



Ministry of Environment, Forest
and Climate Change
Government of India

State of Conservation Report
Manas Wildlife Sanctuary, India (N 338)

**RESPONSE TO THE WORLD
HERITAGE COMMITTEE DECISION
41 COM 7B.28**

Submitted by
State Party: India
to
UNESCO World Heritage Centre, Paris

November, 2018

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EXECUTIVE SUMMARY

State Party	India
State, Province or Region	Assam, Bodoland Territorial Areas District (Baksa)
Name of Property	Manas Wildlife Sanctuary
Criteria under which property nominated	<p>Criterion-vii: <i>To contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance;</i></p> <p>Criterion-ix: <i>to be outstanding examples representing significant on-going ecological and biological processes in the evolution and development;</i></p> <p>Criterion-x: <i>To contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation.</i></p>
Response to the Committee Decision 41 COM 7B.28	<p>The World Heritage Committee vide its decision no 41 COM 7B. 28 in 2017 has sought a few clarifications from the State Party with regards to the annual update on the OUVs of the Property that was taken out of the World Heritage in Danger List in 2011.</p> <p>The Executive Summary of the detailed response is as mentioned below-</p> <ol style="list-style-type: none"> 1) The Property is getting funds from Govt. of India under CSS-Project Tiger, CSS-Biosphere reserve, CSS-Project Elephant. The Park authority is also getting fund from Bodoland Territorial Council, Assam Project on Forest and Biodiversity Conservation Society (APFBC), Compensatory Afforestation Fund Management & Planning Authority (CAMPA), CORPUS Fund etc. The Manas Tiger Conservation Foundation also received about Rs.81Lakhs during 2017-18 which is used for the management of the Park. 2) The poaching of Rhinos in Manas National Park is currently under control with the intensification of patrolling, better relationship with fringe villagers followed by enhanced intelligence network. Since April, 2016, no rhino has been poached in Manas. The Rhino population has now increased to 36. During 2017 and 2018 (upto October) 6 rhino calves were born in Manas. 3) Manas Tiger Reserve was assessed with "Good" rating in Management Effectiveness Evaluation in 2018. 4) The Park authority, in collaboration with experts, started an initiative on Grassland Management. A Standard Operating Protocol (SOP) has also been prepared in this regard. 5) The Park Authority has camera trapped "Asiatic Brush Tailed

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	<p>Porcupine" for the first time in Manas during 2018</p> <p>6) The law and order situation in the region has improved to a great extent. Regular patrolling is also carried out by Government Para-Military forces besides their assigned duties. They also help Park authorities, as and when requested.</p> <p>7) Regarding recommendation of WHC on submission of revised proposal (41 COM 8B.36) for extension of the property, Park authority would like to state that, there are some encroachment outside the present property under Panbari Range. These encroachers have claimed for rights under the Scheduled Tribe and other Traditional Forest Dwellers (Recognition of Forest Rights) Acts, 2006 and their claims are under scrutiny at appropriate forum. Once the matter is resolved, revised proposal will be prepared as per recommendation of the WHC and will be submitted to the Committee</p> <p>8) Transboundary cooperation with Royal Manas National Park (which is on the tentative World Heritage Site list) has been intensified. Synchronized patrolling has been conducted along the Indo-Bhutan Border for the first time in 2018.</p>
	<p>9) Efforts have been initiated to include Manas Biosphere Reserve in the World Network of Biosphere Reserve (WNBR). For this purpose, G. B. Pant National Institute of Himalayan Environment and Sustainable Development, Kosi-Katarmal, Almora, has been assigned the responsibility to prepare the dossier.</p> <p>10) A proposal has been approved by the government for translocation of five female Wild buffalo to Chhattisgarh and in exchange, forty spotted deer will be translocated (wild to wild) from Chhattisgarh to Panbari Range of Manas for restocking the existing population.</p> <p>In conclusion, the property has complied with almost all recommendations made by the World Heritage Committee and the State Party has been able to maintain the OUVs of the property.</p>
Name and contact information of official local institution/agency	<p>Organization: Assam Forest Department</p> <p>Address: Field Director, Manas Tiger Project, Barpeta Road. Assam. India 781315</p> <p>Tel : +91-3666-261413(O)</p> <p>Res : +91-3666-260251</p> <p>Mobile: +91-9435111172</p> <p>Email : fd.manastp@gmail.com</p>

