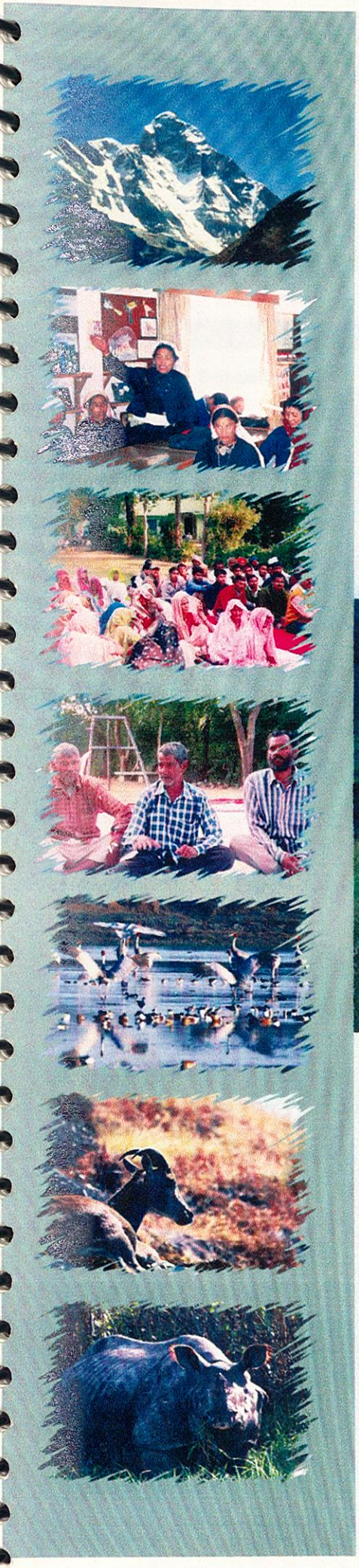

World Heritage Biodiversity Programme for India

Prepared by

भारतीय वन्यजीव संस्थान
Wildlife Institute of India

जहाँ है हरियाली ।
वहाँ है खुशहाली ॥

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Ashoka Trust for Research in Ecology and the Environment
www.atree.org

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List of Acronyms

4WD	4-Wheel Drive Vehicle
ATREE	Ashoka Trust for Research in Ecology and the Environment
ATREE-EH	Ashoka Trust for Research in Ecology and the Environment – Eastern Himalayas Program
BNHS	Bombay Natural History Society
BTC	Bodo Territorial Council
CBOs	Community Based organizations
CF	Conservator of Forests
DFO	District Forest Officer
EA	External Agency
EDCs	Eco-Development Committees
EH	Eastern Himalayas
FD	Forest Department
GBPIHED	G. B. Pant Institute of Himalayan Environment & Development
GEF	Global Environment Facility
GIS	Geographical Information Systems
HQ	Headquarters
ICDP	Integrated Conservation and Development Projects
ITBP	Indo-Tibetan Border Police
IUCN	The World Conservation Union
IWP Act	Indian Wildlife Protection Act
KAHC	Karbi-Anglong Autonomous Hill Council
KGNP	Keoladeo Ghana National Park
KNP	Kaziranga National Park
LPG	Liquid Petroleum Gas
MNP	Manas National Park
MoE&F	Ministry of Environment and Forests
MoUs	Memorandum of Understanding
MLA	Member of Legislative Assembly
MP	Member of Parliament
NDBR	Nanda Devi Biosphere Reserve
NDNP	Nanda Devi National Park
NGOs	Non-governmental Organizations
NIM	National Institute of Mountaineering
NP	National Park
NTFP	Non Timber Forest Produce
PA	Protected Area
PCC	Programme Coordination Committee
PRO	Public Relations officer
RS	Remote Sensing
TRAFFIC	Trade Records Analysis of Flora and Fauna in Commerce
UNDP	United Nations Development Project
UNESCO	United Nations Educational, Scientific & Cultural organizations
UNF	United Nations Foundation
WG	Western Ghats
WHB	World Heritage Biodiversity
WHBPI	World Heritage Biodiversity Programme for India
WHBTF	World Heritage Biodiversity Trust Fund
WHC	World Heritage Convention
WHS	World Heritage Sites
WII	Wildlife Institute of India
WLS	Wildlife Sanctuary
WWF-I	World Wide Fund for Nature-India
WTI	Wildlife Trust of India

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23 November, 2003

Executive Summary

India, one of the earliest signatories to the World Heritage Convention has five key Protected Areas currently on UNESCO's World Heritage List - Kaziranga and Manas in Assam, Keoladeo Ghana in Rajasthan, Sundarbans in West Bengal and Nanda Devi in Uttaranchal. All five sites satisfy the natural heritage criterion '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 and conservation' (iv) and hence are critical to the preservation of globally significant biodiversity.

A strong potential exists to build and to strengthen the constellation of India's World Heritage Biodiversity (WHB) sites in ways that are exemplary and beneficial for the larger network of PAs in India and abroad. The World Heritage Convention also offers a unique possibility in India to link nature and culture in innovative ways to promote conservation of species like the tiger and the elephant at a nation-wide scale. India presents the greatest challenge anywhere in the world for integrating conservation and development on a grand scale, and success here could have major implications for other parts of the developing world.

The WHB sites symbolize humanity's struggle to conserve the earth's precious biological heritage against its own onslaught of nature. Combined with other Protected Areas such as National Parks and Wildlife Sanctuaries, WHB sites represent the last stand of the nature and the best hope for humanity to conserve our most precious endowment. India represents a remarkable example of successful efforts to conserve significant amounts of biodiversity against all odds. Despite the presence of more than one billion people, India has managed to place 154,826 km^2 of its land area under its PA network. Considerable amount of biodiversity also occurs in habitats outside protected areas. Furthermore, protected areas in India are among the best-managed reserves in the developing world.

