mg KET) **to 3.0 ml** (375 mg XYL & 300mg KET)	Yohimbine hydrochloride (0.125 $mgkg^{-1}$ body weight)
2	**Medetomidine (MED) and Ketamine (KET)**	50-60 µg kg^{-1} body weight MED and 1-2 $mgkg^{-1}$ body weight KET		25-35 mg of Atipamezole hydrochloride

Approach to the 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 tele-injection however depending on the opportunities; other suitable areas can also be explored.



Preferred darting site in a large carnivore

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 vasodilatation 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.

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 anesthesia.

Supplemental Information

a. **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.

b. **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.

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

d. **Managing emergencies:** Emergency drugs and equipment would be available during the entire operation. Adequate supplies of emergency drugs should be ensured at all times.

e. **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.

Data Sheet for Recording and Monitoring Immobilized Animal

Area Details

Date ……..……

Location …….. GPS Lat……. Long……..

Collar Frequency ……

Purpose of capture ……..

Ambient temperature …….. Day (cloudy, bright) ……

Animal Details

Species …… Physical condition ……..

Emotional state before drugging ……..... Sex ……

Approximate age …… Weight (kg)……..……

Breeding status ……..

Body Measurements

Nose tip to Tip of tail …… Nose tip to base of tail ……...

Nose tip to base of skull (Occipital) …… Tail length……..

Height (Shoulder blade to heel) …….. Hind limb length ……..…

Left fore limb or Hind limb paw dimension Length …… Width ……..

Neck girth …….. Length of Canines ……..

Immobilization Details

Name of Immobilizing Drug(s)	**Time of Injection**	**Drug dose given**	**Route**	**Site**
1.				
2.				
3.				
4.				

Behaviour at the time of darting
(running, walking, standing, excited) ……..

Induction time when animal goes down/ approached……..
Animal Monitoring

Time	**Signs shown following immobilization**	**Respiration Shallow/ deep/ irregular & rate**	**Temperature (^{0}F)**	**Pulse (rate)**

Drug reversal

Name of reversal Drug(s)	**Time of Injection**	**Drug dose & volume given**	**Route**	**Site**
1.				
2.				

Time when animal shows first sign of recovery - …….

Details about recovery event till animal regains consciousness /shows signs of recovery

……..

Any other comments - ……..

Supplemental drugs

Name of other supportive Drug(s)/antibiotic(s) etc. given	**Trade name**	**Volume used**	**Route**	**Site**
1				
2.				
3.				
4.				

Biological sampling

Name of sample	Preservative used	Examination required	Handed over to	Remarks

GUIDELINES FOR DECLARATION OF BIG CATS AS 'MAN-EATERS'

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- 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.

- 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, mere 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 by a 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'.

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Annexure-III

DETAILED INSTRUCTIONS FOR THE 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 due capacity building and 'hands on' field training involving the Wildlife Institute of India and other relevant outside experts, if needed.

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PRIORITISING AREAS FOR TIGER MONITORING

The tiger source areas and its surrounding forests have the maximum tigers, besides some protected areas and forest patches. The districts/forest divisions having spatial occupancy of tiger as indicated in the maps need ongoing monitoring on a daily basis. In this context, the following actions are indicated:

(a) Monitoring the tiger source areas using camera traps to generate photo ID for creating a photo database (Phase-IV monitoring)
(b) Implementing Phase-IV monitoring in areas having tiger occupancy as indicated in the map
(c) Periodic comparison / review of camera trap tiger photos to fix ID of tigers reported in several areas near a source site
(d) Complementing the camera trap monitoring with simple foot patrolling in the peripheral areas, while maintaining day-to-day record as per Phase-IV monitoring protocol
(e) Monitoring livestock depredation by tiger and ready payment of compensation
(f) Keeping track of sudden change in land use in areas having tiger presence
(g) Avoiding blockage of traditional tiger / wildlife corridors in areas outside the tiger reserves falling in various forest divisions
(h) Monitoring sudden change in cover values in tiger areas (change in cropping pattern etc.)
(i) Monitoring tiger movement along river courses
(j) Keeping track of insecticides sale outlets and their use in tiger bearing areas (to avoid poisoning of water)
(k) Networking through local workforce for gathering information relating to wandering gangs traditionally involved in poaching of wild animals
(l) Keeping track of local market days

(m) Fostering creation / maintenance of wildlife monitoring register at the Gram Sabha level in areas outside tiger reserves, with incentives for informing tiger presence
(n) Creation / maintenance of 'wildlife / tiger offence register' at the Gram Sabha level with reward system for assisting in crime detection
(o) Deploying special monitoring teams around highways, open wells, railway tracks, electrical transmission lines, village ponds, natural water holes, irrigation canals
(p) Insulating high tension electrical transmission poles in tiger bearing areas, besides covering open wells and irrigation canals
(q) Keeping track of encumbered tigresses in tiger bearing areas for monitoring the dispersing young ones
(r) Periodic checking of samples from water points/perennial water sources for lethal contamination
(s) Alerting local people in right burdened, tiger bearing areas to prevent lethal encounters
(t) Periodic disease monitoring of village cattle in the tiger bearing areas to avoid disease transmission to natural prey base for tiger
(u) Monitoring natural salt licks to prevent poisoning / poaching in tiger bearing areas
(v) Keeping track of local ironsmiths engaged in preparation of 'gin traps', snares etc.
(w) Creation of wildlife crime dossier and exchange of such information with field units in tiger bearing areas under intimation to the NTCA
(x) Fortnightly monitoring of tiger mortality and progress of tiger offence cases ongoing in the courts of law by the Chief Wildlife Warden
(y) Monthly monitoring of tiger mortality and progress of tiger offence cases ongoing in the courts of law by the PCCF/HOFF
(z) Use sniffer dogs for detection of body parts, escape routes and other leads

*****

(The SOP has been prepared by the NTCA with inputs from Shri P.K.Sen, Dr Ullas Karanth, Ms Prerna Singh Bindra, Dr P.K.Malik, Dr Parag Nigam and field officers)

No. 15-37/2012-NTCA
Government of India
Ministry of Environment and Forests
National Tiger Conservation Authority
***

Annexe No. 5, Bikaner House,
Shahjahan Road, New Delhi-110011.
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E-mail: jdntca@gmail.com

Dated the 30th January, 2013

To,

1. The PCCF/HOFF(s),
   Tiger Range States.

2. The Chief Wildlife Warden(s)
   Tiger Range States.

Sir,

As you are aware, advisories have been issued by the Project Tiger / National Tiger Conservation Authority, time and again, for dealing with emergency arising due to straying of tigers in human dominated landscapes. Based on inputs from field officers, experts vis-à-vis the said advisories, a Standard Operating Procedure has been developed after fine tuning to meet the present challenges.

In this context, I am directed to forward herewith a copy of the said Standard Operating Procedure (SOP) for dealing with emergency arising due to straying of tigers in human dominated landscapes, duly approved by the competent authority, for implementation.

The SOP may please be translated in vernacular and widely circulated amongst the field staff for guidance.

Yours faithfully,

Encl: As above

(S.P. Yadav)
Deputy Inspector General (NTCA)

Copy for information to:

1. PS to MEF.
2. PPS to Secretary (E&F).
3. PPS to DGF & SS, MoEF.
4. PPS to ADG (WL).

Copy for information to:

1. Additional Director, WCCB, New Delhi.
2. IGF, Guwahati.
3. AIGs, Nagpur and Bangalore.

STANDARD OPERATING PROCEDURE TO DEAL WITH EMERGENCY ARISING DUE TO STRAYING OF TIGERS IN HUMAN DOMINATED LANDSCAPES



MINISTRY OF ENVIRONMENT AND FORESTS

GOVERNMENT OF INDIA

NATIONAL TIGER CONSERVATION AUTHORITY

STANDARD OPERATING PROCEDURE TO DEAL WITH EMERGENCY ARISING DUE TO STRAYING OF TIGERS IN HUMAN DOMINATED LANDSCAPES

1. **Title:** Standard Operating Procedure to deal with emergency arising due to straying of tigers in human dominated landscapes

2. **Subject:** Dealing with emergency arising due to straying of tigers in human dominated landscapes

3. **Reference:** Advisories of National Tiger Conservation Authority /Project Tiger on the subject

4. **Purpose:** To ensure that straying tigers are handled in the most appropriate manner to avoid casualty / injury to human beings, tiger, cattle and property.

5. **Short summary:** This Standard Operating Procedure (SOP) provides the basic, minimum steps which are required to be taken at the field level (tiger reserve or elsewhere) for dealing with incidents of tiger straying in human dominated landscapes.

6. **Scope:** The SOP applies to all forest field formations including tiger reserves besides other areas where such incidents occur.

7. **Responsibilities:** The Field Director would be responsible in the case of a tiger reserve / fringe areas. For a protected area (National Park / Wildlife Sanctuary), the concerned protected area manager would be responsible. In the case of other areas (revenue land/conservation reserve/community reserve/village/township) the Wildlife Warden, as per the Wildlife (Protection) Act, 1972, or Divisional Forest Officer/ Deputy Conservator of Forests (under whose jurisdiction the area falls), would be responsible. The overall responsibility at the State level would rest with the Chief Wildlife Warden of the concerned State.

8. **Suggested field actions to deal with strayed wild carnivores (tiger / leopard)**

(a) 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

(b) 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.

(c) 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.

(d) 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.

(e) 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.

(f) Set up camera traps near kill site to confirm / establish the ID of the animal.

(g) 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).

(h) 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).

(i) 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.

(j) 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.

(k) 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**.

(m) 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).

(n) 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)**.

(o) 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.

(p) 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.

(q) 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.

(r) 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.

(s) It is important to have properly designed suitable cages and transport mechanism which cause least stress to the captured carnivore.

9. **Preventive / Proactive Measures** to be followed in tiger straying incidents / areas prone are at **Annexure-III.**

10. Guidelines for prioritizing areas for tiger monitoring are at **Annexure-IV.**

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Annexure 1

PROTOCOL ON IMMOBILIZATION AND RESTRAINT OF TIGERS

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 immobilizes 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/CO_2 to propel the dart should be selected. Light weight plastic darts of 3-5 ml. capacity should be used for remote injection using air powered/CO2 tele-injection projector. Needle length is critical factor while darting tigers. The outside diameter of the needle should be 1.5- 2.0 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.

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.

Recommended drug/ dosages for immobilization of adult tiger

Sr. No.	Drug(s) for immobilization	Male	Female	Rreversal drugs (antidote)
1.	**Hellabrunn mixture (HBM)** [Xylazine (XYL) and Ketamine (KET)] mixture in a ratio of 1.25:1	**3.0 ml** (375 mg XYL & 300mg KET) **to3.5 ml** (437.5 mg XYL & 350 mg KET)	**2.5 ml** (312.5 mg XYL & 250 mg KET) **to 3.0 ml** (375 mg XYL & 300mg KET)	Yohimbine hydrochloride (0.125 $mgkg^{-1}$ body weight)
2	**Medetomidine (MED) and Ketamine (KET)**	50-60 µg kg^{-1} body weight MED and 1-2 $mgkg^{-1}$ body weight KET		25-35 mg of Atipamezole hydrochloride

Approach to the 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 tele-injection however depending on the opportunities; other suitable areas can also be explored.



Preferred darting site in a large carnivore

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 vasodilatation 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.

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 anesthesia.

Supplemental Information

a. **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.

b. **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.

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

d. **Managing emergencies:** Emergency drugs and equipment would be available during the entire operation. Adequate supplies of emergency drugs should be ensured at all times.

e. **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.

Data Sheet for Recording and Monitoring Immobilized Animal

Area Details

Date ……..……

Location …….. GPS Lat……. Long……..

Collar Frequency ……

Purpose of capture ……..

Ambient temperature …….. Day (cloudy, bright) ……

Animal Details

Species …… Physical condition ……..

Emotional state before drugging ……..... Sex ……

Approximate age …… Weight (kg)……..……

Breeding status ……..

Body Measurements

Nose tip to Tip of tail …… Nose tip to base of tail ……...

Nose tip to base of skull (Occipital) …… Tail length……..

Height (Shoulder blade to heel) …….. Hind limb length ……..…

Left fore limb or Hind limb paw dimension Length …… Width ……..

Neck girth …….. Length of Canines ……..

Immobilization Details

Name of Immobilizing Drug(s)	Time of Injection	Drug dose given	Route	Site
1.				
2.				
3.				
4.				

Behaviour at the time of darting
(running, walking, standing, excited) ……..

Induction time when animal goes down/ approached……..
Animal Monitoring

Time	Signs shown following immobilization	Respiration Shallow/ deep/ irregular & rate	Temperature (^{0}F)	Pulse (rate)

Drug reversal

Name of reversal Drug(s)	Time of Injection	Drug dose & volume given	Route	Site
1.				
2.				

Time when animal shows first sign of recovery - …….

Details about recovery event till animal regains consciousness /shows signs of recovery

……..

Any other comments - ……..

Supplemental drugs

Name of other supportive Drug(s)/antibiotic(s) etc. given	Trade name	Volume used	Route	Site
1				
2.				
3.				
4.				

Biological sampling

Name of sample	Preservative used	Examination required	Handed over to	Remarks

Annexure-II

GUIDELINES FOR DECLARATION OF BIG CATS AS 'MAN-EATERS'

***

- 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.

- 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, mere 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 by a 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'.

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Annexure-III

DETAILED INSTRUCTIONS FOR THE 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 due capacity building and 'hands on' field training involving the Wildlife Institute of India and other relevant outside experts, if needed.