1. BACKGROUND

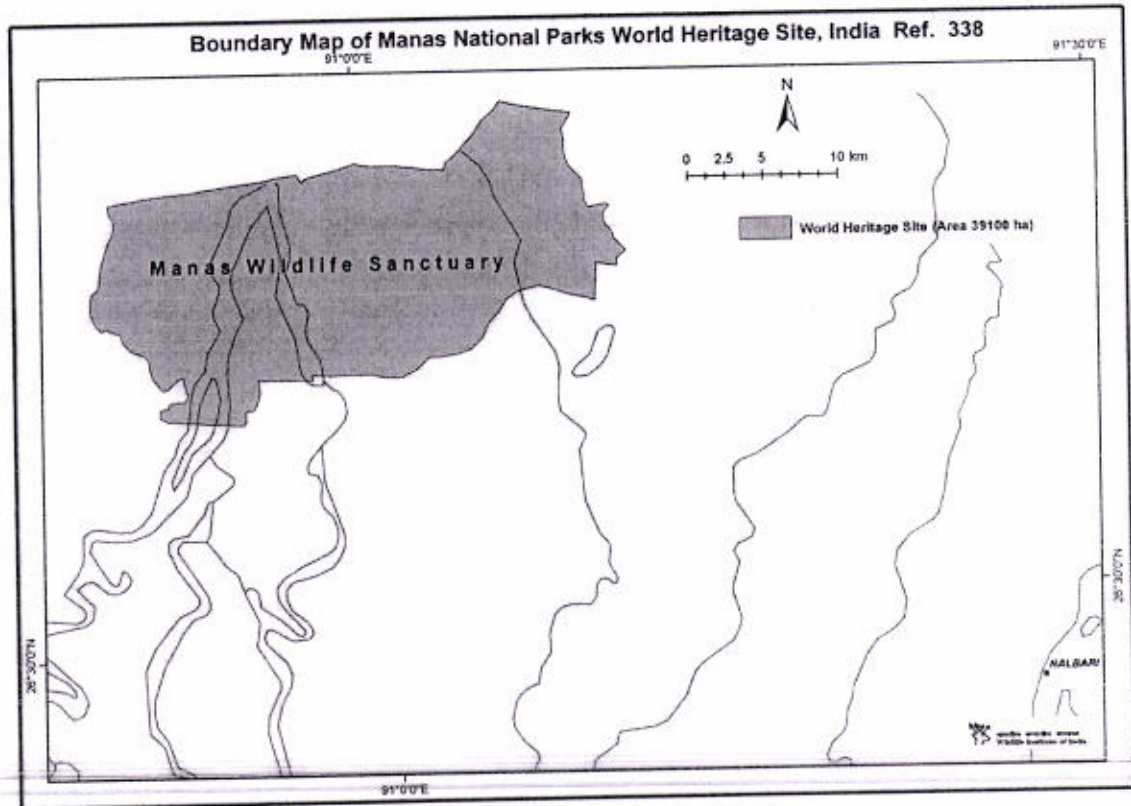
The Manas Wildlife Sanctuary was inscribed in 1985 in the World Heritage List (UNESCO), a site of outstanding universal value under 'Natural' criteria (ii), (iii) and (iv), currently criteria (ix), (vii) and (x). The World Heritage Property provides critical and viable habitat for more rare and endangered species than any of the protected areas in the Indian sub-continent, including 21 species listed in the IUCN Red Data book.

In 1992, the UNESCO-IUCN reviewed the status of the site and declared the property to be a World Heritage Site "in Danger" owing to damage to the property's infrastructure, wildlife and its habitat during the Bodo agitation since 1988. However, in June 2011, the World Heritage Centre (WHC) decided to remove the danger tag and restore the original World Heritage Site status on the property taking account of the recovery of its OUV following comprehensive efforts made by the State Party.

Manas WHS currently extends to an area of 391 Km², which also forms the core of the Protected Landscape (**Map 1**). The landscape also has six national and international designations such as National Park, Tiger Reserve (core), Biosphere Reserve, Elephant Reserve and Important Bird Area.

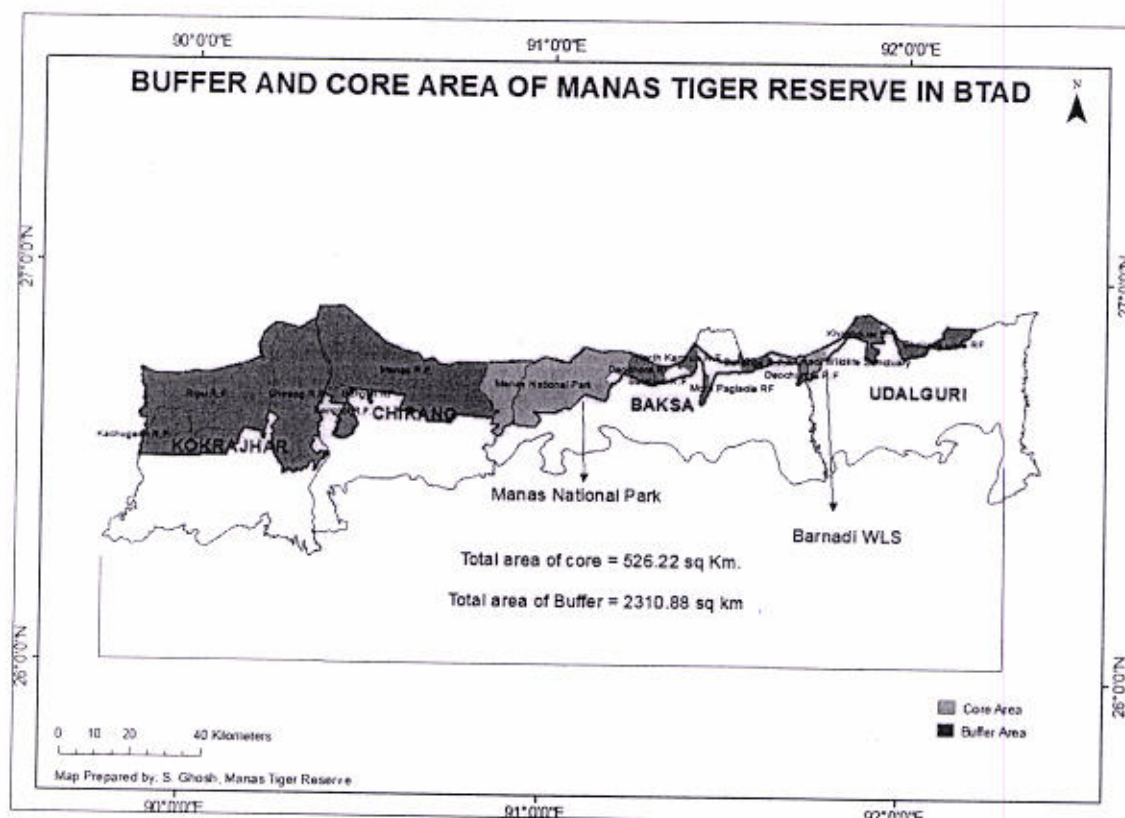
Map 1: Boundary map of Manas World Heritage Site, India