The WHB sites and other Protected Areas in India, however, remain highly vulnerable to degradation. As islands, these areas are surrounded by harsh biophysical landscapes and alienated local communities. The PA management is not fully equipped to deal with the growing threats to the parks. The staff is inadequately trained in the enforcement of laws protecting wildlife. In some cases such as Manas in the northeast, field staff is demoralized, having suffered setbacks due to insurgency and social turmoil in the area. Moreover, the field staff have neither access to good communications nor to facilities for health and education for themselves and their families and the basic infrastructure required for the effective management of the PAs are generally lacking.

At higher levels, the park management has been unable to incorporate concepts of conservation science and wildlife management in developing management plans. Since parks represent habitat islands surrounded by dissimilar habitats with high densities of human populations, changes inside the park due to intrinsic and extrinsic factors are inevitable. However, there is no significant effort to adopt a systems approach to anticipate and predict future changes. Continuous assessment and monitoring of biodiversity are almost non-existent.

The "island" status of the World Heritage sites also makes them highly vulnerable to anthropogenic pressures. Although these islands are connected to varying degrees with other natural habitats, there have been no comprehensive efforts to examine the feasibility of establishing habitat connectivity in areas containing the WBH sites. Since the areas surrounding sites are even more vulnerable to human pressures than the WBH sites, it is critical to examine the potential of connection among natural areas wherever these sites are located and to bring these areas under greater protection.

A more serious problem is the lack of local community involvement in conservation efforts. Local communities in many cases remain hostile to the idea that the parks cannot be used for their traditional purposes of grazing, fishing, or extraction of fuel wood and non-timber forest products. Wild animals from the parks also pose a danger to their livestock, crops and houses, thus exacerbating the conflict. Thus, local communities perceive conservation legislation as a threat to their livelihoods. Although there are economic benefits from conservation, such as ecotourism, such benefits generally do not accrue to local communities.

Protected areas also have a low profile. The civil society in general is not aware of the importance and in some cases even the existence of World Heritage sites. Although the protected areas have a tremendous educational potential, educational institutions hardly ever use world heritage sites for educational purposes.

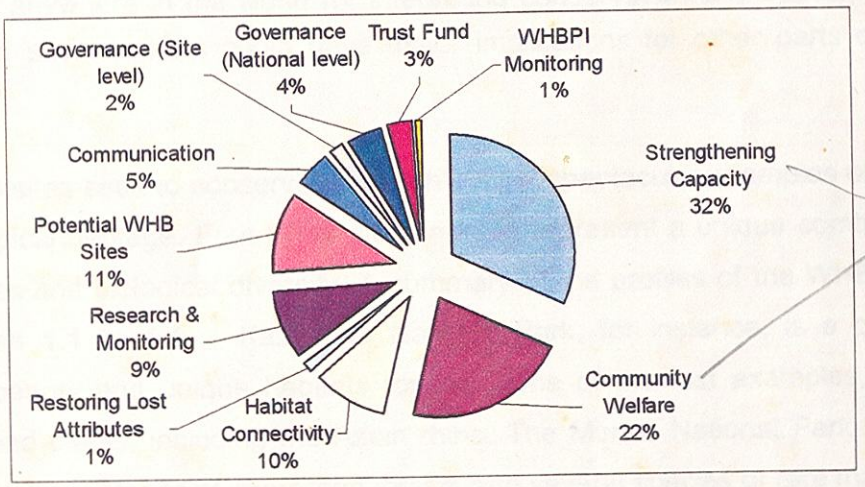
A new initiative funded by the United Nations Foundation (UNF) and United Nations Educational, Scientific and Cultural Organization (UNESCO) and coordinated by the Ministry of Environment and Forests, Government of India initially covering four existing and ten proposed World Heritage Cluster Sites in India has been initiated to address the key conservation and management issues within a single new framework. This framework referred to as the **'World Heritage Biodiversity Programme for India (WHBPI)'** has been developed through a collaborative planning process by the Wildlife Institute of India (WII) and the Ashoka Trust for Research in Ecology and the Environment (ATREE). The ten year WHBPI will have two phases of four and six years each. Four of the existing five WHB sites in India namely Kaziranga, Keoladeo, Manas and Nanda Devi National Parks have been included in the WHBPI. The fifth WHB site namely Sunderbans has been kept out of this

programme as it is receiving a similar support from the Asian Development Bank under the 'Sunderbans Biodiversity Project'.

The goal of the WHBPI is to strengthen biodiversity conservation in Protected Areas by building replicable models at WHB sites that emphasize law enforcement, promote habitat integrity and connectivity, enhance the role of local communities in Protected Area management, improve the professional, social and political profile of the Protected Area management community and its civil society partners.

The specific objectives of WHBPI are to: 1) increase the capacity of the staff to address critical needs in conservation, management and protection of the WHB sites, (2) enable the park staff to incorporate principal concepts of modern science in management plans, (3) increase the connectivity among natural areas in the vicinity of the WHB sites, (4) enhance the stake and the involvement of local communities in the management and the protection of the parks, (5) raise the profile of the WHB sites in civil society, (6) bring about policy and governance reforms so that the management have the flexibility to address contemporary challenges to the conservation of biodiversity in the parks, and (7) conduct surveys at sites that may be designated as additional World Heritage Biodiversity cluster sites.

The total cost of the four-year WHBPI is US$ 7.8 million or INR 35.95 crores. The component-wise breakup is shown in the pie chart below:



It is stated that World Heritage Biodiversity Programme is a maiden joint effort of the government and non-government conservation community in India to raise funds with the active support of the United Nations Foundation and the UNESCO for conserving the biodiversity values of the WHB sites in India. It is envisaged that funding support upto US $ 5 million would be raised by the United Nations Foundation and the remaining funds through other co-financing mechanisms and donor support. An adaptive and consensus-driven implementation approach would be needed to ensure the success of WHBPI.