*****

Annexure-IV

PRIORITISING AREAS FOR TIGER MONITORING

The tiger source areas and its surrounding forests have the maximum tigers, besides some protected areas and forest patches. The districts/forest divisions having spatial occupancy of tiger as indicated in the maps need ongoing monitoring on a daily basis. In this context, the following actions are indicated:

(a) Monitoring the tiger source areas using camera traps to generate photo ID for creating a photo database (Phase-IV monitoring)
(b) Implementing Phase-IV monitoring in areas having tiger occupancy as indicated in the map
(c) Periodic comparison / review of camera trap tiger photos to fix ID of tigers reported in several areas near a source site
(d) Complementing the camera trap monitoring with simple foot patrolling in the peripheral areas, while maintaining day-to-day record as per Phase-IV monitoring protocol
(e) Monitoring livestock depredation by tiger and ready payment of compensation
(f) Keeping track of sudden change in land use in areas having tiger presence
(g) Avoiding blockage of traditional tiger / wildlife corridors in areas outside the tiger reserves falling in various forest divisions
(h) Monitoring sudden change in cover values in tiger areas (change in cropping pattern etc.)
(i) Monitoring tiger movement along river courses
(j) Keeping track of insecticides sale outlets and their use in tiger bearing areas (to avoid poisoning of water)
(k) Networking through local workforce for gathering information relating to wandering gangs traditionally involved in poaching of wild animals
(l) Keeping track of local market days

(m) Fostering creation / maintenance of wildlife monitoring register at the Gram Sabha level in areas outside tiger reserves, with incentives for informing tiger presence
(n) Creation / maintenance of 'wildlife / tiger offence register' at the Gram Sabha level with reward system for assisting in crime detection
(o) Deploying special monitoring teams around highways, open wells, railway tracks, electrical transmission lines, village ponds, natural water holes, irrigation canals
(p) Insulating high tension electrical transmission poles in tiger bearing areas, besides covering open wells and irrigation canals
(q) Keeping track of encumbered tigresses in tiger bearing areas for monitoring the dispersing young ones
(r) Periodic checking of samples from water points/perennial water sources for lethal contamination
(s) Alerting local people in right burdened, tiger bearing areas to prevent lethal encounters
(t) Periodic disease monitoring of village cattle in the tiger bearing areas to avoid disease transmission to natural prey base for tiger
(u) Monitoring natural salt licks to prevent poisoning / poaching in tiger bearing areas
(v) Keeping track of local ironsmiths engaged in preparation of 'gin traps', snares etc.
(w) Creation of wildlife crime dossier and exchange of such information with field units in tiger bearing areas under intimation to the NTCA
(x) Fortnightly monitoring of tiger mortality and progress of tiger offence cases ongoing in the courts of law by the Chief Wildlife Warden
(y) Monthly monitoring of tiger mortality and progress of tiger offence cases ongoing in the courts of law by the PCCF/HOFF
(z) Use sniffer dogs for detection of body parts, escape routes and other leads

*****

(The SOP has been prepared by the NTCA with inputs from Shri P.K.Sen, Dr Ullas Karanth, Ms Prerna Singh Bindra, Dr P.K.Malik, Dr Parag Nigam and field officers)

ANNEXURE - XV

No. 15-37/2012-NTCA
Government of India
Ministry of Environment & Forests
National Tiger Conservation Authority
****

Annexe No.-V, Bikaner House,
Shahjahan Road, New Delhi-110011.
Telefax: 2338 9883
E-mail: jdntca@gmail.com

Dated: 18th March, 2013

To

1. The PCCF/HOFF (s),
   Tiger Range States.

2. The Chief Wildlife Warden (s),
   Tiger Range States.

Sub: Standard Operating Procedure (SOP) for disposing Tiger/ leopard carcass/ body parts – reg.

Sir,

Advisories have been issued by Project Tiger/National Tiger Conservation Authority from time to time, on different issues relating to tiger mortality, post mortem, reporting etc. Based on the same and with inputs from field officers / experts, a Standard Operating Procedure (SOP) for disposing tiger/ leopard carcass/ body parts has been developed to meet the present challenges.

A copy of the said Standard Operating Procedure (SOP) for disposing tiger/ leopard carcass/ body parts, duly approved by the competent authority, is forwarded herewith for information and necessary action.

The SOP my please be translated in vernacular and widely circulated amongst the field staff for guidance.

Yours faithfully,

Encl: As above.

SD/-

(**S.P. Yadav)**
Deputy Inspector General (NTCA)

Copy to:

1. PS to MEF.
2. PPS to Secretary (E&F).
3. PPS to DGF & SS, MoEF.
4. PPS to ADG (WL)
5. Additional Director, Wildlife Crime Control Bureau, New Delhi.
6. Inspector General of Forests, Regional Office, Guwahati.
7. Assistant Inspector General (NTCA), Nagpur and Bangalore.

STANDARD OPERATING PROCEDURE FOR DISPOSING TIGER/ LEOPARD CARCASS/BODY PARTS



MINISTRY OF ENVIRONMENT AND FORESTS

GOVERNMENT OF INDIA

NATIONAL TIGER CONSERVATION AUTHORITY

STANDARD OPERATING PROCEDURE FOR DISPOSING THE TIGER/ LEOPARD CARCASS/BODY PARTS

1. **Title :** Standard Operating Procedure for disposing the tiger/ leopard carcass/ body parts.

2. **Subject:** Tiger death/seizure of body parts

3. **Reference:** Advisories of the Ministry of Environment & Forests/ Project Tiger/ NTCA on the subject (Advisory No: 1-60/89-WL I dated 04-11-1994 from the Addl. IGF (wildlife) Ministry of Environment and Forests)

4. **Purpose:** To ensure that the carcass/ body parts of tiger/ leopard are disposed of in a transparent manner to prevent any pilferage for illegal market.

5. **Short summary:** This Standard Operating Procedure (SOP) provides the basic, minimum steps which are required to be taken at the field level (tiger reserve or elsewhere) for disposing of tiger/leopard carcass/ body parts where carcass is available or the body parts have been seized.

6. **Scope :** The SOP applies to all forest field formations including tiger reserves besides other areas where the incident has occurred.

7. **Responsibilities:** The Field Director would be responsible in the case of a tiger reserve. For a protected area (National Park / Wildlife Sanctuary), the concerned protected area manager would be responsible. In the case of other areas (revenue land/conservation reserve/community reserve/village/township) the Wildlife Warden, as per the Wildlife (Protection) Act, 1972, or Divisional Forest Officer/ Deputy Conservator of Forests (under whose jurisdiction the area falls), would be responsible. The overall responsibility at the State level would rest with the Chief Wildlife Warden of the concerned State.

8. **Detailed instructions for the procedure to be followed for disposing of the tiger/ leopard carcass/ body part(s) where body part(s) / carcass is available**

(i) At Scene of crime (SoC) / incident: when carcass or parts available:

- Follow the SOP issued by the NTCA on dealing with the tiger mortality/ seizure of body parts.
- Dispose of the carcass by incineration in the presence of the Field Director or an officer not below the rank of the Conservator of Forests besides the Post Mortem (PM) Team having representation from the civil society institution
- While incinerating the carcass, the sequence must be photographed and video recorded.
- Before leaving the site, ensure that the whole carcass including bones are fully burnt.
- After ensuring the complete incineration of the carcass, prepare a 'Panchnama (Memo) on disposal of the carcass, duly signed by the PM Team and officer incharge, and send a final report (Annexure-I) to the CWLW under intimation to the NTCA with supporting photographs/ documents.

(ii) In case of seizure of body parts (Skin – dry or fresh/ bones/meat or other body parts):

- Follow the SOP issued by the NTCA on dealing with the tiger mortality/ seizure of body parts.
- In case of seizures of body parts, the same may be required as evidence for prosecution in the courts of law and hence in such situations do not dispose the same till the orders of the concerned court for such disposal are obtained.
- Once orders have been obtained by the competent authority, dispose of the body part (s) by incineration in the presence of the Field Director or an officer not below the rank of the Conservator of Forests besides the Team (same as prescribed for the Post Mortem) having representation from a civil society institution
- While incinerating the body parts, the sequence must be photographed and video recorded.
- Before leaving the site, ensure that the whole/ all body parts are fully burnt.
- After ensuring the complete incineration of the body part (s), prepare a 'Panchnama' (Memo) on disposal of the body part (s), duly signed by the said Team and officer incharge, and send a final report (Annexure-I) to the CWLW under intimation to the NTCA with supporting photographs/ documents.

(iii) In cases of seized stock of wildlife trophies obtained during seizure/ confiscation:

- All seized stock of wildlife trophies, where no case is pending in a Court of law, should be destroyed through incineration in the presence of the Field Director or an officer not below the rank of the Conservator of Forests besides a team (same as prescribed for the post mortem) having representation from a civil society institution.
- While incinerating the body parts, the sequence must be photographed and video recorded.
- Before leaving the site, ensure that the whole/ all body parts are fully burnt.
- After ensuring the complete incineration of the body part (s), prepare a 'Panchnama' (Memo) on disposal of the body part (s), duly signed by the said Team and officer incharge, and send a final report (Annexure-I) to the CWLW under intimation to the NTCA with supporting photographs/ documents.
- The provisions of the Wildlife (Protection) Act, 1972 must be followed before destroying such stock.

*****

ANNEXURE - 1

FINAL REPORT

To be submitted for disposal of each case of tiger/ leopard carcass/ body part (s)/ trophy

1	Name of Office	
2	Locational details of the mortality: description, GPS, Compartment /Block/Range /Sub-Division/ Forest Division/ Tiger Reserve or place/ time	
3	Date of Mortality/ carcass report	
4	In case of seizure of body parts details indicating the status of carcass or seized material	
5	Details of the person (staff/ Others) who reported the incident first: name/address/ contact details/ telephone numbers/e-mail	
6	For carcass: Date, time and Place of Post Mortem (PM)	
7	Details of PM Team (names/designation/ address/ contact)	
8	Details of the missing body parts, if any	
9	Cause of death as ascertained after the PM	
11	Colour photographs of the carcass/ body part (s)- (close ups, indicating injury, if any); details of comparison with camera trap photo data base	
12	Cause of death: Natural/ Poaching	
13	In case of poaching/ seizure of body parts: i. further action taken/ proposed: ii. attach colour photographs of the seized body part/s iii. attach certification regarding species identity (for bone pieces/ meat/ other body parts which are not physically	

	identifiable) iv. action taken with respect to offenders/ suspects (if arrested) v. status of Case/ complaint: number, date of filing the complaint, Sections of law, name of Court where filed	
14	Panchnama/memo of disposal of carcass/ body part (s)	Enclosed/ not-enclosed
15	Remarks if any	
16	Signature of the Officer In-charge with name, designation, date and stamp	

(SOP prepared with inputs from Field Officers of Tiger Reserves)

***

No. 15-38/2010-NTCA
Government of India
Ministry of Environment and Forests
National Tiger Conservation Authority
***

Annexe No. 5, Bikaner House,
Shahjahan Road, New Delhi-110011.
Telefax: 2338 983
E-mail: jdntca@gmail.com
Dated the 14th June, 2013

To,

The Chief Wildlife Warden(s),
All Tiger Range States.

Sir,

Recently there has been media coverage regarding spread of lethal Canine Distemper Virus (CDV) in tiger, in countries like Indonesia and Russian Federation. The said disease is incurable, causing high fever, watery eyes, lethargy, vomiting, diarrhea, progressing to seizures, paralysis and death. The infected animals have also been observed to display strange behaviour, with disorientation, inability to predate, besides loss of fear.

As a precaution, the following preventive measures are suggested:

(1) Vaccination of stray cattle, cats and dogs living around tiger reserves should be done on a regular basis.
(2) Incidents of wild animals showing abnormal behaviour, as above, must be reported immediately.
(3) Tissues of dead animals (brain tissue for CDV) should be collected for pathological analysis.
(4) Facilities of deep fridge for storing samples should be ensured in each tiger reserve.
(5) Record of each sample collected and their analysis should be maintained.
(6) Periodic checking of water quality in tiger reserves (pre and post monsoon) alongwith their chemical analysis should be undertaken.

The Field Directors and field staff may please be directed accordingly. A research paper on the detection of 'Peste des petits ruminants virus' (PPRV) in tissues of Asiatic Lion is also enclosed herewith for your kind perusal.

Yours faithfully,

Encl: As above

(S.P. Yadav)
Deputy Inspector General (NTCA)

Copy to:
1. The Director, Wildlife Institute of India, Dehradun.
2. Field Director, All Tiger Reserves.
3. IG/AIG, NTCA Regional Offices – Bengaluru / Guwahati / Nagpur.

Copy for information to:
1. PS to MEF.
2. PPS to Secretary (E&F), MoEF.
3. PPS to DGF & SS, MoEF.
4. PS to ADG (WL), MoEF.

pISSN 1229-845X, eISSN 1976-555X
J. Vet. Sci. (2012), 13(2), 203-206
http://dx.doi.org/10.4142/jvs.2012.13.2.203
Received: 20 Jun. 2011, Revised: 2 Sep. 2011, Accepted: 17 Mar. 2012

JOURNAL OF
Veterinary
Science

Short Communication

Peste des petits ruminants virus detected in tissues from an Asiatic lion (*Panthera leo persica*) belongs to Asian lineage IV

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In this study, *peste des petits ruminants* virus (PPRV) was detected in frozen pooled tissue samples from a dead Asiatic lion (*Panthera leo persica*). The samples were negative for canine distemper virus and positive for PPRV nucleic acids when tested with one-step RT-PCR using the appropriate virus-specific primers. Subsequent amplification, cloning, and sequencing of the partial nucleocapsid, matrix, and fusion genes confirmed the presence of PPRV nucleic acid. Comparative sequence and phylogenetic analyses of the structural genes of the isolated virus confirmed that the virus belonged to Asian lineage IV and was closely related to PPRV circulating in India.

Keywords: Asiatic lion, detection and isolation, PPR virus, sequence and phylogenetic analyses

Peste des petits ruminants virus (PPRV), a member of the genus *Morbillivirus*, is the causative agent of a highly contagious viral disease of small ruminants. PPRV is grouped genetically into four lineages based on a partial fusion (F) protein gene analysis. The disease is enzootic in West Africa, the Middle East, Arabian Peninsula, and parts of Asia [5]. Outbreaks of *peste des petits ruminants* (PPR) in wild animals [15] or in zoological collections [10] could be of considerable significance for virus perpetuation. Recently, the potential of PPR occurrence in different animals like camel, cattle, buffaloes has been debated. PPR seroprevalence in cattle, buffaloes [3], camels, Bharals (*Pseudois nayaur*), and other wild animals or ones in zoological collections [10] have been used to study the natural transmission of PPRV among these animals under field conditions [1]. Subclinical or inapparent cases of PPR in animals may reveal novel characteristics of the epidemiology and transmission of PPRV. However, the presence of infectious virus in these cases has not yet been reported except in a few hosts like gazelles [2] and camels [11]. In the present study, the PPRV genome was detected in tissues from an Asiatic lion that died of trypanosomiasis [confirmed by the Centre for Animal Disease Research and Diagnosis (CADRAD), Indian Veterinary Research Institute (IVRI), India]. The isolated virus was characterized by comparing sequences of the nucleocapsid (N), fusion (F), matrix (M), and hemagglutinin (H) genes with ones of PPRVs that were previously published [5].