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Map2: Location map of Manas World Heritage Site as the core of Manas Tiger Reserve in Assam, India



The World Heritage Committee vide Decision 41 COM 7B.28 adopted at its Session held in 2017 requested the State Party to submit to the World Heritage Centre, by **1 December 2018**, an updated report on the state of conservation of the property and the implementation of the above, for examination by the World Heritage Committee at its 43rd session in 2019. In this context, response of the State Party of India is provided below:

2. **PARA-3: NOTES WITH APPRECIATION THE SUCCESSFUL REDUCTION OF POACHING AT THE PROPERTY IN RECENT YEARS, BUT CONSIDERS THAT POACHING REMAINS A SIGNIFICANT THREAT TO THE PROPERTY, WHICH REQUIRES CONTINUED HIGH PRIORITY ATTENTION;**

The Park authority would like to state that, since filing last report to WHC by 1st December, 2016, no Rhino has been killed in Manas by poaching. However, under Panbari Range, which is outside the property, one Tiger was killed in the month of July, 2017 but all the poachers were arrested immediately and Tiger skin with all bones and arms used for conducting the crime was recovered and sent to the appropriate court for trial.

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Since then, no poaching incident has taken place. The Park authority has formed number of Eco Development Committees (EDCs) and are providing livelihood support to needy people through the EDCs. Due to regular interactions with these EDCs, the relationship with fringe villagers have improved considerably and as a result the villagers are supporting the management in conservation and protection. Further, intensification of patrolling with support of internationally acclaimed NGO like PANTHERA has also helped to curb/ check poaching.

The incidences of grazing of cattle within Bansbari Range area have been reduced with the cooperation of local fringe villagers and this has resulted in the improvement of habitat of herbivores.

Besides above, frequent awareness programme conducted with support of NGOs have also helped in raising the awareness level.

All these factors have contributed a lot in controlling poaching inside Manas National Park.

Government of India has been undertaking Management Effectiveness Evaluation (MEE) to evaluate the performance of protected areas in Indian since 2006. The protected areas are assessed in terms of their design/planning, adequacy/appropriateness and delivery and graded in poor/fair/good/very good ratings. Manas Tiger Reserve has been subject to evaluation four times, in 2006, 2010, 2014 and 2018. Manas continues with "Good" rating and has increased its scores from 60.48% in 2014 to 71.09% in 2018.

3. **PARA-4: WELCOMES THE STATE PARTY'S EFFORTS TO BOOST STAFF MORALE AND ADDRESS SHORTAGES IN FRONT-LINE STAFF BY ENGAGING ARMED HOME GUARDS, CASUAL LABOURERS AND SERVICE PROVIDERS, AND ENCOURAGES THE STATE PARTY TO PROVIDE THEM WITH SPECIALIZED TRAINING, IN AN EFFORT TO FILL VACANT POSITIONS IN THE LONG TERM;**

The Park authority has taken up number of steps to boost the morale of staff. Some of these are:

- I. Exposure visits for staff and EDC members have been arranged with the fund sanctioned under various Central Sector Schemes. During 2017 and 2018, some staff and EDC were sent to Buxa Tiger Reserve, Kanha Tiger Reserve, Panna Tiger reserve to study good practices. Further, staff and EDC members

have been sent to Ranthambore and Sariska Tiger Reserves for same purpose. It is worth mentioning that some of the frontline staff have never travelled outside the home state; therefore, these visits have helped in boosting their morale.

- II. The Park authority has started the system of rewarding frontline staff in recognition of their services, which also helped in boosting the morale of staff.
- III. With the support of an NGO Aaranyak, the park authority has recently conducted an exercise to study the Psychological Profile of frontline staff by engaging experts. This has provided valuable information to the Park authority on their human resource.
- IV. The Park Authority has started initiative to publish one quarterly Newsletter solely for the frontline staff. It will contain articles written in English, Assamese and Bodo language for the benefit of camp staff. The Camp staff are encouraged to contribute by way of writing articles based on their experience in whatever languages they like. Besides it will also be used to update knowledge of the staff on conservation.
- V. A number of new patrolling roads have been constructed within the Park to increase the mobility of the staff. Departmental elephants are deployed on rotation basis under different camps for better patrolling/coverage of areas.
- VI. The UNESCO Category 2 Centre for World Natural Heritage Management and Training for Asia and the Pacific Region at Wildlife Institute of India, Dehradun conducted a training programme on "Monitoring of Outstanding Universal Values of Natural World Heritage Sites in India" in Manas National Park, Assam on 16-17 February, 2018. The overall objective was to build capacity and sensitize frontline forest staff and other stakeholders of World Heritage Sites with the best OUV monitoring techniques such as wildlife monitoring, use of GIS application and socio-economic tools to assess and manage the OUV of the natural World Heritage Sites. The staff were provided orientation to World Heritage and OUV, briefed on the WHS monitoring and reporting requirements and a special session was held on M-STripes (Monitoring System for Tigers), an app-based monitoring system introduced in several protected areas of India. The sessions had both lecture mode and field demonstration. An OUV assessment exercise was undertaken with the participants which sought to assess the current status of the condition of the site. 40 frontline staff of Manas World Heritage Site participated in the on-site training and provided a positive outlook for the site. A SWOT analysis was also undertaken with the staff which gave an overview of the challenges and prospects of conservation and management of Manas World Heritage Site.