1 Project Background, Goal and Objectives

1.1 Background

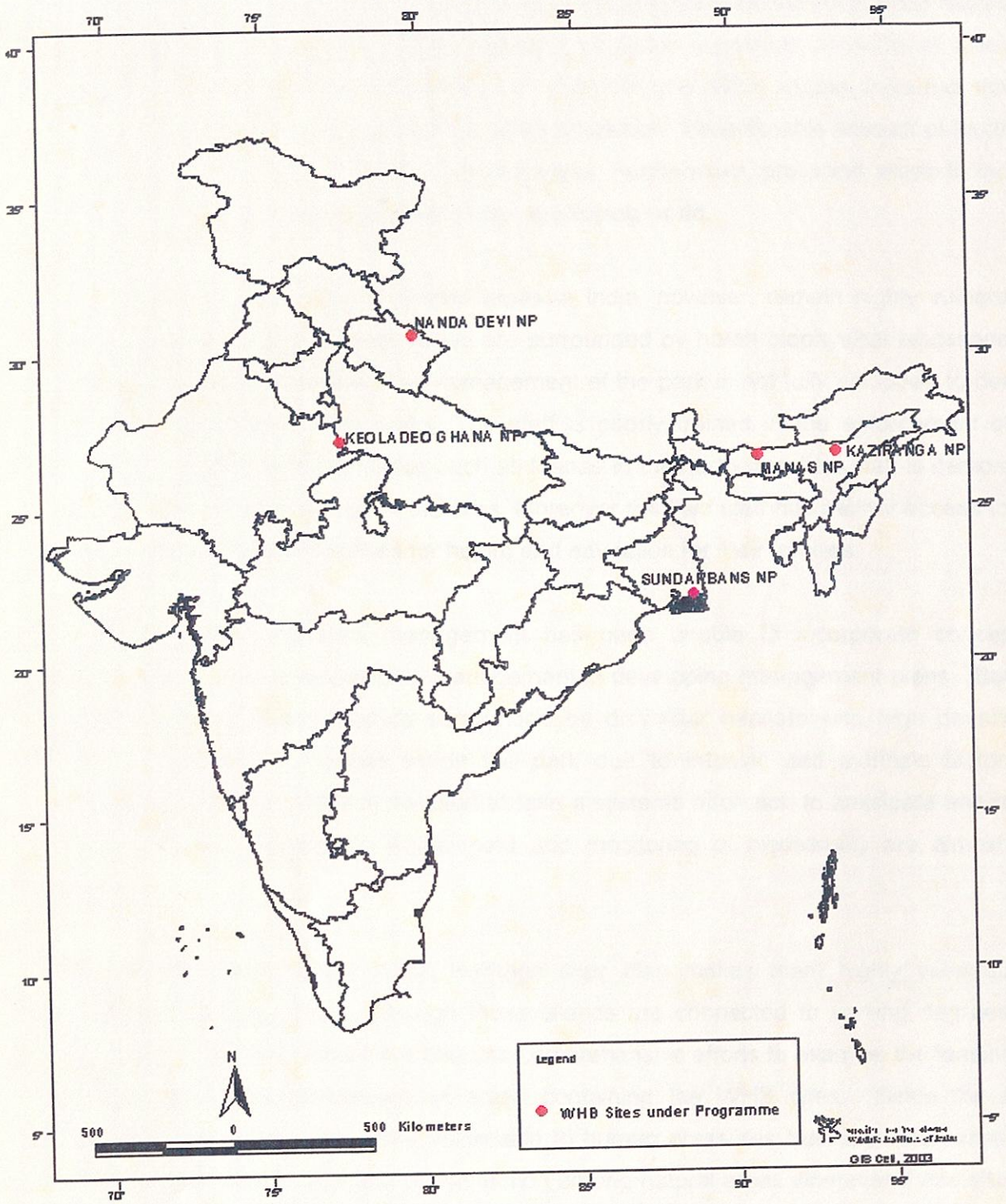
India, one of the earliest signatories to the World Heritage Convention has five key Protected Areas currently on UNESCO's World Heritage List - Kaziranga and Manas in Assam, Keoladeo Ghana in Rajasthan, Sundarbans in West Bengal and Nanda Devi in Uttaranchal (**Figure 1.1**). All five sites satisfy the natural heritage criterion '*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 and conservation*' (iv) and hence are critical to the preservation of globally significant biodiversity.

A strong potential therefore exists to build and strengthen the constellation of India's World Heritage Biodiversity (WHB) sites in ways that are exemplary and beneficial for the larger network of PAs in India, and abroad. The World Heritage Convention offers a unique possibility in India to link nature and culture in innovative ways to promote conservation of species like the tiger and the elephant at a nation-wide scale. India presents the greatest challenge anywhere in the world for integrating conservation and development on a grand scale, and success here could have major implications for other parts of the developing world.

The WHB sites seek to conserve the earth's most spectacular examples of unusual, natural and biological heritage. Four WHB sites in India represent a unique combination of natural landscapes and biological diversity. A summary of the profiles of the WHB sites is given in **Annexures 1.1 to 1.4**. Kaziranga National Park, for instance, is a prime example of unusual beauty and unique habitats for the some of the last examples of world's rarest animals and plants, including the Asian rhino. The Manas National Park includes some of the most diverse stands of evergreen forests and several species of rare mammals.

The Keoladeo National Park is an internationally acclaimed wetlands harboring over 300 avifaunal species; it is the wintering ground for many migratory bird species including the Siberian crane. The Nanda Devi National Park protects a wilderness zone of the Himalayan ecosystem and provides habitat for the highly endangered snow leopard and its associated prey species.