Pooled tissue samples from the spleen, liver, kidney, lung, and heart of the deceased Asiatic lion from Gujarat, India was submitted to the CADRAD for diagnosis. A portion of the samples was also sent to the IVRI (India) for virological evaluation. According to the post-mortem examination, there were no gross and histopathological changes indicating a specific diagnosis. During the necropsy, a large amount of sero-sanguineous fluid was found within the body cavities. No apparent internal or external gross lesions of diagnostic significance were noticed in any organs. Samples were initially screened for PPRV antigen by a sandwich ELISA kit [13]. Marginal positivity was observed as indicated by an optical density of 0.172 *vs.* the negative control (0.120) and background (0.105) values. Total RNA extracted with an RNeasy Mini Kit (Qiagen, Germany) was subjected to a one-step RT-PCR assay [4] in the presence of PPRV and canine distemper virus (CDV)-specific primers as previously described [4,7-9]. The sample was positive for PPRV and negative for CDV.

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Subsequent amplification, cloning, and sequencing of the partial N (351/368 bp), M (191 bp), and F (372 bp) gene sequences confirmed the presence of PPRV (GenBank accession No. JN632530 and JN632531).

Sequence analysis of the partial F gene (372 bp) using the NCBI-BLAST (USA) server and MegAlign programs (DNAStar, USA) showed 100% identity with PPRV recovered from experimentally infected cattle (GenBank accession No. EF641264). Overall identities of 98% and 100% were observed with all Indian PPRV isolates, including that from Gujarat, irrespective of their origin. Among the isolates from Gujarat, the Patan/Gujarat/2005/sheep isolate had a high sequence identity (99%) to this isolate on comparison with F gene sequences. Similarly, analysis of the partial N gene sequence revealed a 98 ~ 99% identity with all Indian PPRV isolates and 99% identity with the Gujarat isolates. A phylogenetic tree based on a partial 372 bp sequences of the F gene (Fig. 1A) and 425 bp sequence of the N gene (Fig. 1B) was created using MEGA 4 [14] to demonstrate the relationships with other PPRV strains/isolates. This analysis showed clustering of all the Indian isolates together into a branch (lineage IV) separate from the Nigerian (lineage I) and ICV89 (lineage II) isolates as previously reported [5].

PCR assay was conducted to verify that the tissues were indeed from an Asiatic lion than from sheep or goats origins. The DNA recovered from the tissue samples of the Asiatic lion was subjected to Ple 46 locus based species-specific satellite marker PCR using Ple 46 Fwd and Ple 46 Rev primers as previously described [12]. The PCR products were separated on a 3% agarose gel (data not shown). Specific amplicons between 111 ~ 119 bp in size were observed, indicating that the samples were from an Asiatic lion/big cat species. The 10% triturated homogenate filtered supernatant was used to infect a 48-h-old confluent Vero cell (ATCC) monolayer in 25 cm^2 flask as per standard protocols. The cells were monitored for the appearance of morbillivirus-specific cytopathic effects (CPEs). After a week of incubation, the infected cells were further passaged blindly and periodically examined for visible CPEs. Virus was successfully isolated (designated PPRVInd.Guj.Lion/2007) from the cells at passage 4 and identified by virus-specific RT-PCR.

For further molecular characterization, PCR amplification,

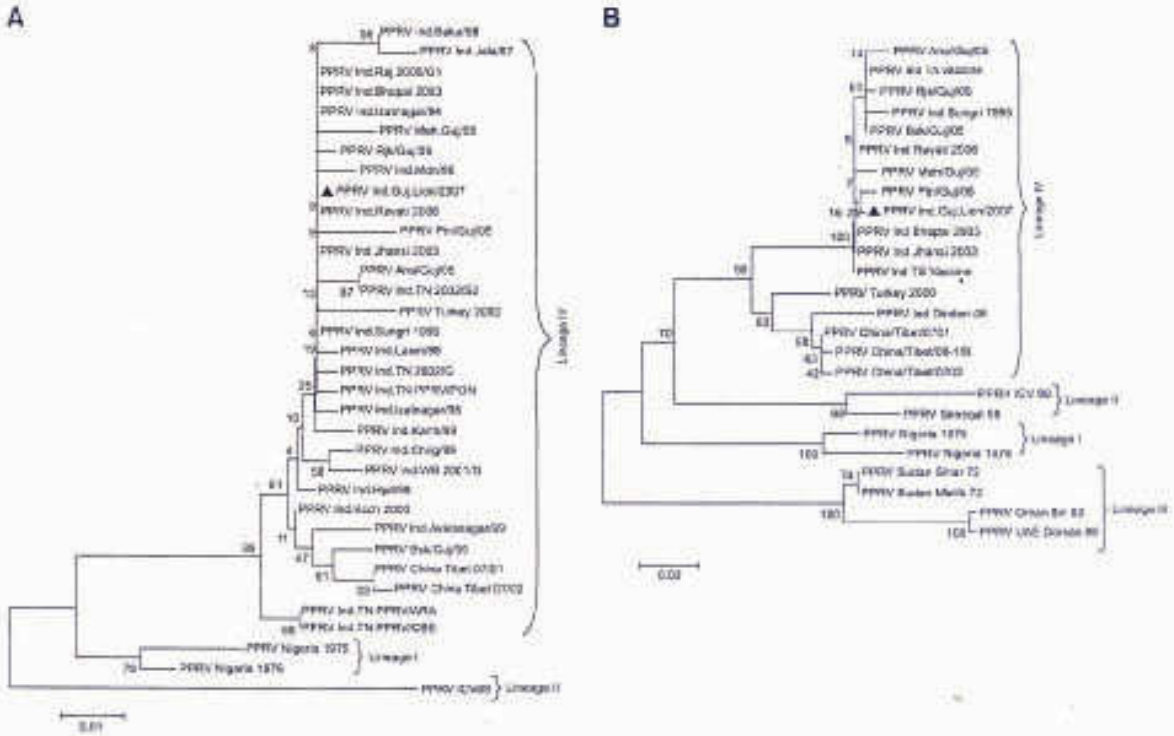


Fig. 1. Phylogenetic analysis based on partial (A) F gene (372 bp) and (B) N gene (425 bp) sequences of PPRV isolates by bootstrap test of phylogeny using the neighbor-joining method. Values of the major clusters are indicated in the node or branch of the tree, which represent the bootstrap confidence tested using 1,000 replicates of the data set. Bar represents the genetic distance (*i.e.*, number of substitutions per site).

sequencing, and sequence and phylogenetic analyses of the open reading frames (ORF) of structural genes (N, M, F, and H) from the virus isolated at passage 7 were carried out as previously described [5] to understand the genetic relationship with other PPRVs (GenBank accession No. JN632532~JN632535). Comparative sequence and phylogenetic analyses of the four gene (N, M, F and H) sequences from the lion isolate showed a close resemblance to Indian isolates and clustered into Asian lineage IV as previously reported [5]. Predicted amino acid sequence analyses of the N, M, F, and H genes also showed no significant difference in sequence alignment compared to other Indian Asian lineage IV isolates. In general, six of the seven residues in the H gene are presumed to be important for measles virus hemagglutinin-signalling lymphocyte activation molecule (SLAM) receptor interactions [6]. Along with the isolate from our study, these residues are conserved within the Nigerian and other PPRV isolates (Y529, D530, R533, F552, Y553, and P554) as reported earlier [6].

Percent identities of 97.7~99.8%; 98.8~100%; 99.4~99.9% and 99.5~99.8% were observed among the N, M, F, and H genes of Indian PPRVs respectively when analyzing the nucleotide sequences. Similarly, percent identities of 97.7~99.8%; 98.2~99.7%; 99.1~99.8%; and 99.0~99.7% were observed among the N, M, F, and H genes of Indian PPRVs respectively when analyzing the predicted amino acid sequences.

PPRV is a pathogen that infects small ruminants including ones in the wild, but PPRV seroprevalence has also been reported in other species [1]. Earlier studies on PPR indicated that it is enzootic in India [3,5]. Favorable climatic conditions may promote virus survival, spread of the virus, and distribution of seasonal outbreaks. Furthermore, the role of wildlife in the epizootiology of PPR has not been fully elucidated. In India, systematic attempts to isolate and characterize the virus from wild animals were seldom performed.

The occurrence of PPR in a subclinical form in cattle and buffaloes assumes epizootological significance [3]. In a similar manner, the detection of PPRV in the tissue samples from as Asiatic lion may be of significance. Detection of PPRV antigen/nucleic acids in tissues from the Asiatic lion was indicative of subclinical/inapparent infection. Such cases of infection could be due to close contact with other infected animals or contaminated fomites. The animal might have been seroconverted which has been reported for other infected animals [3] and could reveal new insight into PPRV epidemiology and transmission. In general, morbilliviruses have the propensity to adapt to new host species, which can be explained by the deterministic role of a conserved receptor (SLAM) and could be of paramount importance. Earlier studies on PPR showed that wild ruminants may play an important epidemiological role as a source of infection for domestic animals [10,15] and the reverse situation may also be possible. However, further random screening or methodical sero-screening, virus detection, and genome sequencing analysis of inapparently infected wild animals will help elucidate the disease prevalence among wild animals including ruminants.

To the best of our knowledge, this is the first report of detection and partial genetic characterization of PPRV isolated from Asiatic lion tissues. Our findings may provide insight into the emergence of PPR in a new species. Greater emphasis should be placed on continuous serological and clinical surveillance of PPR in wild ruminants to better understand the prevalence of PPRV, its impact on wildlife conservation, and the possible roles of different species in PPRV transmission.

Acknowledgments

The authors thank the Director, IVRI for providing the facilities and financial assistance, the staff of Rinderpest and Allied Disease Laboratory, Division of Virology for their valuable assistance and Joint Director of the CADRAD, IVRI for regularly sending clinical samples to the Division of Virology for viral disease diagnoses.

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NATIONAL TIGER CONSERVATION AUTHORITY

राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण

(Statutory Body under the Ministry of Environment & Forests, Govt. of India)

(पर्यावरण एवं वन मंत्रालय, भारत सरकार के अन्तर्गत संविधिक निकाय)

Dr. RAJESH GOPAL
डा0 राजेश गोपाल
Addl. DGF (Project Tiger) &
Member Secretary (NTCA)
अति0 वन महानिदेशक (बाघ परियोजना) एवं
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MOST URGENT

No. 1-5/93-PT **Dated the 13th January, 2014**

To,

Chief Wildlife Warden(s),
All Tiger Range States.

Sub: Threat to tigers from Canine Distemper Virus.

Ref: 1. Letter No. 15-38/2010-NTCA dated 14.6.2013.
2. Letter No. 15-38/2010-NTCA dated 18.6.2013.
3. Letter of even number dated 13.12.2013.

Sir,

Kind reference is invited to the correspondence cited above.

In view of the threat to our wild tiger population from Canine Distemper Virus, it is strongly advised that a special drive may please be launched in collaboration with the Veterinary Department of the State for sensitizing field officials of tiger reserves and veterinary officers of concerned districts.

It is important to create a 'barrier' through prophylactic immunization of dogs / cats in the buffer areas of tiger reserves. During post mortem, blood / tissue samples should be collected from carnivores for subsequent examination, and such samples are required to be sent to Wildlife Institute of India / Indian Veterinary Research Institution for the needful. **The Field Directors may please be alerted with respect to detection, treatment and monitoring of sick animals in tiger reserves and their vicinity.**

This may kindly be accorded top most priority, while apprising this Authority of the action taken.

Yours sincerely,

Rajesh Gopal

(Dr. Rajesh Gopal)
ADG (PT) & Member Secretary (NTCA)

Copy to:

1. ACS / Principal Secretary, Forest Department, All Tiger Range States.
2. PCCF & HOFF(s), All Tiger Range States.
3. Field Director(s) of all tiger reserves.
4. Regional Offices of NTCA – Bengaluru / Nagpur / Guwahati.

ANNEXURE - XVIII

FORMAT OF ANNUAL PLAN OF OPERATION
FOR SEEKING CENTRAL ASSISTANCE UNDER CENTRALLY SPONSORED SCHEME - PROJECT TIGER

(Rs. In Lakhs)

Sl. No.	Item	Para No. of CSS-PT Guidelines	Previous Year Details					Current year proposal			Justification
			Location	Physical		Financial		Location	Physical Target	Financial Target	
				Target	Achievement	Target	Achievement				
NON-RECURRING											
	Total										
RECURRING											
	Total										
	G.Total										

Certificate : It is certified that

(1) No deviation has been done except as approved by the NTCA.

(2) Items proposed are as per the CSS-PT guidelines.

Counter Signed

Chief Wildlife Warden

Signature of the Field Director
Name of the Tiger Reserve

PROTOCOLS FOR THE ESTABLISHMENT OF A NATIONAL REPOSITORY OF CAMERA TRAP PHOTOGRPHS OF TIGERS (NRCTPT)

PART-I: WORK TO BE DONE AT RESERVE AND STATE LEVEL BEFORE IMAGES ARE SENT TO THE NATIONAL TIGER CONSERVATION AUTHORITY(NTCA)

1. INTRODUCTION

Photographic images of tigers are accumulating rapidly across India as a result of camera trap surveys, general photography, forensic work and other activities by multiple agencies. If these images are systematically collected and compiled in a retrievable and useful manner, they can be of immense assistance to the protection, management and rigorous monitoring of wild tiger populations in India. The purpose of this note is to outline the establishment of such a NATIONAL REPOSITORY OF CAMERA TRAP PHOTOGRPHS OF TIGERS (NRCTPT) under the direct control of National Tiger Conservation Authority (NTCA) with facilitation for instant sharing of information with States and other participants.

Intensive camera trapping has been now mandated as the main methodology for annual monitoring of tiger populations in key source populations and tiger reserves (http://projecttiger.nic.in/whtsnew/Protocol_Phase_IV_Monitoring_r.pdf). Additional tiger photographs may be made available by individual reserve or through any other ad hoc camera trapping efforts as well as from photographs of dead tigers, skin seizures and photographs of wild tigers obtained by tourists, forest officials and other individuals. All statistical information about tiger populations in the country will be derived from these individual identifications based on rigorous analysis conducted by NTCA / outside experts at NRCTPT.