4. **PARA-5: TAKES NOTE OF THE REPORT THAT AN EVICTION OPERATION WAS CARRIED OUT PEACEFULLY IN THE BHUYANPARA RANGE AND ALSO WELCOMES THE ACTIVITIES UNDERTAKEN BY THE STATE PARTY, INCLUDING IN THE FRAMEWORK OF THE JOINT IUCN-KFW (GERMAN DEVELOPMENT BANK) FUNDED LIVELIHOODS SUPPORT PROGRAMME, IN AN EFFORT TO REDUCE DEPENDENCY ON THE PROPERTY'S RESOURCES, ENSURE THE PARTICIPATION OF WOMEN, AND SEEK LONG-TERM SOLUTIONS TO ENCROACHMENT;**

The Park Authority requests the WHC to refer to the report regarding encroachment in Manas submitted by Wildlife Institute of India vide letter no. WII/C2C/MANAS/19/2015 dtd, 24th August, 2018 (**Annexure-1**). It is true that some areas have been re-encroached for growing paddy due to lack of insufficient staff deployed in the area. As per Tiger Conservation Plan of Manas Tiger Project, it was proposed to deploy a company of 135 Eco- Task Force (Territorial Army) in the area for domination/habitat improvement in the area. Principal Chief Conservator of Forest (Wildlife), Government of Assam has been requested again for deployment of the said company which will help in effectively dealing with the encroachment.

Under the joint IUCN-KFW (German Development Bank) funded livelihood support programme, the Park Authority has enhanced women's participation in management. Core value and norms of the scheme follows in the livelihood interventions defined as 'conservation livelihood' is based on following principles -

- Activity of livelihood intervention designed through participatory consultation processes with the community and incorporating their views, needs and choices following the framework of access restriction under Indian legal provision in the case of Protected Area;
- Incorporating livelihood activities which have parity with local ecological settings and cultural systems;
- Focus on empowering the people on alternative livelihood based on assets available with them and making an effort to change the outlook of the people about conservation.

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Table – 1. Criteria of selection of beneficiaries*	
I	Women headed marginalised HH
II	Land less HH
III	Agricultural landless HH
IV	Marginal farmer (less than 2 bigha of land)
V	HH solely depend on wage earning

*All these categories of HH having dependency on Park to collect NTFP for Self-use as well as sale to earn cash money

Women have been given adequate priority while selecting the beneficiaries.

Table – 2. Coverage of women in the project as beneficiary			
Range	Women headed HH	Individual women provided with alternative livelihood	Individual women involved in group for alternative livelihood activities
Eastern range (Bhuyanpara)	37	683	114
Central range (Bansbari)	29	103	10
Western range (Panbari)	52	123	30

The implementing agency has given more focus in Bhuyanpara range to reduce the pressure on the park where the human pressure was maximum till few years back. Due to the successful implementation, the pressure has been gradually reduced to a great extent.

Forty one awareness camps were conducted in last two years to sensitize women on different livelihood options under this programme as below:

Table – 1. A. Awareness camp on alternative livelihood		
Range	Village cluster	No of awareness camp*
Bhuyanpara Range (Eastern)	Bhuyanpara	16
	Kokilabari	05
Bansbari Range (Central)	Kahitema	09
	Bansbari	03
Panbari Range (Western)	Panbari	08

Women who were earning on average Rs. 250.00 per week two years before are now able to earn on average Rs. 2500.00 per week. Women are also engaged in their new activities and hence don't get time to visit the park as earlier.

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5. PARA-6: REGRETS THAT NO FURTHER INFORMATION WAS PROVIDED ON THE USE OF FIRE IN GRASSLAND MANAGEMENT AND ITS POTENTIAL ROLE AGAINST THE PROLIFERATION OF INVASIVE SPECIES SUCH AS BOMBAX CEIBA, AND REITERATES ITS REQUEST TO THE STATE PARTY TO UNDERTAKE OR COMMISSION A DETAILED STUDY ON THIS MATTER, IN ORDER TO ENSURE THAT THE USE OF FIRE DOES NOT FURTHER COMPLICATE THE LONG-STANDING THREAT OF INVASIVE SPECIES IN THE PROPERTY;

Manas National Park (MNP) consists of diverse vegetation formations that range from tall grassland with no trees to moist deciduous forest with a dense canopy and no grass species. It is also one of the last remaining large habitats in the Eastern Terai, which has the full complement of plant species, and small and large mammal both herbivores and carnivores. Sparse woodlands with a prominent grass layers and pure grasslands of different types are however the more common feature. The Terai Ecosystem is maintained by periodic flooding, fire, grazing by herbivores and without these perturbations mechanisms the vegetation would be dominated by low-land deciduous or semi-evergreen forest (Das et al, 2018).