Fig. 1.1 Locations of World Heritage Biodiversity Sites in India



The WHB sites symbolize humanity's struggle to conserve the Earth's precious biological heritage against its own onslaught of nature. Combined with other protected areas such as national parks and wildlife sanctuaries, WHB sites represent the last stand of the nature and the best hope for humanity to conserve our most precious endowment. India represents a remarkable example of successful efforts to conserve significant amounts of biodiversity against all odds. Despite the presence of more than one billion people, India has managed to place 154,826 km^2 of its land area under protection. Considerable amount of biodiversity also occurs in habitats outside protected areas. Furthermore, protected areas in India are among the best-managed reserves in the developing world.

The WHB sites and other protected areas in India, however, remain highly vulnerable to degradation. As islands, these areas are surrounded by harsh biophysical landscapes and alienated local communities. The management of the park is not fully equipped to deal with the growing threats to the parks. The staff is poorly trained in the enforcement of laws protecting wildlife. In some cases such as Manas in the northeast, field staff is demoralized, by episodes of social turmoil in the area. Moreover the field staff has neither access to good communications nor to facilities for health and education for their families.

At higher levels, the park management has been unable to incorporate concepts of conservation science and wildlife management in developing management plans. Because parks represent habitat islands surrounded by dissimilar habitats with high densities of human populations, changes inside the park due to intrinsic and extrinsic factors are inevitable. However, there is no effort to take a systems approach to anticipate and predict future changes. Continuous assessment and monitoring of biodiversity are almost non-existent.

The "island" status of the World Heritage sites also makes them highly vulnerable to anthropogenic pressures. Although these islands are connected to varying degrees with other natural habitats, there have been no comprehensive efforts to examine the feasibility of establishing habitat connectivity in areas containing the WHB sites. Since the areas surrounding sites are even more vulnerable to human pressures than the WHB sites, it is critical to examine the potential of connection among natural areas wherever these sites are located and to bring these areas under greater protection.

A more serious problem is the lack of local community involvement in conservation efforts. Local communities in many cases remain hostile to the idea that the parks cannot be used for their traditional purposes of grazing, fishing, or extraction of fuel wood and non-timber

forest products. Wild animals from the parks also pose a danger to their livestock, crops and houses, thus exacerbating the conflict. Thus, local communities perceive conservation legislation as a threat to their livelihoods. Although there are economic benefits from conservation such as ecotourism, such benefits generally do not accrue to local communities.

Protected areas also have a low profile. The civil society in general is not aware of the importance and in some cases even the existence of World Heritage sites. Although the protected areas have a tremendous educational potential, educational institutions hardly ever use world heritage sites for educational purposes.

The United Nations Foundation (UNF) and the United Nations Education, Scientific and Cultural Organisation (UNESCO) have joined hands to strengthen the conservation and management of the world heritage sites. A planning grant was provided to the Ministry of Environment and Forests (MoE&F), Government of India to develop a ' World Heritage Biodiversity Programme for India' (WHBPI). Four of the existing five WHB sites in India namely Kaziranga, Keoladeo, Manas and Nanda Devi National Parks are to be included in the WHBPI. The fifth WHB site namely Sunderbans has been kept out of this Programme as it is receiving a similar support from the United Nations Development Programme (UNDP) and the Asian Development Bank (ADB) under the 'Sunderbans Biodiversity Project'. The MoE&F entrusted the responsibilities of developing the WHBPI jointly to the Wildlife Institute of India (WII), Dehradun and the Ashoka Trust for Ecology and Environment (ATREE), Bangalore. The profiles of the two implementing agencies are given in the **Annexure 1.5.**

1.2 Goal and Objectives of WHBPI

The goal of the WHBPI is to strengthen biodiversity conservation in Protected Areas by building replicable models at WH sites that

- *emphasize law enforcement,*
- *promote habitat integrity and connectivity,*
- *enhance the role of local communities in Protected Area management,*
- *improve the professional, social and political profile of the Protected Area management community and its civil society partners.*
- *initiate policy and governance reforms to address contemporary challenges to conservation of biodiversity*

The specific objectives of WHBPI are to: 1) increase the capacity of the staff to address critical needs in conservation, management and protection of the WHB sites, (2) enable the park staff to incorporate principal concepts of modern science in management plans, (3) increase the connectivity among natural areas in the vicinity of the WHB sites, (4) enhance the stake and the involvement of local communities in the management and the protection of the parks, (5) raise the profile of the WHB sties in civil society, (6) bring about policy and governance reforms so that the management have the flexibility to address contemporary challenges to the conservation of biodiversity in the parks, and (7) conduct surveys at sites designated as additional potential World Heritage Biodiversity Sites.

Three critical ingredients are needed to strengthen India's PA network. These are;

- A strong cadre of committed and trained Protected Area personnel who are empowered morally and materially (through continuous training; insurance schemes for accidents, injuries and loss of life in line of duty; award schemes for performance; schemes of national and public recognition *etc.*) and whose services to the nation and its people are valued and respected to enable them to effectively carry out their legal and social duties to protect India's biodiversity.

- A strong base of political and public supporters, including local communities, non-governmental organizations and community leaders, who appreciate the important role of PAs in ensuring long-term ecological security, and rally in support of the importance of the work of protected areas personnel.

- A review of PA design and boundaries to promote networking among sites through corridors and other management zones to enhance conservation and sustainable development at the eco-region and/or biodiversity hotspot scales, particularly to better protect the habitats of large and wide-ranging species such as the elephant and the tiger.