The first January of 2006 will be treated as the starting date for accumulating these tiger identifications in a rigorous, secure national database. Given the maximum life span of about 15 years for wild tigers, the database will have to be continually accrued over the years. An initial capacity for 99,999 individual tiger ID records is suggested.

Although the tiger photo-ID database can be a powerful tool, the possibility of problems arising from accidents, errors, and deliberate manipulation is substantial. Therefore, a carefully designed protocol to regulate and validate the inflow of photographs right at the establishment stage of NRCTPT is crucial. Furthermore, to use the software program ***'ExtractCompare'*** (Hiby et al. 2010) with its associated standard MS Access data-base, it is imperative to establish strict quality control regimes right at the inception to maintain high levels of data integrity. This document contains details on how such a reliable National Repository of Camera Trap Photographs of tigers **(NRCTPT)** can be established and maintained.

This document also contains five data forms which are used to ensure authentic recording of tiger photo data from Field level to the State level. ONLY *'Data Form - C'* is filled by hand in the field by survey personnel. Other four data forms are filled by authorized official / researcher at Reserve / State level.

2. RESPONSIBILITIES OF THE CENTRAL DATABASE MANAGEMENT FACILITY AT THE NTCA, NEW DELHI, AFTER THE DATABASE IS ESTABLISHED

1) Receiving tiger photographs and ancillary information in a properly labeled, formatted and authenticated manner on hard copy forms and digital form together with authentication documents duly signed by authorized personnel certifying them.

2) Scrutinizing, selecting photos and entering the camera-trap photo-capture data and their associated photo-images into the database together with all the meta-data (including location, date, time, personnel involved, and other meta-data from storage media, camera traps, film rolls etc.).

3) Using software program ***ExtractCompare*** to perform batch level automated matching followed by visual examination to identify unique individuals and assign the unique ID numbers.

4) Documenting and archiving all received images (including those not entered into the database) for future reference, vouching, resolving disputes etc.

5) Generating all statistical analyses and interpretation of results.

6) Sharing these results with the respective states, parliament, participating scientific institutions/partners, etc.

The Regional Offices of the NTCA will facilitate the process by interacting with the States involved.

3. PROTOCOLS TO BE FOLLOWED AT THE STATE AND TIGER RESERVE LEVEL BEFORE COMMENCING FIELD DATA COLLECTION

Each state with help from technically qualified persons/institutions will develop a SURVEY DESIGN for each Tiger Reserve or Source Site, keeping in view requirements specified under Phase IV of National Tiger Estimation and the **ladder process** of moving from Section 2 to Section 3 provisions therein.

Once the Survey Design is approved by the Chief Wildlife Warden (CWLW) of the State and necessary logistical needs, personnel and other resource needs are identified, the steps listed below will be required to implement field surveys for reliable data collection.

1) Each Tiger Reserve or Source Site will identify a "supervisor" to oversee the entire field survey operations. The supervisor can be either a Forest Department officer at the rank of Range Forest Officer or above, or a qualified scientist authorized by the state Chief Wildlife Warden to implement Phase IV protocols.

2) The supervisor at the Tiger Reserve or Source Site level will assign a unique LOCATION LABEL to each TRAP LOCATION where camera traps will be deployed in the field FOLLOWING THE SURVEY DESIGN APPROVED BY NTCA.

3) The supervisor will record and list all such TRAP LOCATIONS with their GPS co-ordinates as well as a GEOREFERNCED DESCRIPTIVE NAME associated with a map at 1:50,000 scale using the ***'Data Form – A'***.

4) Each camera trap unit and film roll or electronic disk used for gathering camera trap data will get a unique, non-repeated identification number which should be inscribed on it.

5) The supervisor will prepare a deployment plan and schedule covering all trap locations identified in the approved survey design. Using the ***'Data Form – B'***, he/she will track the deployment of units at all locations in Tiger Reserve or Source Site.

4. PROTOCOLS TO BE FOLLOWED BY FIELD SURVEY TEAMS

The field protocols outlined below will be strictly followed and adequate checking / validation and supervision will be in place to ensure data integrity:

1) Each "double sided camera trap" (hereinafter called camera trap) consists of two cameras and tripping systems, each one with its own unique ID numbers.

2) While setting up camera traps 'Date' and 'time' settings of both the cameras at a trap location will be synchronized.

3) Only image storage device (e.g. memory card or film roll) which have unique ID inscribed on them, will be loaded into the cameras.

4) While out in the field, camera traps will be set up initially, checked routinely and removed systematically according to the deployment plan prescribed in *Data Forms A* and *B*. The set up and checking activities for camera traps will be carried out with all relevant ancillary data being recorded exactly as shown in ***'Data Form – C'***.

It is important that all field survey personnel, supervisory personnel and others write their names legibly, sign and date the filled forms exactly as shown above. This will form the basis of authenticity of the entire exercise and will be diligently done. The supervisor will ensure authentication of the data forms and associated data received from the field and ensure its safe keeping.

5. PROTOCOLS TO BE FOLLOWED AT THE TIGER RESERVE LEVEL

The carefully stored data and storage media (films, disks) will be handled by the Tiger Reserve or Source Site level supervisor authorized by the Field Director or the qualified researcher appointed by the Chief Wildlife Warden. He/she will ensure that the following steps are implemented:

1) The data to be integrated at reserve level will include: The raw camera trap data (on memory cards from digital cameras or film rolls from film cameras) each with its own Individual ID, imprinted meta-data and associated data forms.

2) **Downloading and storing images as <u>'field copy'</u> at Tiger Reserve or Source Site level:** Create a new folder on the computer hard disc, and name it by joining the 'name of the field technician' from whom the images were received, and the 'date of receiving data'. For example, images received from Mr. Santosh Naik on 8th October 2012 (this will be on *Data Form - C*) is copied into a computer drive with a specific folder name that identifies it as below:

   Example folder name: *SantoshNaik -8-10-2012*

Each data form received from Santosh Naik on 8th October 2012 should also be tagged/filed under the same name (Example: *SantoshNaik-8-10-2012*).

3) Create sub-folders within this folder that is named by pairing the 'camera ID' and 'memory card ID' (or Film roll ID).

   Example sub-folder name: *KA-CAM192-MC003*

   Download images from the memory cards into these respective folders. Do not rename them, so they retain their original names as generated in the camera.

4) Images stored as above are considered as **'field copy'** of images received from field survey personnel. Store **all** images like this and not just tiger images. As an example, the folder structure of storing this 'field copy' of image will be:

   Example: *SantoshNaik-8-10-2012 > KA-Cam192-MC003 > {Img001.jpg, Img002.jpg, Img003.jpg, etc.}*

   The next, and further subfolders for images received from Santosh Naik on 8th October 2012 will be:

   Example: *SantoshNaik-8-10-2012 > Cam213-MC006 > {Img001.jpg, Img002.jpg, Img003.jpg, etc.}*

5) Now, leaving this 'field copy' of images as it is on the hard disc, create **a second 'backup copy' of these images** in a separate folder.

6) After downloading images from the memory card as two copies, format the memory cards. Always make sure the memory cards are formatted before giving the camera units back to the field survey personnel.

7) Documenting tiger capture details in ***'Data Form – D'***: At the Tiger Reserve or Source Site level, examine all images carefully and enter details related to each tiger photo-capture in a fourth data-form.

8) The two images from two cameras of a trap location are linked as 'complementary images' of each other, as shown in the example '*Data Form - D*' in Annexure 4.

   a) When establishing the link between two images as the 'right flank' and 'left flank' of same individual through the same photo-capture event, take extreme care in using the date-time information from the meta-data of the image or time-stamp on the images.
   b) Counter-check this 'linking' of images with information recorded in '*Data Form* - C', and by looking at other images captured immediately before and after these tiger images.
   c) The supervisor will also look at the 'set-up time' and the next 'check time' at a location to ascertain if a tiger capture in the image was from the same location using '*Data Form - C'*.

6. PROTOCOLS TO BE FOLLOWED AT THE STATE LEVEL

The task of recording, compilation, authentication before submission of data to the NTCA will be performed at Chief Wildlife Warden's office or at Head Quarters of the

scientific institution conducting the survey.

1) After camera trapping is completed for the season or for a pre-defined period, four data-forms *('Data Form - A', 'Data Form - B', 'Data Form - C', and 'Data Form - D'),* all authenticated by and countersigned by the reserve director/head of research institution will be sent to the Chief Wildlife Warden as well as to NTCA (two identical copies) for further authentication.

2) Field Director will also send images collected at Tiger Reserve or Source Site level **(the 'field copy' of images)** on CDs/DVDs to the Chief Wildlife Warden for further authentication.

3) If any individual tiger can be identified based on preliminary visual comparisons, at Tiger Reserve or Source Site, 'Annual Temporary Tiger ID number' will be assigned by the Chief Wildlife Warden, using ***'Data Form - E'***.

4) Till this point all data will be in the form of paper **field data-sheets**, and **films or digital images** on CDs/DVDs. Entries in a MS Excel spreadsheet will be recorded at state level and sent to the NTCA.

5) At State level the data received from all Tiger Reserves or Source Sites will be thoroughly validated and authenticated.

6) Apart from *'Data Form - E'*, and an 'authenticated version' of data, no other new document is created at State level. Also, DO NOT rename or reorganize the images in any way. This data sent to the NTCA will be deemed as authentic and final.

'Data Form - A':

Note:

1. **This form is to be filled by an authorized official / researcher at Tiger Reserve or Source Site level to record all Camera Trap Locations are recorded and give unique Spatial Camera Trap Location Label** is given.
2. This form lists all the **Camera Trap Location Label**s strictly based on the **Survey Design Map** prepared by the scientific collaborator.
3. Example data are filled in red font color in the form specimen below only for illustration.

Name of the Tiger Reserve / Source Site: Nagarahole Tiger Reserve
Supervisor's (Authorized official/Researcher) Name & Signature: Narendra Patil

Camera Trap Location Label	Geo-referenced Description of Camera Trap Location	Latitude (by map or GPS)	Longitude (by map or GPS)	Range/Section Name	Beat/Sub-beat Name
NH-72	On Tiger Road,100 meters East from junction with Chikpala Road	11.76327	76.40622	Nalkeri/Balecove	Moorkal

'Data Form - B':

Note:

1. **This form is to be filled by an authorized official / researcher at Tiger Reserve or Source Site level.**
2. This form is essential for tracking the deployment of camera traps and image-data collection.
3. Example data are shown in red color font in the specimen-form below only for illustration.

Name of the Tiger Reserve / Source Site: Bandipur Tiger Reserve
Supervisor's (Authorized official/Researcher) Name & Signature: Killivalavan Rayar

Sl.No.	Camera Trap Location ID	Camera ID	Memory card ID	Date of Deployment	Date of removal	Date of Downloading images
1	BP72	KA-Cam192	MC003	1-10-2012	7-10-2012	8-10-2012
2	BP72	KA-Cam213	MC006	1-10-2012	7-10-2012	8-10-2012
3	BP73	KA-Cam215	MC012	1-10-2012	7-10-2012	8-10-2012
4	BP73	KA-Cam194	MC015	1-10-2012	7-10-2012	8-10-2012
5	BP74	KA-Cam215	MC006	8-10-2012		
6	BP74	KA-Cam194	MC012	8-10-2012		
7	BP75	KA-Cam192	MC015	8-10-2012		
8	BP75	KA-Cam213	MC003	8-10-2012		

'Data Form – C':

Note:

1. This form is filled by **Field survey personnel/technicians by hand while they are actually setting up or checking camera traps.**
2. This is the ONLY form to be filled in the field by survey personnel.
3. Example data are in red color font in the specimen-form below only for illustration: THESE ARE FILLED BY HAND IN THE FIELD.

Names of camera trapping field survey personnel **Santosh Naik** and **Naveen Kumar**				Name of supervisor: **Killivalavan Rayar**			Tiger Reserve/Source Site name and year of survey: **Nagarahole -2012**	
Signature of survey personnel: **……. and ……..**				Signature of supervisor: **…….**			Sheet No: **1 of 3**	
Date	Time	Camera Trap Location Label	Camera ID	Memory Card ID	Start image	End image	No. of images	Remarks
Setup: ***02/10/12***	**0745**	***NH24***	**Karnataka-CAM 192**	**MC003**	**01**	**05**	**4**	**Tiger found in image 02**
Check: ***03/10/12***	**0730**		**Karnataka-CAM 213**	**MC006**	**03**	**07**	**4**	**Tiger found in image 04**
Setup: ***02/10/12***	**0815**	***NH24***	**KA-CAM 216**	**MC034**	**01**	**03**	**2**	**Leopard in image 02**
Check: ***03/10/12***	**0800**		**KA-CAM 220**	**MC023**	**04**	**06**	**2**	**-**

'Data Form – D':

Note:

1. *Photo-capture details* for each tiger image, and its *opposite flank image* is recorded in this form.
2. This form is filled at the Tiger Reserve or Source Site level after preliminary processing of images by referring to data given in 'Data Form - C'.
3. Example data in red color font in the specimen-form below is only for illustration.
4. **Only record FILE NAME OF THE IMAGE and FILE LOCATION in the 'FILED COPY' images folder are recorded.** THE .JPG IMAGES ARE NOT TO BE PASTED ON THE FORM! These are shown just to link them to file names used here as example.

Name of the Tiger Reserve / Source Site: Nagarahole Tiger Reserve
Supervisor's (Authorized official/Researcher) Name & Signature: Killivalavan Rayar

Camera Trap Location Label	Date	Time	Folder path and File name of the Left Flank	Folder path and File name of the Right Flank
NH24	02-10-12	20:13	*SantoshNaik-8-10-2012* > *KA-Cam192-MC003* > IMG0002.jpg 	*SantoshNaik-8-10-2012* > *KA-Cam213-MC006* > IMG0004.jpg 

'Data Form - E':

Note:

1. **YEARLY Temporary tiger ID, age-sex class details (if available)** for each photo-capture are recorded in this form, reserve/source site wise for the entire state.
2. **This form is filled by authorized representative of Chief Wildlife Warden for the whole State**.
3. Example data are red color font in the specimen-form below is only for illustration.

Name of the State: Karnataka
Name and Signature of authorized representative: Narendra Patil
Chief Wildlife Warden's Name & Signature: ……..