From the management perspective the tall, wet grasslands - which are the main habitat of number of endangered species such as the greater one-horned Rhinoceros, Tiger, Eastern Barasingha, Water Buffalo, Pygmy Hogs, Hispid Hare and Bengal Florican, had degraded gradually owing to number of drivers including uncontrolled burning, spread of alien invasive plant species, natural succession (invasion of woody species like *Bombax ceiba* & *Dillenia pentagyna*) coupled with anthropogenic pressures. At present, management of habitat consists largely of using fire or chopping of saplings from grassland areas, to the extent that their manpower, funds, and logistics would permit. In fact, the Park Management is very much concerned about the lack of a scientific basis for the use of fire, and inability of frontline staff to understand the constant invasion of grasslands by pioneer woody plant species.

Considering the situation, the Manas National Park Field Director's Office requested concerned Non-governmental Organizations along with experts to devise a framework for scientific, sustainable habitat management protocol. Thus, the first Workshop on Habitat management was held on November, 2017. The main aim of the workshop was to develop both short term and long-term plan for the management of grasslands of the Manas National Park. In this workshop different ideas and interventions for habitat management were discussed. In the same workshop hands on experience of habitat management technique was demonstrated to the front-line staff by the experts. These workshops eventually lead

to a forum of NGOs and experts under the aegis of Park Director for habitat management initiatives. It was also decided to entrust 4 main grassland assemblages for monitoring purposes to four different NGOs.

The second workshop was held in the month of February, 2018. In this workshop, concept of the habitat management restoration and protection, different invasive species identification and interventions required to restrict the growth, monitoring mechanisms were discussed. It also decided that a proper fire regime would be strictly followed in order to avoid the risk of accidental fire in dry season. The prescribed fire regime is from end of January to end of February, so that no harm causes to grassland obligated species like Pygmy Hog, Hog Deer, Bengal Florican etc.

The monitoring mechanisms have common protocol for all the sites along with a data-sharing mechanism. The park management will be continuing this process along with necessary follow ups.

The park management in association with conservation NGO, Aaranyak, has been implementing a project on "Monitoring and Control of Invasive Plant Species in the Grassland Ecosystem of Manas National Park" during 2014-18. The grassland in the park is facing serious threats from the invasion of the two invasive plant species, *Chromolaena odorata* and *Mikania micrantha*. These are perennial plants and have luxuriant growth, which are replacing the native grass species at an alarming rate. This study was first of its kind in the landscape and established baseline information on the spread of two major invasives of the park. About 20% of the grasslands are severely affected by these invasive species. One of the primary drivers of spread of invasive is clearings or opening (e.g. - road, walkways), livestock grazing and other anthropogenic disturbances. It was found that *Imperata cylindrica* grass patches were amongst the most affected areas. To control the spread of invasive alien plants (IAPs), experimental plots with different three treatments- uprooting, cutting and cutting and burning of IAPs were set up in the grasslands of Manas. The manual uprooting of IAPs was identified as the best method of controlling these invasives. Efforts are also being made to promote the use of these invasive species for augmenting livelihoods of the local community. In this context, it was tested and found that dye property of *Chromolaena* leaves have good quality. Training programmes on dyeing of yarns and cloths for women from fringe villages of Manas National Park have also been conducted.

The formation of a platform through a consortium of conservation NGOs for habitat management for Manas landscape is an innovative approach from a management

perspective in protected areas management in this part of the world. This forum will not only be helpful to Manas, but it can also act as role model for habitat restoration across Terai Ecosystem.

Copy of the minutes of the workshop held from November, 14th to 16th (2017) is enclosed as **Annexure -2**.

Copy of the Agenda of the second workshop held in February, 1st and 2nd (2018) is enclosed herewith as **Annexure-3**.

Based on the deliberations, an Standard Operating Protocol (SOP) was prepared which is enclosed as **Annexure-4**.

6. **PARA 7: ALSO REGRETS THAT THE STATE PARTY OF BHUTAN HAS STILL NOT PROVIDED TO THE WORLD HERITAGE CENTRE A COPY OF THE ENVIRONMENTAL IMPACT ASSESSMENT (EIA) FOR THE MANGDECHHU HYDRO ELECTRIC PROJECT; ALSO REITERATES ITS REQUEST TO THE STATE PARTY OF BHUTAN TO PROVIDE A COPY OF THIS EIA AS WELL AS THE INFORMATION ABOUT THE STATUS OF THE PROJECT, IN ACCORDANCE WITH PARAGRAPH 172 OF THE OPERATIONAL GUIDELINES; AND URGES THE STATE PARTY OF BHUTAN TO CONSULT WITH THE STATE PARTY OF INDIA REGARDING AN ASSESSMENT OF POTENTIAL IMPACTS OF THIS PROJECT ON THE OUTSTANDING UNIVERSAL VALUE (OUV) OF THE PROPERTY**

This para pertains to the State Party of Bhutan.

7. **ADDITIONAL INFORMATION: WILDLIFE MONITORING**

I. **All India Tiger Estimation**

Phase-I data collection as part of the country-wide tiger monitoring protocols (Jhala *et al.* 2017) was carried out in Manas National Park during November-December, 2017 under the aegis of National Tiger Conservation Authority (NTCA), Government of India. Under this exercise, carnivore sign surveys of 5 km minimum length were walked to record signs of tiger, co-predators and mega herbivores present in the park. Along with this, line transects were walked to estimate density of tiger and its co-predator's prey. Habitat plots for vegetation and human disturbance status were recorded along the line transect at every 400 meters. The data has been entered in MSTripES

(Monitoring System for Tigers) desktop software for further processing at the Wildlife Institute of India.