India's current PA network evolved in the 1970s and 1980s. The management plans of these PAs were largely based on extensions of the then existing forestry working plans and often traditionally oriented towards assumptions of vegetation climax and ignored the role of disturbance whether natural or anthropogenic in shaping the landscape and driving ecological processes. Most PAs include many non-forest landscapes such as grasslands and wetlands that have vital linkages with ecological and geomorphological processes and landscape dynamics outside the boundaries and often upstream through rivers. However, there existed a "compartmentalisation" in thinking that proposes that ecosystems and

communities within the reserve boundary be regarded as an impregnable fortress. Unfortunately even the establishment of research institutes at the national level and the growth of wildlife science as a discipline in India have largely failed (with a few notable exceptions) to bring rigour and serious scientific analyses in reserve management. Ecological monitoring as a tool for framing of management plans for PAs with complex and diverse ecosystems subject to temporal and spatial variability was never adopted and instead *ad hoc*, unscientific and inconsistent methodologies were often used. There have been many important developments in Conservation Biology, Sampling, Remote Sensing/Geographical Information Systems and Landscape Ecology in the 1990s, but these concepts and tools have yet to make a mark in the management of India's Protected Areas.

2 The Planning Phase

2.1. Approach

To meet the goals and objectives of the WHBPI, tasks were assigned to the two partner agencies the Wildlife Institute of India, Dehradun (www.wii.gov.in) and the Ashoka Trust for Ecology and Enviornment (www.atree.org) (**Table 2.1**) and the resulting work has led to the development of a proposal for WHBPI for an initial period of four years, but likely to last up to a whole decade. The proposal coming out of the planning phase will work at two levels, namely;

- Undertake concrete on-the ground actions for conservation of a targeted sub-set of existing or potential WH sites; and
- Building on the above, influence the policy environment as it relates to PA management, particularly of WHB sites, and biodiversity conservation at broader scales beyond the Protected Area such as eco-regions, and biodiversity hotspots.

As part of the WHBPI, potential World Heritage sites have been identified. Of particular interest for UNESCO, UNDP, International Conservation NGO partners and Indian counterparts are potential World Heritage Sites representing the two biodiversity 'hot-spots' (Eastern Himalayas and Western Ghats) as well as the entire *terai* eco-region that runs along the Indo-Nepal border from west-to-east and the Valley of Flowers in Uttaranchal State. The potential for designing and developing World Heritage areas comprising clusters of Protected Areas in these regions of globally biodiversity is quite strong.

The activities that are to be executed with UNF financing during the first four years of the WHB Programme were designed in order to meet the following objectives:

- Fulfill unmet staff and equipment needs at sites through small amounts of targeted UNF funds, which leverages additional resources from the Government, UNDP-GEF, conservation NGOs, bilateral donors, foundations, private sector and other interested groups;
- Improve habitat connectivity between PAs, for the benefit of keystone/ flagship species like the elephant and the tiger;[1]

[1] Of necessity, this would emphasize participatory approaches to landscape management, and includes compensation for wildlife induced crop damage and loss of human lives; preferential employment opportunities for youth and women from affected communities in the PA system and its units, support to development options that are not dependent on extractive uses, such as tourism, research and educational services; etc.

- Offer incentives to local NGOs and/or community groups to provide intelligence on poachers' identities and movements or for setting up voluntary local action groups that directly assist the staff and participate in law enforcement;
- Design and implement a communications and advocacy strategy for raising the profile of the protected area management profession within Indian society and raising the interest of youth particularly women in choosing that profession as a career option;

Table 2.1. Summary of tasks undertaken by WII and ATREE.

S No.	Task	Lead agency	Partner agency	Modality
1	Assessment of critical training and infrastructure needs at 4 WH sites	WII	ATREE	Organized site level workshops at Keoladeo Ghana, Kaziranga, Nanda Devi National Parks
2	Assessment of community needs at 4 WH sites	ATREE	WII	Organized site level workshops at Keoladeo Ghana, Kaziranga, Nanda Devi National Parks
3	Identification of potential WH sites	ATREE for East-Himalayas & Western Ghats	-	Conducted rapid assessment and synthesized available information
		WII for Terai Eco region	-	Conducted rapid assessment and synthesized available information
4	Develop proposal for enhancing habitat connectivity	ATREE for East-Himalayas & Western Ghats	-	Conducted rapid assessment and synthesized available information
		WII for Keoladeo Ghana & Nanda Devi	-	-
5	Designing of communication & advocacy strategy	ATREE – New Delhi	ATREE WII	Organised a National level consultation workshop
6	Develop a proposal of designing mixed natural-cultural WH sites	ATREE for East-Himalayas & Western Ghats	-	Commission a short term study
		WII for Terai Eco-region		
7	Organization of PCC meetings	WII	ATREE	-
8	Report preparation	WII	ATREE	-

2.2 Consultations

A series of site and state level consultations involving a wide array of stakeholders were organized during the planning phase. The list of participants is provided in **Annexures 2.1 to 2.4**. In addition to this, Project Coordination Committee (PCC) meetings was organized under the chairmanship of Additional Director General (Wildlife), MoE&F, Government of India to give shape to the WHBPI.

3 Strengthen Capacity for Effective Management

3.1 Background

Effective protection of WHB sites requires well-equipped, well-trained and motivated staff along with a strong communication network.

The approach to the aspects of this project was motivated by the lessons learned from the actual management planning and protected area management activities at the operational level over the past two decades. We have drawn from this experience through the participation of conservationists, scientists, NGOs and park managers in the site level workshops as well as by consulting with an active wildlife biologist on the PCC, and researchers active in the proposed WHB sites. We have also referred to the management plans of existing World Heritage sites. In addition, recent field visits to existing and proposed WHB sites as well as other protected areas in the Western Ghats provided additional material.

Despite the fact that investments in strengthening PA infrastructure have been made in the past, these have been planned and implemented in an '*adhoc*' manner rather than a well conceived and comprehensive strategy to strengthen capacity for effective management. Thus, many of the critical infrastructure needs are still either "unmet" or "partially met". In view of the above the following objectives have been set for this component under WHBPI.