Tiger Reserve / Source Site	Camera Trap Location Label	Date	Time	Folder path and File name of the Left Flank	Folder path and File name of the Right Flank	Temporary Tiger ID	Sex	Age
Nagarahole	NH24	02-10-12	20:13	*SantoshNaik-8-10-2012 > KA-Cam192-MC003 >* IMG0002.jpg	*SantoshNaik-8-10-2012 > KA-Cam213-MC006 >* IMG0004.jpg	NH2012-23	Male	Adult

PROTOCOLS FOR THE ESTABLISHMENT OF THE NATIONAL REPOSITORY OF CAMERA TRAP PHOTOGRAPHS OF TIGERS (NRCTPT)

PART-II: COVERING WORK TO BE CARRIED OUT AFTER IMAGES ARE RECEICED BY THE NTCA

1. RESPONSIBILITIES OF THE CENTRAL DATABASE MANAGEMENT FACILITY AT THE NTCA, NEW DELHI, AFTER THE DATABASE IS ESTABLISHED AND IMAGES ARE RECEIVED

6) Receiving tiger photographs and ancillary information in a properly labeled, formatted and authenticated manner on hard copy forms and digital form together with authentication documents duly signed by authorized personnel certifying them.

7) Scrutinizing, selecting photos and entering the camera-trap photo-capture data and their associated photo-images into the database together with all the meta-data (including location, date, time, personnel involved, and other meta-data from storage media, camera traps, film rolls etc.).

8) Using software program ***ExtractCompare*** to perform batch level automated matching followed by visual examination to identify unique individuals and assign the unique ID numbers.

9) Documenting and archiving all received images (including those not entered into the database) for future reference, vouching, resolving disputes etc.

10) Generating all statistical analyses and interpretation of results.

7) Sharing the results in the form of unique Tiger IDs with the respective states, parliament, participating scientific institutions/partners and the public.

The Regional Offices of the NTCA can facilitate the process by interacting with the States involved.

However, all the procedures below are implemented by technically fully qualified personnel.

2. PROTOCOLS FOR THE PROCESSING OF IMAGES, ARCHIVING AND ANALYSIS AT THE NTCA, NEW DELHI

All images (including tigers), electronic meta data and ancillary data in hard copy forms, duly authenticated at Reserve and State level and countersigned by officials as mentioned on the forms will finally arrive at the NTCA from the office of the Chief Wildlife Wardens for further processing and assignment of National Unique Tiger IDs (UTID). The exact format in which these data are received will be as below:

- Images will be received on CDs or DVDs, or negative film rolls. These disks and rolls will contain images termed as original ‘STATE COPIES’.
- These disks MUST HAVE linked authenticated Data Forms A, B, C, D and E.

These camera trap images will be processed for individual identification of tigers by fully following the protocols/steps as described below:

I. RE-ORGANIZING AND RE-NAMING ALL CAMERA TRAP IMAGES IN WINDOWS EXPLORER

Authenticated 'STATE COPIES' of images are stored in folder structures already described in document 1. These images are required to be re-named / re-labeled in a standardized manner for the whole country before they can be entered into the National Tiger Photo Database. To maintain data integrity, and also to facilitate easy storing of data in the database, these images received as STATE COPIES must be re-organized as per steps below.

STEP 1:

Retaining the same folder structure, make **A FRESH DUPLICATE COPY** of all the images and meta-data on the hard disk of a separate computer with adequate storage space. On the copy, the images get a new name (or label) by fixing a **'date-time stamp'** to the image number. This date-time information will be derived from *EXIF metadata* (Exchangeable Image File Format) embedded in images by the digital cameras. There are standard software tools for renaming images by stringing EXIF meta-information of images with their original image numbers.

Example:

Label of image received: *IMG0001.jpg*

New name after re-labeling: *2012-10-02_20-13-37_IMG0001.jpg*

STEP 2:

CREATE A NEW FOLDER STRUCTURE. For each TIGER RESERVE OR SOURCE SITE create as many NEW folders as there are unique camera trap locations. EACH NEW FOLDER MUST have a label using the Camera Trap Location ID contained in Data Form A described in document 1.

Example: for location *'Mannina Katte Road 2.4'* create a folder by its Camera Trap Location ID NH24

1. Refer to 'Data Form – C' and 'Data Form – D' to identify TIGER images as captured at specific camera trap location, and then copy these images into appropriate Camera Trap Location folder.

Example: copy images from *SantoshNaik-8-10-2012 > KA-Cam192-MC003* into folder *NH24 > {images captured at MNKR 2.4}*, and images from *SantoshNaik-8-10-2012 > KA-Cam213-MC006* into folder NH24 *> {images captured at MNKR 2.4}*.

2. PLEASE NOTE THAT MOST CAMERA TRAP UNITS WOULD HAVE BEEN MOVED AROUND, SO PLEASE DO THE FOLLOWNG TO TAKE CARE OF THIS ISSUE: If, a camera trap unit was deployed in more than one location before downloading images at tiger reserve office, one should be very careful in ascertaining the location for images because they will be downloaded

into a single folder in the field copy of images. For example, if the camera unit 'KA-Cam192' was deployed in two locations, the folder *SantoshNaik-8-10-2012 > KA-Cam192-MC003* will have images taken from these two locations. It is very important to refer to *'Data Form - C'* (and cross-validate with *'Data Form - B'*) to ascertain the dates when the unit was shifted to a new location, and accordingly copy the images into two different folders.

Example: copy images captured in location NH24 from *SantoshNaik-8-10-2012 > KA-Cam192-MC003* into folder *NH24 > {images captured at Camera Trap Location ID NH24}*, and images captured in location NH25 from *SantoshNaik-8-10-2012 > KA-Cam192-MC003* into folder *NH25 > {images captured at Camera Trap Location ID NH25}.*

3. By stringing together the 'Camera Trap Location ID', 'date-time of capture' with the 'original image number', a unique reference image file name is created for all images received at NTCA.

   Example: NH25*_2012-10-02_20-13-37_IMG0002.jpg*

Where,

Source site code	Location ID	Date/time stamp of image	Image number
NH (Nagarahole)	*25*	*2012-10-02_20:13:37*	*IMG0002*

Note: Each image gets linked to a Tiger Reserve (of possible and nearest source site) in India. We have used the list of Tiger Reserves (current and potential source sites identified by NTCA) to generate codes for each of the Tiger Reserves (see Appendix 1).

Referring to Data Forms C, D and E, select all tiger images and copy them into a new folder. Lable this new folder by site and year of trapping.

Example: Bandipur 2012

Establish and validate opposite flanks for each photo-capture by looking into Data Forms C, and D.

THOROUGHLY CROSS CHECK **TEMPOARY IDs** assigned to individual tigers **BY STATE CWWS in Data Form E**, by VISUALLY COMPARING all tiger images received.

II. **INSERTING THE CAMERA TRAP DATA TO NATIONAL TIGER PHOTO DATABASE USING MS ACCESS FORM**

Finally ALL images of camera trapped tigers from all source sites/tiger reserves, and their capture details are consolidated into NTPD. This is done in two stages.

1) First, the camera trap data from a single TIGER RESERVE OR SOURCE SITE is appended to a carrier database 'tiger_append'. A final validation of the data can be performed at this stage, and if there are any irregularities they are resolved. **PLEASE NOTE THAT ALL TIGER IMAGES RECEIVED FROM FIELD GET INCLUDED IN THE DATABASE**.

2) In the second stage, data from 'tiger_append' database are imported into the

central database. A subset of these tiger images is tagged for extracting patterns in *ExtractCompare* software. These patterns are then compared with all other images using the *ExtractCompare* software and the tigers that do not find a match with any tiger in the database get a new ID. The scheme of naming the tigers is defined in the next part of this document.

3) This comprehensive database from all tiger reserves/source sites and from all previous years also records National Unique Tiger ID.

III. **ASSIGNMENT OF UNIQUE NATIONAL TIGER IDs (UTIDs) USING ExtractCompare SOFTWARE**

Establishing the identity of each the tiger, and then to have unambiguous NATATIONAL identifications to all photographed tigers is central to maintaining a reliable national database from camera trap data.

The general naming scheme outlined below reflects two important aspects about the individual tiger identity: first the landscape from where the individual was captured, and second the 'strength' of the identity of the individual tiger based on its photos (so as to be able to separate out ambiguous identities from unambiguous identities).

1. To avoid multiple counting and controversies it is essential for each tiger to have one PERMANENT national ID (UTID). It is logical and ecologically meaningful to have these IDs linked spatially to one of the five disjunct tiger landscapes as well as to the year of First capture. These IDs SHOULD NOT BE ASSIGEND TO STATES OR TIGER RESERVES because tigers often move across these boundaries either permanently or temporarily. We propose the following general scheme for UTID:

   Example: *WG- stands for Western Ghats, followed by a unique running serial number that is nationally assigned and continued over the years.*

   WG-12387, CI-19680, NE-3427 etc

   Each individual tiger is spatially coded to the landscape from where it was first captured. We have used the list of landscapes identified by NTCA to generate the codes for each landscape (see Appendix 2)

2. Based on the quality of photos and the number of photos in each capture there can be four types of names or "IDs" for each tiger: (a) IDs for unusable images, (b) IDs for 'unidentifiable' individuals, (c) Partial IDs, and (d) Permanent IDs.

   a) Not-usable image (NUI)

   Photos that are merely recognizable as that of a tiger but without any necessary and sufficient stripe patterns available for individual identification should be described as 'unusable' images. Following ID format will be used for such images.

   Example: *WG-12-NUI0001,*
   Where *'WG'* indicates the landscape and *'12'* indicates the year of capture

   b) Unassigned image (UAI)

There will be cases of camera trap images of a single flank that cannot be compared with all the same flank images in the dataset, even when stripe patterns are visible in the image. For example, a left hind leg image cannot be compared with an image that has only left front leg visible in it.

Such images are temporarily labeled as 'unidentified', and can potentially match images in the ensuing season. An unidentified individual during the camera trap survey in year 2012 can be named as follows.

Example: *WG-12-UAI0001*

c) Partial ID

When only a single broad side profile image of either the right or the left flank of the tiger exists for a new individual tiger, its identity will be ambiguous because a *left-flank-only* image and a *right-flank-only* image may logically belong to either the same individual or two different individuals.

In such cases it is best to reflect the ambiguous identity of the individual in its ID, and such IDs will be considered as Partial IDs. If in the ensuing camera trapping season, these images with 'ambiguous identity' match images of a capture with both the flanks then the individual tiger will be assigned a Permanent ID.

Examples of Partial ID: *WG-L00335*, and/or *WG-R00333*

Where, ID series with *'L'* refers to individuals with only usable left-flank photos, and *'R'* series to individuals with only usable right-flank photos.

d) Permanent ID

The identity of a tiger is unambiguous only when there is at least one capture with clear broad side profiles of *both flanks* in the data set. Only for tigers with both flank images, a permanent ID is assigned. The permanent ID has a spatial component (a code for the landscape) and a serial number which is national.

Example of a permanent ID: *WG-2875*

Once these National Unique Tiger IDs are assigned at the NTCA, they SHOULD BE COMMUNICATED TO THE to each STATE (Chief Wildlife Warden) to replace temporary IDs assigned by them earlier in the process.

IV. **Additional information in the database**

This database can be used to record sightings from naturalists who have taken clear photos amenable for individual identification, as well as to record tiger mortalities with images of either their carcasses or pelts seized, to establish / ascertain reliable identity of the individual tiger. In all such cases, pattern matching software *ExtractCompare* can be effectively used to match these images with camera trapped individuals in the database that will greatly enhance tiger conservation. But such images from other sources should be included in the database ONLY when reliable information on the location and date of photograph taken is available.

***

APPENDIX 1

List of source sites that include tiger reserves and proposed tiger reserves

Sl.No.	Source Site Name	Source Site Code
1	Achanakmar	AK
2	Anamalai	AM
3	Bandhavgarh	BG
4	Bandipur	BP
5	Bhadra	BD
6	Biligiri Rangaswamy Temple	BR
7	Bor	BO
8	Buxa	BX
9	Corbett	CB
10	Dampa	DM
11	Dandeli-Anshi	AD
12	Dudhwa-Kishanpur	DK
13	Gundla Brahmeswaram	GB
14	Guru Ghasidas	GG
15	Indravati	IV
16	Kalakad-Mundanthurai	KK
17	Kanha	KN
18	Katerniaghat	KG
19	Kawal	KW
20	Kaziranga	KZ
21	Kudremukh	KM
22	Manas	MA
23	Melghat	MG
24	Mhadei-Cotigao-Netravali	MD
25	Mudumalai	MM
26	Mukandara Hills	MH
27	Mukurthi-Nilambur	MN
28	Nagarahole	NH
29	Nagarjunsagar	NS
30	Nagzira-Navegaon	NN
31	Namdapha	NM
32	Nameri	NR
33	Pakke	PK
34	Palamau	PL
35	Panna	PA
36	Parambikulam	PB
37	Pench (Maharashtra)	PM
38	Pench (MP)	PN
39	Periyar	PY
40	Pilibhit	PI
41	Rajaji	RJ
42	Ranthambore	RB
43	Ratapani	RP
44	Sahyadri	SH
45	Sanjay-Dubri	SD
46	Sariska	SK
47	Satkosia	ST
48	Satpura	SP
49	Satyamangalam	SM
50	Shendurney	SN
51	Similipal	SI

52	Suhelwa	SW
53	Sunabeda	SU
54	Sunderbans	SB
55	Tadoba-Andhari	TD
56	Udanti-Sita Nadi	US
57	Valmiki	VM
58	Wayanad	WY

APPENDIX 2

Tiger landscapes in India

Sl. No.	Tiger landscape	Tiger landscape Code
1	Central India	CI
2	Eastern Ghats	EG
3	North East Hills and Brahmaputra Flood Plains	NE
4	Shivalik Hills and Gangetic Plain	SH
5	Sunderbans	SU
6	Western Ghats Complex	WG

ANNEXURE - XX

STANDARD OPERATING PROCEDURE FOR DEALING WITH TIGER DEATH

MINISTRY OF ENVIRONMENT AND FORESTS

GOVERNMENT OF INDIA

NATIONAL TIGER CONSERVATION AUTHORITY

STANDARD OPERATING PROCEDURE FOR DEALING WITH TIGER DEATH

1. **Title :** Standard Operating Procedure for dealing with tiger death

2. **Subject:** Tiger death/seizure of body parts

3. **Reference:** Advisories of NTCA/Project Tiger on the subject

4. **Purpose:** To ensure that the causative factors for tiger death are ascertained and taken to logical conclusion in the interest of tiger conservation.