Camera trapping through mark recapture method was carried out from January to March 2018 following the Phase-III protocols (Jhala *et al.* 2017) of the all-India tiger monitoring by the park management with technical support from NGOs Aaranyak and WWF-India. Under this exercise camera trap units were set up for population estimation of tiger, co-predators and prey across the National Park. This data is currently under processing at the Wildlife Institute of India.

Reference: Y. V. Jhala, Q. Qureshi, and R. Gopal, 2017. Field Guide: Monitoring tigers, co-predators, prey and their habitats. Fourth ed. Technical Publication of National Tiger Conservation Authority, New Delhi and the Wildlife Institute of India, Dehradun. TR-2017/012.

II. Ecology of Clouded Leopard

A research project titled, "Ecology of Clouded Leopard (*neofelis nebulosa*) in an East Himalayan Biodiversity Hotspot" is currently ongoing in Manas National Park during 2016-2019 by scientists of the Wildlife Institute of India in association with the Field Directorate, Manas Tiger Project. The project objectives are to: (i) estimate the abundance of clouded leopard and other carnivore species within selected areas of Manas National Park; (ii) determine prey choice and foraging habits of clouded leopard in the reserve; (iii) assess temporal activity and space use of clouded leopard and other sympatric carnivores.

Preliminary information regarding clouded leopard presence, habitat use and conflict related information was gathered through questionnaire survey with the forest staff of the NP. Camera trapping of the 500 sq. km of the core area of the NP was initiated to develop a baseline data for further continuous monitoring. Photographic results revealed presence of 16 carnivore and 14 other species in the core area of Manas National Park including clouded leopard (*Neofelis nebulosa*), tiger (*Panthera tigris*), leopard (*Panthera pardus*), wild dog (*Cuon alpinus*), elephant (*Elephas maximus*), gaur (*Bos gaurus*), wild water buffalo (*Bubalus arnee*), hog deer (*Axis porcinus*), sambar, common palm civet (*Paradoxurus hermaphroditus*), crab-eating mongoose (*Herpestes urva*), Indian crested porcupine among others.

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In the coming years, intensive fieldwork will be done to collect multi-season data. Density estimation and activity patterns of clouded leopards and sympatric carnivores will be calculated.

III. Rapid Survey of Hispid Hare

A rapid survey of Hispid Hare was carried out by the park management in association with the UNESCO Category 2 Centre for World Natural Heritage Management and Training for Asia and the Pacific Region, Wildlife Institute of India from 19-22 February, 2018. Hispid Hare belongs to the monotypic genera *Caprolagus* of family Leporidae distributed along with Bhabhar-Teraï region of Nepal, India and southern Bhutan. It is categorised as 'Endangered' under the IUCN Red List and is also listed under Schedule I of the Indian Wildlife (Protection) Act, 1972.

The survey was carried out in the grasslands of Bansbari and Bhuyanpara Range of Manas WHS. Since the species is elusive and hard to detect on field, the team relied on the sign survey method and search for the pellets with the help of forest officials. The survey was carried out in 10 sites as follows: Kanchanbari, Kuribeel, Mofou, Bangalehathdhowa, Katajhar, Digjari, Sewali, Thangwamara, Panda camp and Dhonbeel in the two ranges of the park. In each of these sites, 4-5 km length trail was surveyed on foot and elephant-ride in the places with high grass density to locate the presence of Hispid Hare pellet.

A total of 194 pellet groups (pellet groups <50: 36%; 50-100: 21%; 100-200: 22%; >200: 20%) were recorded from the present survey. Furthermore, 21% of the encountered pellets were fresh and 68% were classified as old and rest was partly deteriorated. Among the surveyed sites Kanchanbari, Bangalehathdhowa, Dhonbeel, Kuribeel and Mofu camp sites comprised more number of pellet groups compared to other sites. On 19 February, 2018, a Hispid Hare was sighted in the grassland of Kuribeel. It was evident from the observations that the occurrence of Hispid Hare pellet was mostly confined to the areas with less disturbance (in terms of extent of grassland grazing and invasive species) and high in overall cover and grass density. Long-term monitoring of hispid hare in conjunction with scientific grassland habitat management process is required for its conservation.

Recent projects completed/ ongoing and publications

Bhatt, U.M., Habib, B., Sarma, H.K. and LYNDOH, S., 2018. Catch me if you can: Species interactions and moon illumination effect on mammals of tropical semi-evergreen forest of Manas National Park, Assam, India. *bioRxiv*, <https://doi.org/10.1101/449918>.

Bhatt, U.M., Habib, B. and Lyngdoh, S., 2018. Chital: Photographic evidence of Axis axis after two decades in Manas National Park, Assam, India. *ZOO'S PRINT*, 33(8), pp.5-8.

Lahkar, D., Ahmed, M.F., Begum, R.H., Das, S.K., Lahkar, B.P., Sarma, H.K. and Harihar, A., 2018. Camera-trapping survey to assess diversity, distribution and photographic capture rate of terrestrial mammals in the aftermath of the ethnopolitical conflict in Manas National Park, Assam, India. *Journal of Threatened Taxa*, 10(8), pp.12008-12017.