1. Meet critical, unmet infrastructural needs of the existing WHB sites.

2. Strengthen protection measures to secure existing WHB sites especially where they are weak or ineffective.

3. Enhance the capacity of the site staff through training to enforce protection measures, assess simple ecological indicators and communicate with civil society and local people.

The site-specific activities proposed under WHBPI as for example the restoration of the damaged infrastructure in Manas, provision for high altitude gear for frontline staff in Nanda Devi, providing floating patrolling camps for the protection of Brahmaputra riverine extension areas in Kaziranga and provision of pollution free, battery operated vans for group transport in Keoladeo will substantially increase the capacity for effective management of these WHB sites. The training of frontline staff alongwith their national and international study tours and

provision of UNESCO-WHB awards for outstanding staff would enhance their skills and their moral.

3.2 Activities and Budget Lines

Based on the series of stakeholder consultations organized during the planning phase, a frame work of WHBPI has been worked out which includes the following activities for strengthening the capacity for effective management at the four WHB sites under this component. Some of these activities may have to be further refined on the basis of actual availability of funds and institutional support needed at the time of implementation. The 'indicators of success; and the 'means of assessment' of all the proposed activities in the four sites are given in **Annexure 3.1 to 3.4**. The budget for this component is given in **Tables 3.1 to 3.4**. The overall cost of this component is Rs. 11,51,90,000 and USD 25,04,130.43.

Table 3.1. Activity, timeline, Implementing Agency and budget for the strengthening capacity for effective management component in Kaziranga National Park.

S. No	Activity	Year				Agency	Cost/Year (Rs.)	Total Cost 4 years (Rs)	Total Cost 4 years (US$)
		1	2	3	4				
3.1.1	*Enhance key infrastructural requirements*								
3.1.1.1	Building of roads and bridges in extension areas (25 km)	X	X			PA	1125000	2250000	48,913.04
3.1.1.2	Repair and maintenance of roads in extension areas	X	X	X	X	PA	562500	2250000	48,913.04
3.1.1.3	Upgradation and modernisation of existing elephant camps for park elephants and staff	X		X		PA	900000	1800000	39,130.43
3.1.1.4	Establishment of floating anti-poaching camp in northern extension areas	X	X			PA	450000	900000	19,565.22
3.1.1.5	Boundary demarcation on northern side	X	X			PA	90000	180000	3,913.04
	Subtotal							**7380000**	**160,434.78**
3.1.2	*Provide Adequate Communication & Transport Infrastructure*								
3.1.2.1	Purchase of modern communication equipment and upgradation of existing ones	X		X		EA, PA	900000	1800000	39,130.43
3.1.2.2	Purchase of vehicles (4WD, flat bottom boats, Motorcycles, cycles)	X	X			PA	562500	1125000	24,456.52
3.1.2.3	Transportation of unused boats from Manas to Kaziranga	X				PA	45000	45000	978.26
	Subtotal							**2970000**	**0.00**
3.1.3	*Improve skills for staff in key areas*								
3.1.3.1	Workshops to orient staff towards interactions with local communities, and to sensitise them to peoples issues.	X		X		EA, PA	45000	90000	1,956.52
3.1.3.2	Workshop to train staff in basic data collection for monitoring populations of target species	X		X		EA, PA	45000	90000	1,956.52
3.1.3.3	National study tour	X	X	X	X	PA	270000	1080000	23,478.26
	Subtotal							**1260000**	**27,391.30**
3.1.4	*Improve motivation and commitment of staff*								
3.1.4.2	Construction of two family housing colonies		X	X		PA	540000	1080000	23,478.26
3.1.4.3	Purchase and distribution of field kits for forest staff in extension areas	X		X		EA	675000	1350000	29,347.83
3.1.4.4	UNESCO WHB awards for outstanding staff (10 awards)	X	X	X	X	PA	225000	900000	19,565.22
	Subtotal							**3330000**	**72,391.30**
3.1.5	Improve Protection Measures								
3.1.5.1	*Improve patrolling*								
3.1.5.1.1	Establishment of new beat camps in extension areas and KAHC (25 camps)	X	X			PA	1687500	3375000	73,369.57
3.1.5.1.2	Purchase of arms and ammunitions and repair and maintenance of existing arms*	X	X			PA	180000	360000	7,826.09
3.1.5.1.3	Training in effective use of arms and weapons		X	X	X	PA, EA	45000	135000	2,934.78
	Subtotal							**3870000**	**84,130.43**
3.1.5.2	*Provide Incentives for field staff in patrol camps*								
3.1.5.2.1	Purchase of provisions for patrol camps	X	X	X	X	PA	630000	2520000	54,782.61
3.1.5.2.2	Solar Lanterns (@3000 X 75), Transistor radios, magazines etc	X		X		PA, EA	202500	405000	8,804.35
	Subtotal							**2925000**	**63,586.96**
3.1.5.3	*Improve Intelligence & Information on Poaching*								
3.1.5.3.1	Training of staff in intelligence gathering, and setting up informer network		X	X	X	PA, EA	45000	135000	2,934.78
	Subtotal							**135000**	**2,934.78**
3.1.5.4	*Improve Ability to Apprehend & Prosecute*								
3.1.5.4.1	Training workshop for anti-poaching squads to enhance ability, apprehend and prosecute offenders	X		X		EA, PA	45000	90000	1,956.52
3.1.5.4.2	Orientation of staff in legal procedures and appropriate clauses of the various legal acts pertaining to WHB sites	X		X		EA, PA	45000	90000	1,956.52
	Subtotal							**180000**	**3,913.04**
	Component subtotal							**22050000**	**260,217.39**

Table 3.2. Activity, timeline, Implementing Agency and budget for the strengthening capacity for effective management component in Keoladeo National Park.