5. **Short summary:** This Standard Operating Procedure (SOP) provides the basic, minimum steps which are required to be taken at the field level (tiger reserve or elsewhere) for dealing with incidents of tiger mortality where the carcass is available or the body parts have been seized.

6. **Scope :** The SOP applies to all forest field formations including tiger reserves besides other areas where the incident has occurred.

7. **Responsibilities :** The Field Director would be responsible in the case of a tiger reserve. For a protected area (National Park / Wildlife Sanctuary), the concerned protected area manager would be responsible. In the case of other areas (revenue land/conservation reserve/community reserve/village/township) the Wildlife Warden, as per the Wildlife (Protection) Act, 1972, or Divisional Forest Officer/ Deputy Conservator of Forests (under whose jurisdiction the area falls), would be responsible. The overall responsibility at the State level would rest with the Chief Wildlife Warden of the concerned State.

8. **Detailed instructions for the procedure to be followed in tiger death / seizure of body part / incident reported but no body part / carcass available but for corroborative field evidences**

(i) At Scene of crime (SoC) / incident (responsibility : Range Officer, Assistant Director / Assistant Conservator of Forests, Deputy Director / Divisional Forest Officer)

- Reach the spot at the earliest, while informing the Field Director/Conservator/Chief Conservator of Forests having jurisdiction
- Call for Investigation Team to the spot immediately. It should be mandatory for the Investigation Team to visit the SoC with Investigation Kit.
- Cordon off the area with the help of rope/tape so that evidences are not disturbed
- Take photographs of undisturbed site/video record from different angles for comparison with camera trap recordings (if done in the area). Photographs and video should have both close ups and from distance shots. Tapes may be placed to show distances of various physical objects found at SoC. Circumstantial observation at SoC should be minutely recorded.
- Do not manipulate evidences
- Divide the whole area into grids/circles for investigation and collection of evidences
- Note down all finer details, date, time, GPS location, weather etc. Each step and action in the investigation process should be properly documented. It is highly recommended that

Investigating Officers (IOs) should adopt the practice of writing daily case diaries as prescribed under Section 172 CrPC and submit it to next supervisory officer on daily basis.

- Requisite seizure/arrest memo should be prepared on the spot.
- Wherever possible, two independent witnesses should be associated in search, seizures and arrests.
- Survey the entire area. In case of suspected infighting of animals, look for trails of other injured animals also.
- At least an area of about 500 meters encircling the Scene of Crime (SoC) may be searched thoroughly for evidence. In many cases it is seen that the animal moves some distance after it is hit by the bullet or it consumed poison. It is also common that the poachers remove the carcass to a nearby place for the sake of convenience in de - skinning the animal.
- Rivers, lakes or other water bodies near by the SoC may also be inspected for collection of evidence as the poachers wash their body or the tools/weapons used in de-skinning the animal in the nearby rivers or water bodies. In some cases it is also noticed that the poachers enter the Tiger Reserve walking along the river banks.
- Record foot prints of animals/human/tyre marks of vehicles if any by using plaster of Paris.
- Search & collect all possible evidences carefully in original conditions, while preserving (if needed)
- Search for evidences at ground level, eye level and above eye level (eg. hideout/machan/bullet marks on trees/freshly cut branches/traces of kindled fire on the floor/burnt matchsticks etc.). Samples to be collected from the spot may include: blood, body-fluids, tissues, hair/fur/teeth/bone pieces etc., gun powder, cloth fibre, paint chips, soil, cartridge case, bullets, foot prints, tyre marks, gutka wrapper, match sticks, food items, water sample from waterhole etc.
- Tools recovered from the spot should be appropriately secured for finger prints, stains etc.
- At times clothes worn by the accused are to be seized for analysis of blood stains, fluids etc. Nail cuttings may be taken if skinning is suspected.
- Use transparent polythene bags for collecting these samples. The different articles should not be put in one bag. Each article needs to be put in one bag, separately.
- Specimen seal to be sent to the expert, Court and the third copy to be put in official file for records.
- Properly label and seal the samples collected. Assign each sample with exhibit number and brief description. Search the leads/trails/routes of escape/exit. Use sniffer dogs for leads (if available).
- Record external evidence from carcass: wounds, bullet injury/marks, symptoms of poisoning etc., apart from body measurement (if possible). Injuries on the carcass should be properly measured and described / explained.
- Go for Post Mortem (PM) if team available or otherwise keep the carcass in deep fridge. The PM has to be conducted during the day light.
- While doing PM – collect sample of visceral content and tissue. Send visceral sample for forensic analysis to a reputed laboratory; send the tissue sample to the Wildlife Institute of India (WII) or a recognized institute within the country having domain expertise for DNA profiling and histo-pathological tests.
- Finalize the PM report, and send the same to the Chief Wildlife Warden (CWLW) under intimation to the National Tiger Conservation Authority (NTCA). In case the PM report is under process, send a preliminary report to the Authority indicated immediately
- Dispose of the body as per rules in the presence of the competent authority In case of seizures of body parts, the same may be required as evidence for prosecution in the courts of law and

hence in such situations do not dispose the same till the orders of the concerned court for disposal of the same are received.

- Issue a departmental preliminary offence report (POR)/FIR etc.
- Prepare a seizure memo and arrest memo with signature of accused (if present), witnesses etc. alongwith a site map, and a species identification certificate issued by a forest officer, not below the rank of an Assistant Conservator of Forests who would certify that he has identified the species on the basis of his training and experience in identifying the species in the field

(ii) If suspect(s) is arrested:

- Collect name, address, biometric details, photographs, height, weight etc. of suspect(s). During the search/ arrest/ interrogation, special care should be taken to seize/ get details of telephone nos. especially mobile phones, diaries including numbers scribbled on a piece of paper etc. These are crucial in tracing linkages. Persons arrested must be informed of the full particulars of the offence committed and the grounds for arrest. (Sec.50 Cr. P.C. & Art 22 (1) - Constitution of India)
- Prepare an arrest memo with ground/basis for arrest, citing reasons/basis for arrest
- Record statements of suspects(s) and/or witness(s) alongwith signatures under Section 50(8) of WPA. Ideally the statement should be recorded by ACF and above authorized by the State Govt. in this behalf (which is the requirement of WPA)
- The nominated person by the accused needs to be informed about the arrest and place where the accused has been lodged as per Section 50A of Cr. P.C and Supreme Court's order in *Joginder Singh's* case intimate
- Get conducted medical examination of arrested suspect(s) and produce before the Magistrate having jurisdiction within 24 hrs. or where forward and backward linkages are to be discovered move an application for remand. Always contact your Public Prosecutor in the local Court before hand in case you are trying to move such application so that the staff succeeds in getting the remand.
- In the case of a female offender, the medical examination has to be conducted only by a female registered medical practitioner.
- Take proper care of health and safety of accused during which he is in your remand. If the accused falls ill in depts. custody, he must be given medical aid or treatment admitted for in a hospital
- Based on interrogations and leads, thoroughly investigate the matter, establish backward and forward links, arrest other links involved based on statement given by the accused and information given by accused.
- The arrested person has a right to consult and be defended by a legal practitioner of his choice (Article 22 (1) of the Constitution of India).
- If the arrested person is poor, he can get free Legal Assistance from the Legal Services Authority (Art 39 A Constitution of India).
- Arrest should not be made on mere suspicion (145 Cr. P.C).
- The arrested person is entitled for compensation for groundless arrest / illegal detention.
- Though the statement given by the accused under Psycho - analysis test has little evidentiary value but in case of hardened criminals who don't cooperate in investigation, such tests may be recommended.
- Prepare a final report, Complaint as per Section 55 of WPA and file in the court of law

- Submit a final report with conclusion regarding cause of death to the Chief Wildlife Warden under intimation to the National Tiger Conservation Authority through the Field Director/Wildlife Warden/Conservator/Chief Conservator of Forests having jurisdiction
- A format of 'Arrest cum Personal Search Memo' is at **Annexure - 1.**

(iii) Actions required at the Office of Field Director/Wildlife Warden/Conservator/Chief Conservator of Forests having jurisdiction/Control Room

- Send a preliminary intimation to NTCA, Chief Wildlife Warden and Regional Deputy Director (RDD) of WCCB about the incident (SMS/ e-mail/telephonic call/fax etc.) immediately
- Constitute a Post Mortem team as per the NTCA protocol
- Send an investigation team/issue office order appointing the Investigating Officer (IO)
- Analyze the past and present intelligence reports for possible leads, cell phone records of history sheeters/suspects, check with neighbouring districts/divisions/States
- Deploy vehicular checking on barriers, inform local Police and issue red alert for checking vehicles at all exit points
- Check the photographs of carcass and compare with the National Repository of Camera Trap Photographs of Tigers (NRCTPT) in NTCA or the Phase-IV camera trap monitoring database or other research database to establish the identity/source area
- Issue an official version of the incident through the Chief Wildlife Warden
- Send the biometric details of suspect(s) to the NTCA for alerting other Field Directors/States/Wildlife Crime Control Bureau, and for establishing possible linkage with other crimes elsewhere
- Closely monitor/supervise the investigation, liaise with Police Department, Tiger Cell of the State (if available), Wildlife Crime Control Bureau and other investigation agencies
- Prepare a ***'Final Report'*** and submit to the Chief Wildlife Warden under intimation to the NTCA. Since all tiger deaths are treated as 'Poaching Cases' by the NTCA unless proven otherwise, justification for categorizing a tiger death as 'Natural' should be provided alongwith evidences
- All cases of poaching / seizure should be dealt in the courts of law having jurisdiction
- Monitor the case ongoing in the court of law till its final disposal by the Court
- After the Court's order, analyze the case for corrective actions (if needed) for further appeal
- If the decision of the Court is satisfactory, close the case and report to the Chief Wildlife Warden under intimation to the NTCA

*****

ANNEXURE-A

IMPORTANT POINTS FOR PREPARING A COMPLAINT

- Check the complaint/ whether relevant sections of the Wildlife (Protection) Act, 1972 and other Acts have been invoked viz. Section 2, 9, 50 etc. of Wildlife (Protection) Act
- Statements under Section 50 (8) of the Wildlife (Protection) Act, 1972 of witnesses and confession statements of suspect(s), (besides relevant sections of other laws)
- Site plan of the crime scene. The map of the compartment can also be useful in this regard.
- Status of site of the said offence – protected area/tiger reserve/forest division/other area, alongwith a copy of Government notification (in case of tiger reserve/protected area/reserved forest/protected forest)
- Post Mortem report
- Expert identification report, from institutions like Wildlife Institute of India, Dehradun or Zoological Survey of India or reputed institution having domain expertise, regarding only portions/pieces/tissues, if seized
- Copy of the specimen seal affixed on the materials sealed
- CD of photographs/video recording done during investigation
- Copy of ownership papers of house/seized vehicle, identity proofs/cards etc.
- Copy of relevant section of the Wildlife (Protection) Act, 1972, and/or any other Act
- Annexure containing list of documents and witnesses
- Forensic report of visceral contents, ballistic report (if applicable)
- A format of Complaint is at **Annexure - 2**.
- A list of documents to be attached with the Complaint and guidelines for filing complaint u/s 55 of the Wildlife (Protection) Act 1972 are at **Annexure - 3**.

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ANNEXURE-B

NOTE ON ACTIONS NEEDED FOR ANTIPOACHING/TIGER PROTECTION

1) In-depth thorough investigation on **EACH CASE** with a final report (should not be left un-resolved/ open ended)
2) Investigation must examine forward/ backward linkages, trans border ramifications, cracking poacher-carrier-trader-consumer nexus/network
3) Close monitoring with the help of information technology/informer network on suspects/history sheeters
4) Examine Post Mortem (PM) and viscera reports
5) Intensive patrolling besides other antipoaching operations should be done in sensitive areas
6) Ensure multi-disciplinary approach and cooperation in case of investigation and intelligence sharing. Wildlife authorities should enter into MoU with IB/LIU for intelligence sharing, MoU with Paramilitary forces like BSF, CRPF, Assam Rifles, SSB etc. for joint patrolling in sensitive border areas, through the State Government and NTCA
7) Review of each case of mortality regularly at the highest appropriate level
8) Ensure review and coordination meeting with Judicial, Police and Revenue Officials on monthly basis
9) Each Tiger Reserve must have a highly trained team of officers/ Rangers for investigations of tiger related crime with all modern & scientific tools of forensic science. The State Forest Department, through the National Tiger Conservation Authority should organize training of such selected elite 'Investigating Teams', if required
10) After complete investigation, proper prosecution of cases in the appropriate courts of law should be ensured through regular monitoring of pending cases at the highest authority at the appropriate level
11) Prepare State/Reserve level of database/history sheet/dossier of each convicted criminals and suspects, while apprising the NTCA periodically. Personal Profiles (PPs) of all accused should be prepared. In case of habitual offenders History Sheets (HSs) may be prepared for surveillance. Copies of PPs and HSs may be sent to NTCA/WCCB as well for circulation and surveillance. A format of Personal Profile is at **Annexure - 4**
12) A separate note on the modus - operandi adopted by the criminals in each tiger poaching case may be recorded and circulated to NTCA/WCCB etc., which could be used in crime prevention strategy and also in the sensitization/ training courses for enforcement agencies.
13) Ensure that each Tiger Reserve has a Security Plan in place as per the guidelines issued by the NTCA
14) Ensure appropriate resources to deal with poaching threats and investigation
15) Since tiger is a highly endangered species falling in Schedule-I of the Wildlife (Protection) Act, 1972, weekly monitoring of tiger offence cases ongoing in courts of law should be done for expediting the same by the Field Director/Wildlife Warden/Conservator/Chief Conservator of Forests having jurisdiction
16) The Chief Wildlife Warden of the State should also review the progress of each tiger case ongoing in various courts of law every fortnight. The Principal Chief Conservator of Forests (HOFF) of the State should also review the same on a monthly basis, while apprising the NTCA

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ANNEXURE - 1

ARREST CUM PERSONAL SEARCH MEMO

(U/S 50 (3) of the Wild Life Protection Act, 1972)

1	Name of Office	
2	Case number, date and Sections of law	
3	Name, parentage and age of the accused arrested	
4	Present and permanent address of the arrested accused	
5	Identification marks of the arrested accused	
6	Reasons for arrest and whether without warrant or with warrant	
7	Place, date and time of arrest	
8	Documents/articles which found on the person of the accused	
9	Name and address of the independent witness who was present at the time of arrest	
10	Name and designation of the officer who effected the arrest	
11	Name of the relative/friend as declared by the arrestee who has been informed of his arrest	
12	Name of the local Police Station where the arrested person is to be kept in custody or other venue of custody of the accused	
13	Any other particulars including injuries on the person of the arrestee if any	
14	Signature of the arrested accused	
15	Signatures of independent witnesses.	