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Glimpses of Habitat Management Workshop in Manas National Park, Assam



Photo:1-Habitat workshop team field visit



Photo:2- Habitat workshop team field visit



Photo:3- Habitat workshop team field visit



Photo:4- Interaction with representatives of various organisations during habitat workshop.

Glimpses of Women's participation under IUCN-KFW (German Development Bank)
funded livelihood support programme



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Annexure-1

Decision : 41 COM 7B.28

Manas Wildlife Sanctuary (India) (N 338)

The World Heritage Committee,

1. Having examined Document WHC/17/41.COM/7B,
2. Recalling Decision 39 COM 7B.11, adopted at its 39th session (Bonn, 2015),
3. Notes with appreciation the successful reduction of poaching at the property in recent years, but considers that poaching remains a significant threat to the property, which requires continued high priority attention;
4. Welcomes the State Party's efforts to boost staff morale and address shortages in front-line staff by engaging Armed Home Guards, casual labourers and service providers, and encourages the State Party to provide them with specialized training, in an effort to fill vacant positions in the long term;
5. Takes note of the report that an eviction operation was carried out peacefully in the Bhuyanpara Range and also welcomes the activities undertaken by the State Party, including in the framework of the joint IUCN-KfW (German Development Bank) funded livelihoods support programme, in an effort to reduce dependency on the property's resources, ensure the participation of women, and seek long-term solutions to encroachment;
6. Regrets that no further information was provided on the use of fire in grassland management and its potential role against the proliferation of invasive species such as *Bombax ceiba*, and reiterates its request to the State Party to undertake or commission a detailed study on this matter, in order to ensure that the use of fire does not further complicate the long-standing threat of invasive species in the property;
7. Also regrets that the State Party of Bhutan has still not provided to the World Heritage Centre a copy of the Environmental Impact Assessment (EIA) for the Mangdechhu Hydro Electric Project; also reiterates its request to the State Party of Bhutan to provide a copy of this EIA as well as the information about the status of the project, in accordance with Paragraph 172 of the *Operational Guidelines*; and urges the State Party of Bhutan to consult with the State Party of India regarding an assessment of potential impacts of this project on the Outstanding Universal Value (OUV) of the property;
8. Requests the State Party to submit to the World Heritage Centre, by **1 December 2018**, an updated report on the state of conservation of the property and the implementation of the above, for examination by the World Heritage Committee at its 43rd session in 2019.

Annexure-2

MINUTES OF THE HABITAT MANAGEMENT WORKSHOP AT BANSBARI

A three-days' workshop on habitat management was held at Bansbari from 14-16 November, 2017 with the aim and objective of developing an action plan for effectively managing the habitat of Manas National Park. The workshop witnessed active participation from various organisations viz. Aaranyak, ATREE, Ecosystem India, WTI, WWF-India besides the park directorate and frontline staffs. This is the first of its kind workshop in the region. During the workshop various issues like- why the habitat should be managed? Which species will be targeted/ benefitted from the management intervention? How do we decide upon the treatments to be subjected to different habitat types? etc. were discussed. Based on the experience sharing by the experts and subsequent field visits, following actions are planned to be implemented.


1. To develop a concise action plan on habitat management that can be implemented through the frontline staff. An in-charge will be selected among the staffs to undertake the activities mentioned in the plan in his area/blocks and will be responsible for reporting.
2. Each organisation already working in Manas is allocated with experimental block for undertaking habitat management activities. As such, **Aaranyak** is entrusted with three blocks- Rupahi, Kheroni and the existing experimental plots they have; **Ecosystem India** will be in charge of the Kuribeel block, **WTI** will be responsible for Rhino camp-Pohu field block and **WWF-India** will be responsible for Katajhar area. As of now, **ATREE** is yet to decide the block they will be in charge of. The forest department will be carrying out their activities in Mahout camp area. A grid map of (2 x 2) km will be prepared by **Aaranyak** and distributed among to the various organisations.
3. Signage(s) will be put to feature the Do's and Don'ts of each of the management technique type and must be adhered to.
4. The treatments in each block will be subjected to/will depend on the type of the vegetation (eg. - tall moist grassland, dry grassland etc).
5. Controlled burning to be adopted for managing the grasslands. No burning should be allowed either by the department staff or outsiders unless instructed. Each year, prior to burning an assessment will be done to identify the time, area and frequency of burning. The frontline staffs will be briefed every year on the burning method(s). Monitoring will be done both for pre and post burning.
6. Firelines are to be created prior to burning a block. The firelines can be - clearing of the existing roads, natural boundaries like stream, patrol paths or newly created line.
7. A study on soil characteristics may be undertaken to understand the underlying process. **WWF-India** may be able to take-up the study as suggested.
8. During 2017-18, burning will be preferably undertaken during the month of December and January and it should end by 15th February.
9. To control the spread of unwanted plants, manual uprooting is the preferred method. In case of big trees, debarking/girdling upto 1 m length is suggested prior to burning. No ploughing or harrowing should be done to control the unwanted plants.
10. Manual uprooting of the unwanted plants should be carried out for consecutive years, at least for five years.
11. To avoid the spread of invasive plants, tethering site(s) of captive elephants will not be used beyond 15 days and the previous tethering sites shall only be used after a gap of three months. This will be put into practice/discussion with the elephants.