S. No	Activity	Year				Agency	Cost/year (INR)	Total Cost 4 Years (INR)	Total Cost 4 years (USD)
		1	2	3	4				
3.2.1	*Enhance Key Infrastructural Requirements*								
3.2.1.1	Improvement & maintenance of Check posts (13 sites)	X	X	X	X	PA	780000	3120000	67826.09
3.2.1.2	Maintenance of Park boundary rubble wall	X	X	X	X	PA	800000	3200000	69565.22
3.2.1.3	Up gradation of forest trails	X	X	X	X	PA	200000	800000	17391.30
	Subtotal							**7120000**	**154782.61**
3.2.2	*Provide Adequate Communication & Transport Infrastructure (Infrastructure)*								
3.2.2.1	Wireless System			X		PA	500000	500000	10869.57
3.2.2.2	Vehicles (Electric Van, Jeep - 4WD, Tractor - Trailer)		X	X		PA	1000000	2000000	43478.26
3.2.2.3	Motor Bikes (5 numbers)	X				PA	250000	250000	5434.78
3.2.2.4	Running costs of vehicles purchased	X	X	X	X	PA	300000	1200000	26086.96
3.2.2.5	Computers & accessories	X				PA	175000	175000	3804.35
	Subtotal							**4125000**	**89673.91**
3.2.3	*Improved Skills of Staff in Key Areas (Capacity building)*								
3.2.3.1	Training on								
	- Communication Skills	X		X		EA	50000	100000	2173.91
	- Animal population estimation techniques	X	X			EA	50000	100000	2173.91
	- Bird watching skills	X	X	X	X	EA	25000	100000	2173.91
	- Study Tour National	X	X	X	X	PA, EA	300000	1200000	26086.96
	- Study Tour International			X		PA, EA	600000	600000	13043.48
	Subtotal							**2100000**	**45652.17**
3.2.4	*Improved Coordination Between Local Communities, PA Management & Other Stakeholders*								
3.2.4.1	Training & sensitization for staff on community relations & extension (ca. 50 staff)	X	X			PA, EA	25000	50000	1086.96
3.2.4.2	Translation, simplification, dissemination & discussion of Management Plan with local communities & other stakeholders	X				PA	50000	50000	1086.96
3.2.4.3	Design & conduct Mass/Public Awareness campaigns (awards for CBOs, EDCs, PA staff, Celebration of Keoladeo & Wetland Day)	X	X	X	X	PA	25000	100000	2173.91
3.2.4.4	Strengthening eco-development committee for regular dialogue, roles, & responsibilities	X	X	X	X	PA	12500	50000	1086.96
	Subtotal							**250000**	**5434.78**
3.2.5	*Improved Motivation & Commitment of Staff (Staff Welfare and Incentives)*								
3.2.5.1	Staff Welfare								
	- Housing			X		PA	1000000	1000000	21739.13
	- Insurance	X	X	X	X	PA	0	0	0.00
3.2.5.2	UNESCO WHB awards for outstanding staff	X	X	X	X	PA	250000	1000000	21739.13
	Subtotal							**2000000**	**43478.26**
3.2.6	Enhance Catchment Capability								
3.2.6.1	Conduct techno-feasibility surveys in the zone of influence	X				PA, EA	500000	500000	10869.57
3.2.6.2	Implement afforestation and soil - moisture conservation measures		X	X	X	PA, EA	100000	300000	6521.74
	Subtotal							**800000**	**17391.30**
3.2.7	*Tapping of River Water via Pipe Line*								
3.2.7.1	Conduct techno-feasibility surveys for water tapping	X				PA	500000	500000	10869.57
	Subtotal							**500000**	**10869.57**
3.2.8	*Enhance Protected Area Management*								
3.2.8.1	Management of Invasive species (terrestrial & aquatic)	X	X	X	X	PA, EA	50000	200000	4347.83
3.2.8.2	Management of feral cattle	X	X	X	X	PA	100000	400000	8695.65
3.2.8.3	Immunization of feral cattle	X	X	X	X	PA	200000	800000	17391.30

3.2.8.4	Creation & maintenance of water bodies		X		X	PA	50000	100000	2173.91
	Subtotal							**1500000**	**32608.70**
3.2.9	Improve Protection Measures								
3.2.9.1	*Improved Intelligence & Information on Poaching*								
3.2.9.1.1	Training of staff on intelligence gathering, etc.	X				PA, EA	75000	75000	1630.43
3.2.9.1.2	System of regular information exchange with other departments.	X	X	X	X	PA	12500	50000	1086.96
3.2.9.1.3	Purchase & distribution of Field Equipment								0.00
	- Personal Gear (100 Nos.)	X			X	PA	300000	600000	13043.48
	Subtotal							**725000**	**15760.87**
3.2.9.2	*Improve Ability to Apprehend & Prosecute*								
3.2.9.2.1	Provision for legal cell and services	X	X	X	X	PA, EA	200000	800000	17391.30
3.2.9.2.2	Develop network of informants & provide incentives for intelligence gathering	X	X	X	X	PA, EA	100000	400000	8695.65
3.2.9.2.3	Training on judicial/legal process/law enforcement and engagement of legal services	X	X	X	X	PA, EA	50000	200000	4347.83
	Subtotal							**1400000**	**30434.78**
	Component subtotal							**20520000**	**446086.96**

Table 3.3. Activity, timeline, Implementing Agency and budget for the strengthening capacity for effective management component in Manas National Park.