7

16	Name, designation and signature of the officer who effected the arrest	

ANNEURE - 2

COMPLAINT IN A WILDLIFE OFFENCE

(U/s 55 of Wildlife (Protection) Act 1972 r/w Sec 200 Cr.P.C)

1	Name of the Office	
2	Offence Report number and date	
3	Place, date and time of offence	
4	Sections of law	
5	Details of property seized	
6	Whose custody the seized properties are lying, if submitted in the court Property Index number	
7	Live specimens if any seized and subsequently rehabilitated in its natural habitat as per the court order	
8	Details of perishable or hazardous materials seized and subsequently destroyed as per the court order	
9	Details of fire arms, if any, seized and handed over to the Police for investigation and the Police FIR number	
10	Whether samples were sent for examination to Wildlife Institute of India, Zoological Survey of India, Botanical Survey of India or any other scientific experts for opinion? If so, details of the opinion received	
11	Name, designation and office address of the officer who filed	

	the Offence Report	
12	Name, designation and office address of the officer filing the complaint	
13	Name and address of the accused against whom the complaint is filed	
(i)	Accused in custody	
(ii)	Accused on bail	
(iii)	Accused not arrested/ absconding	
(iv)	Accused who are habitual/ repeated offenders, details of previous cases	
13	Name and address of the witnesses and facts to be proved by the evidence of each witness	
14	List of documents, if any, submitted along with the complaint	
15	Nature of offences and facts of the case/allegation made against each accused	

Name & designation of the complainant
with office seal

To
The Chief Judicial Magistrate/JMFC
(Address)

ANNEURE - 3

DOCUMENTS TO BE ATTACHED WITH THE COMPLAINT

1. Forwarding/Covering letter addressed to the concerned magistrate praying for taking complaints u/s 55 of WL(P)Act,1972, r/w Section 200 of Indian Criminal Code 1973.
2. Sequential order of incidence preferably in chronological order along with the violation of relevant sections and section 51 under which sentence of the accused is prayed upon.
3. POR/FIR if any along with the information sent to the court
4. List of accused.
5. List of witness.
6. Site memo
7. Arrest memo
8. Medical report
9. Intimation to relatives
10. Seizure Memo
11. Statement of accused
12. Statement of Witness (u/s 50(8) of WLPA
13. Gazette Notification of R.F/NP/Sanctuary
14. PM Report/Expert Opinion
15. Wildlife Census Report (if any)
16. Appointment letter of I.O.
17. Posting order of staff.
18. Log book of vehicle (if used)

19. Any other relevant document having bearing on the incidence.

Guidelines for filing complaint u/s 55 of Wildlife (Protection) Act 1972:

The officer filing the complaint should ensure that he is authorized to file the complaint as envisaged under section 55 of Wildlife (Protection) Act 1972.

If the accused is in judicial custody, the complaint is to be filed within 60 days from the date of arrest of the accused. In case of more than one accused, the 60 days period starts from the date of arrest of the first accused.

The complaint should preferably be typed, or neatly written without any over writings, alterations etc.

Full details of all the accused and the role played by them individually, offences committed by each of them with relevant sections of the Act are to be narrated in the complaint. Present status of the accused like on bail, in judicial custody, absconding etc is also to be mentioned in the complaint. In the case of accused in judicial custody, name of the jail in which they are lodged is to be mentioned. In case of absconding accused, efforts taken by the Investigating Officer to apprehend them including action under Section 82 & 83 CrPC, are also to be narrated in the complaint.

The complaint should be specific and without any ambiguity. Facts not supported by evidence should not be mentioned in the complaint. Similarly, accused against which sufficient evidence is not there should not be named in the complaint. Facts and circumstances connected to the case should be narrated in simple language, sequentially. List of witnesses, documents and material objects should be submitted along with the complaint. The authorized officer who files the complaint should sign all the pages of the complaint and annexures if any.

Statements of all the witnesses, including the official witnesses, recorded u/s 50(8) of Wildlife (Protection) Act as per the list of witnesses, confessional statements of the accused and statements recorded by the Magistrate u/s 164 Cr.PC if any should be filed along with the complaint.

All documents in original or certified copy, as per the list of documents enclosed, should be submitted along with the complaint. A comprehensive list of documents which are to be compulsorily submitted along with the complaint is given below.

Annexure - 4

PERSONAL PROFILE

1. Name, aliases and Father's name:

PHOTO
with date

2. Address:

3. Personal Description:

Date of Birth / age:	Hair:
Place of Birth:	Eyes:
Height:	Sex:
Weight:	Complexion:
Build :	Language:

Citizenship:

Scars/ Identification Marks: ---

Remarks: ---

4. Important personal information:

   a. Telephone/ mobile No(s). :

   b. E – Mail Address:

   c. Passport No. :

   d. Bank Account No(s). :

   e. Aadhar Card No. :

   f. Voter Id Card No.:

   g. Ration Card No.:

   h. Finger print records:

5. Current/ previous occupation(s) and list of properties owned:

6. Associates / relatives/ family members and their occupation:

7. Crime history and brief facts of the wildlife case(s) against him:

8. Crime Modus Operandi:

9. Areas of his current activities/ places of usual movements:

10. Previous Acquittals / Convictions:

11. If declared absconder, details:

12. Any other remarks:

(SOP prepared with inputs from WCCB, Mr Saurabh Sharma, Legal Expert, Field Officers of Tiger Reserves)

PROTOCOL FOR TIGER RE-INTRODUCTION
NATIONAL TIGER CONSERVATION AUTHORITY
(Adapted from the IUCN Guidelines for Re-introductions)

Capture and Translocation of tigers could be undertaken to address the following two Goals:

Re-introduction means an attempt to establish a tiger population in an area which was once part of its historical range, but from which it has been extirpated or become extinct.

Re-inforcement/Supplementation: addition of tigers to an existing population to enhance its long-term viability.

AIMS AND OBJECTIVES OF RE-INTRODUCTION

a. Aims:

The principle aim of any re-introduction should be to establish a viable, free-ranging population in the wild, of tigers which has become locally extinct in the wild. It should be re-introduced within the tigers' former natural habitat and range and should require minimal long-term management.

b. Objectives:

The objectives of a re-introduction may include: to enhance the long-term survival of wild tigers in a manner that they could potentially perform their ecological and evolutionary role.

At no times should tiger translocations be viewed as an alternatives to, or compromise on habitat connectivity's for sustaining and promoting natural dispersal between populations.

TEAM CONSTITUTION

The Team will consist of representatives from Wildlife Institute of India, State Forest Departments, Qualified Veterinarian and a Qualified Wildlife Biologist. The Team leader would be responsible for coordination between the various bodies and provision should be made for publicity and public education about the project. The provisions of the Wildlife Protection Act shall be adhered to at all times. The proposal, progress, and activities of the translocation exercises should be transparent and communicated through appropriate forum and media so as to gain public support.

The National Tiger Conservation Authority (NTCA) will keep an oversight on the translocation process and may also depute a representative as and when considered necessary.

PRE-PROJECT ACTIVITIES

BIOLOGICAL

Feasibility study and background research

- An assessment should be made of the taxonomic status of tigers to be re-introduced. They should preferably be of the same evolutionary significant unit as those which were extirpated, unless adequate numbers are not available. Potential source/founder populations should be identified, assessed and prioritized based on a) genetic and geographical closeness to the proposed reintroduction population, b) Impact of removals on the host/founder population (assessed by a PVA if necessary). Preference should be given to tigers obtained from wild stock for reintroduction. If appropriate wild stock is not available then captive stock should be considered. An investigation of historical information about the loss and fate of individuals from the re-introduction area, as well as molecular genetic studies, may be undertaken in case of doubt as to individuals' taxonomic status.
- In the absence of genetic data tigers from the nearest population that likely had habitat connectivity in the historical past with the area where reintroduction is to be made should be the preferred founder population.
- A Population and Habitat Viability Analysis will aid in identifying significant environmental and population variables and assessing their potential interactions, which would guide long-term population management and reintroduction. Population and management plans for the long term (>25 years) should be prepared on the basis of the above analysis. It should be clear from the onset of the reintroduction program that some reintroduced populations will require continuous management and/or supplementation for long term viability. Commitments from the concerned authority and funding support for this sustained effort are a prerequisite for reintroduction.

Choice of release site and type

- Site should be within the historic range of tigers. For an initial reinforcement there should be few remnant wild individuals. For a re-introduction, there should be no remnant population to prevent disease spread, social disruption and introduction of alien genes. In some circumstances, a re-introduction or re-inforcement may have to be made into an area which is fenced or otherwise delimited, but it should be within the species' former natural habitat and range.
- The re-introduction area should have assured long-term protection (whether formal or otherwise).

Evaluation of re-introduction site

- Availability of suitable habitat: re-introductions should only take place where the habitat and landscape requirements of tigers are satisfied, and likely

to be sustained for the for-seeable future. The possibility of natural habitat change since extirpation must be considered. Likewise, a change in the legal/ political or cultural environment since species extirpation needs to be ascertained and evaluated as a possible constraint. The area should have sufficient carrying capacity to sustain growth of the re-introduced population and support a viable (self-sustaining) population in the long run.

- Identification and elimination, or reduction to a sufficient level, of previous causes of decline: could include disease; over-hunting; poisoning; competition with or predation by introduced species; commercial poaching, habitat loss; and adverse effects of earlier management programmes;,. Where the release site has undergone substantial degradation caused by human activity, a habitat restoration programme and/or programmes to resettle humans should be initiated before the re-introduction is carried out.

Suitability of release stock of Tigers

- It is desirable that source tigers come from wild populations. If there is a choice of wild populations to supply founder stock for translocation, the source population should ideally be closely related genetically to the original native stock and show similar ecological characteristics to the original population.
- Removal of individuals for re-introduction must not endanger the wild source population. Stock must be guaranteed available on a regular and predictable basis, meeting specifications of the project protocol.
- Individuals should only be removed from a wild population after the effects of translocation on the donor population have been assessed, and after it is guaranteed that these effects will not be negative.
- To minimize impact on the founder / host population, preferably tigresses between the age of 2-3 years (Sub-adults) who have become independent of their mother but are yet to establish their own territories should be targeted. This cohort also has the highest reproductive potential and therefore ideal for starting a new population. Male tigers become sexually mature at the age of 2 years but rarely can they breed till 4 years of age in the wild. This age group (2-3 years) is ideal for translocation for reintroduction as their removal from the host population will not result in male turnovers and subsequent infanticide episodes. All effort should be made not to translocate established breeding individuals from the host population. Potential individual tigers that are to be translocated should be monitored prior to their capture to ascertain their social status, health, and behavior.

Release of captive tigers

- Tigers rely heavily on individual experience and learning as juveniles for their survival; they should be given the opportunity to acquire the necessary information to enable survival in the wild, through training in their captive environment; a captive bred individual's probability of survival should approximate that of a wild counterpart.
- Care should be taken to ensure that potentially dangerous captive bred

tigers that might be a danger to local inhabitants and/or their livestock are not released. All tigers should be equipped with radio collars and monitored intensively. If the newly released tiger shows behavior that is likely to cause problems for the local people, it should be removed immediately.

SOCIO-ECONOMIC REQUIREMENTS

- Re-introductions are generally long-term projects that require the commitment of long-term financial and political support.
- Socio-economic studies should be made to assess impacts, costs and benefits of the re-introduction programme to local human populations.
- A thorough assessment of attitudes of local people to the proposed project is necessary to ensure long term protection of the re-introduced population, especially if the cause of species' decline was due to human factors (e.g. over-hunting, over-collection, loss or alteration of habitat). The programme should be fully understood, accepted and supported by local communities.
- Where the security of the re-introduced population is at risk from human activities, measures should be taken to minimise these in the re-introduction area. If these measures are inadequate, the re-introduction should be abandoned or alternative release areas sought.
- If tigers pose potential risk to life or property, these risks should be minimised and adequate provision made for compensation where necessary; where all other solutions fail, removal of the released individual should be considered.

PLANNING, PREPARATION AND RELEASE STAGES

- Construction of a multidisciplinary team with access to expert technical advice for all phases of the programme.
- Identification of short- and long-term success indicators and prediction of programme duration, in context of agreed aims and objectives as per the PVA and population management plan.
- Securing adequate funding for all programme phases.
- Design of pre- and post- release monitoring programme so that each re-introduction is a carefully designed experiment, with the capability to test methodology with scientifically collected data. Monitoring the health of individuals, as well as the survival, is important; intervention may be necessary if the situation proves unforseeably unfavourable.
- If release stock is wild-caught, care must be taken to ensure that: a) the tigers are free from infectious or contagious pathogens and parasites before translocation and b) the stock will not be exposed to vectors of disease agents which may be present at the release site (and absent at the source site) and to which it may have no acquired immunity.
- If vaccination prior to release, against local endemic or epidemic diseases of wild stock or domestic livestock at the release site, is deemed appropriate, this must be carried out during the "Preparation Stage" so as to allow sufficient time for the development of the required immunity.
- Appropriate veterinary measures as required to ensure health of released

stock throughout the programme. This is to include adequate quarantine arrangements, especially where founder stock travels far or crosses international boundaries to the release site.

- Development of transport plans for delivery of stock to the site of re-introduction, with special emphasis on ways to minimize stress on the individuals during transport.
- Determination of release strategy (acclimatization of release stock to release area; behavioural training - including hunting and feeding; group composition, number, release patterns and techniques; timing). Preferably “Soft release” should be the norm.
- Development of conservation education for long-term support; professional training of individuals involved in the long-term programme; public relations through the mass media and in local community; involvement where possible of local people in the programme.

POST-RELEASE ACTIVITIES

- Post release monitoring is required of all tigers. This most vital aspect may be by direct (e.g. telemetry/Satellite tracking) methods as suitable.
- Demographic, ecological and behavioural studies of released stock must be undertaken.
- Study of processes of long-term adaptation by individuals and the population.
- Collection and investigation of mortalities.
- Interventions (e.g. supplemental feeding; veterinary aid) when necessary.
- Decisions for revision, rescheduling, or discontinuation of programme where necessary.
- Habitat protection or restoration to continue where necessary.
- Continuing public relations activities, including education and mass media coverage. Evaluation of cost-effectiveness and success of re- introduction techniques. Regular publications in scientific and popular literature.