12. The neighbouring tea garden manager(s) will be instructed not to introduce plant nitrogen fixing plants that can turn to be invasive to the habitat of Manas (e.g. - Mimosa spp).
13. A strip of 3-5 km, which will include the major grassland along the southern boundary will be the area of focus. Moreover, patrolling roads along the southern boundary should be strengthened and mobile units be developed to ensure better protection.
14. Cattle grazing and human disturbance should be minimised and stricter punishment should be given to the intruders. The number of cattle pounds should be increased along the boundary. EDCs should be involved in creating awareness among the local populace about the need for such measures.
15. Solar fencing along the boundary should be professionally installed and timely maintenance should be taken up by the different stakeholders like villagers, tourist lodges etc. A corpus funding can be created by taking a minimum amount from the people from the fringe areas for the maintenance of the fence.
16. A small working group is formed to follow-up the habitat management activities and the group will meet-up during the first week of December to finalise the action plan. Following the meet, an orientation workshop for habitat management for frontline staff of Manas Biosphere Reserve is also been suggested.
17. All the above-mentioned management techniques should be institutionalised and include in the management plan of the park. The budget should be ensured through the APO and other government funds.

List of Participants

01. Hiranya Kumar Sharma, FD, Manas Tiger Project
02. Abbas Ali Dewan, ACF, Manas Tiger Project
03. Babul Brahma, I/C, Bansbari Range, Manas TP
04. Pranab Kr Das, I/C Panbari Range, Manas TP
05. Kameswar Baro, I/C Bhuyanpara Range, Manas TP
06. Pintu Sarkar, Fr-I, Manas TP
07. Bibuti Prasad Lahkar, AARANYAK
08. Alolika Sinha, AARANYAK
09. Namita Brahma, Center for EESD, TISS, Guwahati
10. Dhritiman Das, ATREE
11. Brojo Kr Basumatary, ATREE
12. Riju Ramchiary, ATREE
13. Goutam Narayan, Ecosystems India
14. Parag J Deka, Ecosystems India
15. Samir kr Sinha, WTI
16. Bhaskar Choudhury, WTI
17. Afab Ahmed, WTI
18. Nazrul Islam, WTI
19. Anupam Sharma, WWF-India
20. Deba Kr Dutta, WWF- India
21. Sushanta Kr Borthakur, WWF-India
22. Beauty Narzary, WWF-India


 Joint Director, Manas Tiger Project
 Manas Biosphere Reserve

Annexure-3

Agenda for Training Workshop on Habitat Management, Survey Procedures and Monitoring Techniques at Manas National Park						
Sl. No.	Date	Time		Session Details	Person responsible	Remarks
		From	To			
1	01/02/18	8:30 AM	9:00 AM	Registration/ reception of participants	WWF-India, MEWS	
2	01/02/18	9:00 AM	9:30 AM	Breakfast	MEWS	
3	01/02/18	9:30 AM	10:00 AM	Welcome address	Field Director, Manas Tiger Project	
4	01/02/18	10:00 AM	11:00 AM	Introductory talk on the Habitat of Manas, Objective of the training their background and the basis, Methodology set as discussed on the previous meetings	Parag Deka, Pigmy Hog Conservation Centre	
5	01/02/18	11:00 AM	11:30 AM	Concept of the Habitat management restoration and protection, Different invasive species in different areas identification and interventions required to restrict the growth, various ideas of habitat management practices with emphasis on the ones applicable in areas of the Manas landscape,	Anupam Sarmah, WWF-India	
6	01/02/18	11:30 AM	11:45 AM	Tea Break	MEWS	
7	01/02/18	11:45 AM	1:00 P.M.	Practices and actions to be adopted for Habitat Management in Manas a detail procedure adopted for Habitat Management till date by Survey and Monitoring Processes. Proper demarcation and allocation of sites on the basis of various factors etc.	Alolika Sinha, Aaranyak, Dhritimaan Das, ATREE	
8	01/02/18	1:00 PM	1:45 PM	Interactive session (site selection, discussion on the different sites Standard Operating Procedures and plan for management and roles and responsibilities to be entrusted for the same)	All Resource Persons	(Map of the allocated sites to be shared by Alolika Sinha)
9	01/02/18	1:45 PM	2:30 PM	Lunch Break	MEWS	
10	01/02/18	2:30 PM	5:00 PM	Field visit and Practical Session	Team	
11	01/02/18	5:00 PM	5:30 PM	Tea Break	MEWS	


 Field Director, Manas Tiger Project
 Disputa Nanda/Asstt

SOP suggested by Habitat Management Forum to Control of Alien Invasive Plant Species in the Grassland of Manas

To control the spread of *Chromolaena odorata* in the grassland of Manas National Park, manual uprooting has been identified as the best method so far. But prior to uprooting the plants following information needs to be collected-

1. The area needs to be identified for the treatment and marked. Data on vegetation should be collected both pre and post treatment.
2. The experimental plots/block should be subjected to the treatment for a minimum of 3 years.
3. Plots of (10 X 10) m are to be laid in the (study) area to collect information on shrubs (*Chromolaena* as well as other shrubs); within this plot a quadrat of (1 x 1) m should be laid to collect information on grass species. (Please refer to the datasheet). The data collection should be done each year prior to treatment. This would help to understand monitor the grass regeneration.
4. Manual uprooting should preferably be done prior to flowering of the *chromolaena* plants.
5. After uprooting, the plants should be collected, dried and burned.
6. To yield better results, the experimental blocks may be fenced and protected from grazing.
7. In addition to these, a study on phenology of the plants and soil conditions needs to be studied.



Dr. Dristi Khatun, Joint Project Director
Bioscience Resource Project