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TRIPARTITE MEMORANDUM OF UNDERSTANDING
BETWEEN
THE MINISTRY OF ENVIRONMENT AND FORESTS
(NATIONAL TIGER CONSERVATION AUTHORITY)
BIKANER HOUSE, SHAHJAHAN ROAD, NEW DELHI
GOVERNMENT OF …….., AND FIELD DIRECTOR ……. TIGER RESERVE

The Government of India has revamped its Tiger Conservation Programme through the setting of the National Tiger Conservation Authority. The urgency in saving the tiger, India's national animal enjoins on the Centre, State and Tiger Reserve Management onerous responsibilities, effective discharge of which is essential. This tripartite memorandum seeks to lay our respective responsibilities and reciprocal commitments linked to fund flows to ensure effective tiger conservation in the country.

This tripartite Memorandum of Understanding made this ……day of ……between the Ministry of Environment and Forests, acting through the National Tiger Conservation Authority, Annexe No. 5, Bikaner House, Shahjahan Road, New Delhi-110011 (hereinafter referred to as the 'NTCA') of the First Part, the State Government of _____, acting through (designation and office address) (hereinafter referred to as the State Government), of the Second Part, and the Field Director of ……. Tiger Reserve (hereinafter referred to as the Field Director), of the Third Part.

Whereas the State Government has submitted a proposal to the Ministry of Environment and Forests, through the Field Director, seeking financial assistance for protection and development of …….tiger reserve, hereinafter referred to as the "____".

And whereas the Ministry of Environment and Forests is ready and willing to extend financial support for the approved items of the said work, on the terms and conditions given below for the year 2009-2010 and thereafter.

NOW, THEREFORE, IT IS HEREBY AGREED between the Parties as follows:

ARTICLE I

Obligations of the Ministry of Environment and Forests (through the NTCA)

The Ministry of Environment and Forests has agreed and affirmed that:-

(1) Funding support under Project Tiger shall be made available to the Tiger Reserve in two phases, on receipt of the Annual Plan of Operation with cost estimates of proposed field initiatives, based on tiger reserve specific "Tiger Conservation Plan".
(2) The first installment of the funding support under Project Tiger would be done by four weeks after receipt of the Annual Plan of Operation from respective State Governments, subject to the availability of funds and directives of the Ministry of Finance.
(3) The second installment of the funding support under Project Tiger would be released by two weeks after receipt of Utilisation Certificate pertaining to previous year from the States alongwith 60% Utilisation Report of funding support released as first installment during the current financial year, and the Progress Report in the desired

format from the Field Director, duly recommended by the Chief Wildlife Warden of the State.

(4) Technical guidance in the form of advisory would be provided to the Field Director under intimation to the State Government in the Tiger Reserve, within the ambit of the provisions contained in the Wildlife (Protection) Act, 1972, with regard to conservation of tigers and their habitat.

(5) An ecological auditing on the impact of investment made in the reserve shall be carried out as per prescribed criteria.

ARTICLE II

Obligations of the Government of …….

The State Government has agreed and affirmed that:-

(1) The Tiger Conservation Plan, as required under section 38V of the Wildlife (Protection) Act, 1972, as amended in 2006, shall be prepared for the Tiger Reserve for which the funding support is being sought from …….., as per the prescribed guidelines within 6 months from ……..

(2) The core or critical tiger habitat and the buffer or peripheral area shall be delineated and notified as required under the Wildlife (Protection) Act, 1972, as amended in 2006 within 6 months from ……..

(3) The staff vacancies shall be filled up by ……..for ensuring effective implementation and field protection, after fixing area norms vis-à-vis the topography within 6 months from ……..

(4) The money released under Project Tiger shall be made available to the tiger reserve within 2 weeks of its receipt in the State for implementing tiger conservation initiatives, as proposed in the Annual Plan of Operations, with due compliance of the normative guidelines and advisories of the said Authority.

(5) The State Government shall post a motivated officer with proven track record, preferably trained in wildlife management, as the Field Director of the Tiger Reserve, with a minimum tenure of three years (extendable if the situation warrants).

(6) The State Government shall constitute a Steering Committee as required under section 38U of the Wildlife (Protection) Act, 1972, as amended in 2006, under the Chairmanship of the Chief Minister, for ensuring coordination, monitoring, protection and conservation of tiger, co-predators and prey animals, within one year from ……

(7) The State Government shall establish a reserve-specific Tiger Conservation Foundation, as autonomous “profit centres” for the Tiger Reserve to facilitate and support its management for tiger conservation and ecodevelopment, by involving local people, as per the guidelines issued, empowered to receive tourism gate collections, assistance from Government and other funds from Government and planning authority, to create a “development fund”, and deploy it for the benefit of the reserve, local people and the staff within 6 months from …….

(8) The State Government shall promote action for local intelligence gathering and protection of the tiger reserve, and this “Security Plan” should form part of the Tiger Conservation Plan, with provisions for periodic “Security Audit”.

(9) The State Government shall ensure capacity building of the frontline staff for effective enforcement, apart from staff development and staff welfare measures, based on a capacity building plan made part of the Tiger Conservation Plan.

(10) The State Government shall regulate tourism as per carrying capacity computed for the reserve and develop forest and wildlife tourism policy for the State within one year from ……..

(11) The State Government shall avail the enhanced relocation package for relocating the villages in the core / critical tiger habitats as per the revised guidelines of the Project Tiger and statutory provisions, in a time bound manner.

(12) The State Government shall take steps for restoring the identified corridor linkages with the Tiger Reserve by mainstreaming tiger conservation in the landscape amongst the various production sectors, with the active involvement of territorial forest divisions, and revenue authorities, having scope for handholding by credible agencies outside the Government system.

(13) The State Government shall ensure ecologically compatible land uses in areas linking one tiger reserve with the other, while ensuring that forestry operations of regular forest divisions and those adjoining tiger reserves are not incompatible with the needs of tiger conservation.

(14) The State Government shall certify that no ecologically unsustainable land use such as mining, industry and similar projects operate within the Tiger Reserve.

(15) The State Government would ensure that the day-to-day tiger monitoring protocol is ensured in the Tiger Reserve as per advisories issued by the National Tiger Conservation Authority (Project Tiger), for facilitating forecasting of untoward happenings.

(16) The State Government shall ensure active management of the buffer zone of the Tiger Reserve with central assistance for eliciting public support through mainstreaming of wildlife concerns, to benefit local people and wild animals, apart from addressing man-wildlife animal interface.

(17) The State shall place in the public domain the Tiger Conservation Plan of the reserve and details of execution within 6 months from …….., in their official website ……., apart from making available the same in local language to promote public vigil.

(18) The money released by the National Tiger Conservation Authority shall be made available to tiger reserves for taking up the works proposed in the Annual Plan of Operations (APO) immediately, with due compliance of the normative guidelines and advisories of the said Authority.

(19) The Director/Officer Incharge of the Tiger Reserve shall be empowered to spend the money provided by the National Tiger Conservation Authority for immediate execution of the schemes, as per the norms and procedures prescribed by NTCA and the State Government.

(20) The State Government will ensure that the Accounts of the grants released by NTCA are audited by Statutory Audit of the State Government on annual basis and a certificate to this effect will be sent to NTCA annually latest by 31st May each year.

ARTICLE III

Obligations of the Field Director ……Tiger Reserve

The Field Director …… Tiger Reserve has agreed and affirmed that:-

(1) A Security Plan would be drawn up for the Reserve, considering its strength weakness opportunity and threat which would form part of the Tiger Conservation Plan, to ensure intelligence based enforcement for protection of tiger, other wild animals and the habitat.

(2) The day-to-day monitoring protocols for tiger and other wild animals would be duly followed, as prescribed by the National Tiger Conservation Authority, to ensure forecasting of untoward happenings in the habitat.

(3) The Tiger Conservation Plan would be prepared within a time frame of six months, as per the guidelines issued by the NTCA with prescriptions for the core, buffer and adjoining areas.

(4) A staff development plan should be prepared and submitted to the State Government for ensuring frontline field staff in the right age group with the capacity to perform field work in the Reserve.

(5) Initiatives for mainstreaming tiger conservation in the buffer and outer landscapes should be taken up through sectoral integration of different district level schemes, to provide livelihood options to the fringe dwellers for reducing their dependency on the Tiger Reserve, with reciprocal commitments from beneficiaries to protect the tiger.

(6) Timely redresssal of man-wild animal conflicts would be ensured to prevent revenge killings of tiger and other wild animals.

(7) A Tiger Conservation Foundation will be set up for the Reserve as a receptacle for gate receipts and other receipts from the State / Central Governments to undertake local actions.

(8) The Annual Plan of Operation for funding support from NTCA shall have reference to the Tiger Conservation Plan.

(9) The cost estimates worked out by the Field Director should be based on approved schedule of rates of the State Government.

(10) The APO must indicate the location / area of proposed initiative / initiatives on a map, along with physical target, financial target and unit rate, with the basis of estimation.

(11) The progress report should invariably indicate the physical achievement (viz., quantity, number, area indicating location) and the objectives fulfilled on implementation of proposed activities.

(12) A year-wise photo catalogue of physical targets shall be maintained to facilitate verification during supervisory visits.

(13) During execution, details of estimate, man-days involved etc. shall be displayed near the work site.

(14) Utilisation Certificate showing unspent balance, if any, shall be furnished to National Tiger Conservation Authority annually after the close of the financial year so that the same is reached in this office by 31st May of each year. Complete Utilisation Certificate shall be submitted immediately on completion of the work.

(15) The accounts of the grants released by National Tiger Conservation Authority shall be maintained properly as per audit requirement and shall be open to inspection by the NTCA/Audit. A copy of these accounts shall also be released to NTCA. In case of construction / habitat improvement works, photocopies of the measurement books (for the work which was executed from NTCA's grant) shall also be sent to NTCA. Details of unspent amount, if any, shall be intimated to the Authority for adjustment as unspent balance or revalidation.

(16) The funds will be used only for the purpose of which it was sanctioned. Diversion of funds will not be allowed without the prior approval of NTCA.

(17) The records of all assets acquired out of the grant released herewith by the NTCA, shall be made available for scrutiny of audit. Such assets shall not be, without the prior approval of Govt. of India / National Tiger Conservation Authority be disposed off, encumbered or utilized for the purpose other than those for which the grant is sanctioned.

(18) A statement showing the extracts of the assets created out of the grants released by NTCA shall be furnished to NTCA annually by 31st May of each year.

(19) The Tiger Reserve Management should consult the Gram Sabha while deploying the local work force, as Members of the Sabha would be conversant with the geographical and other related information about the area.

(20) 1. The Compensation for cattle lifting, crop depredation, injury and death of humans should be decided in consultation with the Zilla Parishad (ZP).

2. The Tiger Reserve Management should coordinate with the concerned Gram Panchayat (GP) while implementing crop protection safeguards and other initiatives relating to man-wild animal conflicts

(21) The Tiger Reserve Management should consult with Panchayati Raj Institutions for providing ecologically viable livelihood options to reduce villagers' dependence on forests. The Gram Sabha should be involved in restoring forest cover in the buffer areas in order to provide a supplementary habitat to animals moving out of core areas.

(22) Zilla Parishad should be involved in monitoring the payment and utilization of the compensation package whether under option-I or option-II.

(23) In case of option II, relocation/rehabilitation from the protected area/tiger reserve by the Forest Department should be done in consultation with the Gram Sabha.

(24) Zilla Parishad Chairperson should be a member of the District level Implementing Committee for ensuring convergence with other sectors.

(25) Implementation and monitoring of district level schemes in the relocated village should be done through Gram Panchayat/Gram Sabha.

(26) Gram Panchayat/Gram Sabha should be involved in identifying labour oriented works relating to the relocation process, ensuring that the relocated villagers get adequate remuneration for their labour.

(27) In case of re-settlement on forest land, the new settlement should be eligible to access forest resources based on their traditional forest rights as certified by the Gram Sabha.

(28) Recommendations of Gram Panchayat/Gram Sabha should be taken while deciding the site for fair price shops, schools, health centre etc. close to the relocated village.

(29) Gram Panchayat/Gram Sabha should be consulted in the identification of services, activities and personnel involved in ecotourism.

(30) The Local Traditional Village Councils or the Gram Sabha under the PESA Ac, 1996, as the case may be, should be consulted on the rehabilitation/welfare package to ensure that such tribal people are provided with livelihood options as well as health care, education and housing facilities, vis-à-vis the statutory provisions contained in the Wild Life (Protection) Act, 1972 as amended in 2006.

ARTICLE IV

(Site-specific action)

Some tiger reserves may warrant special interventions owing to their unique geographical and other attributes.

Examples:

1. Proactive steps for intelligence based enforcement/antipoaching operations in border reserves and sensitive areas.
2. Proactive steps for preventing mortality of wild animals in Kaziranga.
3. Proactive steps for fire prone habitats.
4. Proactive steps for drought prone habitats.
5. Innovative steps for areas affected by insurgency and related problems.

6. Innovative steps for addressing issues like tigers straying out frequently in human settlements in habitats like Sundarbans.

ARTICLE V

Consequences of non-observance of the terms of the MOU

(In case of non-observance of the terms of MOU by the State Government and the Field Director)

1. Stoppage of funding support under Project Tiger.
2. Release of second installment would not be made in case the Utilisation Certificate relating to the first release is not received in the NTCA.
3. Non adherence / observance to MOU may lead to stoppage of incentives which may be provided to the officials and staff of the Tiger Reserve.
4. Non observance of the MOU leading to loss of tiger and its habitat and violation of statutory provisions of the NTCA may lead to penal action on the Field Director through the State Government.

IN WITNESS WHEREOF, the representatives of the Parties to this Memorandum of Understanding being duly authorized have signed this Memorandum of Understanding as of the day, month and year first above written.

Signed for and on behalf of National Tiger Conservation Authority	**Signed for and on behalf of Government of**	**Field Director……..…… Tiger Reserve**
Name & Designation (With Stamp) Dated:	**Name & Designation (With Stamp) Dated:**	**Name & Designation (With Stamp) Dated:**