S. No	Activity	Year				Agency	Cost/Year (Rs.)	Total Cost 4 years (Rs.)	Total Cost 4 years (USD)
		1	2	3	4				
3.3.1	*Enhance key infrastructural requirements*								
3.3.1.1	Rebuilding of bridges 15 nos	X	X			PA	14500000	29000000	630434.78
3.3.1.2	Construction of a modern and well equipped elephant camp for park elephants	X				PA	400000	400000	8695.65
3.3.1.3	Upkeep and maintenance of park elephants	X	X	X	X	PA	345000	1380000	30000.00
	Subtotal							**30780000**	**669130.43**
3.3.2	*Provide Adequate Communication & Transport Infrastructure*								
3.3.2.1	Purchase of modern communication equipment and upgradation of existing ones	X				PA, EA	1200000	1200000	26086.96
3.3.2.2	Purchase of one 4WD	X				PA	550000	550000	11956.52
3.3.2.3	Purchase of one flatbottom boat	X				PA	400000	400000	8695.65
3.3.2.4	Purchase of five Motorcycles	X				PA	250000	250000	5434.78
3.3.2.5	Running costs and Maintenance of vehicles and equipment	X	X	X	X	PA	700000	2800000	60869.57
	Subtotal							**5200000**	**113043.48**
3.3.3	*Improve skills for staff in key areas*								
3.3.3.1	Training of staff in basic vehicle and equipment maintenance and repair and effective wireless communication	X	X			PA, EA	50000	100000	2173.91
3.3.3.2	Workshops to orient staff towards interactions with local communities, and to sensitise them to peoples issues.	X	X			PA, EA	50000	100000	2173.91
3.3.3.3	Workshop to train staff in basic data collection for monitoring populations of target species	X	X	X	X	PA, EA	50000	200000	4347.83
3.3.3.4	National study tour	X	X	X	X	PA	300000	1200000	26086.96
	Subtotal							**1600000**	**34782.61**
3.3.4	*Improve motivation and commitment of staff*								
3.3.4.1	Construction of family housing colony at Bansbari	X	X	X	X	PA, EA	800000	3200000	69565.22
3.3.4.2	Purchase and distribution of field kits for forest staff	X	X	X	X	EA	100000	400000	8695.65
3.3.4.3	UNESCO WHB awards for outstanding staff	X	X	X	X	PA, EA	400000	1600000	34782.61
	Subtotal							**5200000**	**113043.48**
3.3.5	Improve Protection Measures								
3.3.5.1	*Improve patrolling*								
3.3.5.1.1	Improvement of existing beat camps and making them fully functional by providing basic amenities (11 Nos)	X	X			PA, EA	1650000	3300000	71739.13
3.3.5.1.2	Running and Maintenance of beat camps	X	X	X	X	PA	50000	200000	4347.83
3.3.5.1.3	Establishment of new beat camps	X	X	X	X	PA	230000	920000	20000.00
	Subtotal							**4420000**	**96086.96**
3.3.5.2	*Provide Incentives for field staff in patrol camps*								
3.3.5.2.1	Purchase of provisions for patrol camps	X	X	X	X	PA	300000	1200000	26086.96
3.3.5.2.2	Solar Lanterns (@3000 X 30), Transistor radios, magazines etc	X		X		PA	150000	300000	6521.74
	Subtotal							**1500000**	**32608.70**
3.3.5.3	*Improve ability to Apprehend & Prosecute*								
3.3.5.3.1	Creation and training of Antipoaching squads	X	X			PA, EA	50000	100000	2173.91
3.3.5.3.2	Orientation of staff in legal procedures and appropriate clauses of the various legal acts pertaining to WHB sites	X		X		PA, EA	50000	100000	2173.91
3.3.5.3.3	Intelligence gathering services	X	X	X	X	PA,EA	200000	800000	17391.30
3.3.5.3.4	Provision for legal cell and services	X	X	X	X	EA,PA	200000	800000	17391.30
	Subtotal							**1800000**	**39130.43**
	Component subtotal							**50500000**	**1097826.09**

Table 3.4. Activity, timeline, Implementing Agency and budget for the strengthening capacity for effective management component in Nanda Devi National Park.

S.No	Activity	Year				Agency	Cost/year (INR)	Total Cost 4 years (INR)	Total Cost 4 years (USD)
		1	2	3	4				
3.4.1	*Effective Systems & Infrastructure at Key Entry Points*								
3.4.1.1	Setting long range patrolling, surveillence and monitoring squads	X	X	X	X	PA	200000	800000	17391.30
3.4.1.2	Aerial surveillence and field monitoring of biodiversity inside the park	X	X	X	X	PA	400000	1600000	34782.61
	Subtotal							**2400000**	**52173.91**
3.4.2	*Provide Adequate Communication & Transport Infrastructure*								
3.4.2.1	Wireless System	X				PA	500000	500000	10869.57
3.4.2.2	Motor cycles for field staff		X	X		PA	100000	200000	4347.83
3.4.2.3	Computers & accessories	X				PA	175000	175000	3804.35
3.4.2.4	Running costs of vehicles & equipments purchased	X	X	X	X	PA	100000	400000	8695.65
	Subtotal							**1275000**	**27717.39**
3.4.3	*Improved Skills of Staff in Key Areas*								
3.4.3.1	Training on:								
	- High altitude animal population estimations	X	X			EA	75000	150000	3260.87
	- Forensic skills/diagnosis			X		EA	150000	150000	3260.87
	- Mountaineering skills	X	X	X		EA	300000	900000	19565.22
	- Study Tour National	X	X	X	X	PA,EA	300000	1200000	26086.96
	- Study Tour International			X		PA,EA	600000	600000	13043.48
	Subtotal							**3000000**	**65217.39**
3.4.4	*Improved Coordination between Local Communities, PA Management & Other Stakeholders*								
3.4.4.1	Training & sensitization for staff on community relations & extension (30 staff)	X	X			PA, EA	25000	50000	1086.96
3.4.4.2	Translation, simplification, dissemination & discussion of Management Plan with local communities. & others stakeholders	X				PA	50000	50000	1086.96
3.4.4.3	Design & conduct Mass/Public Awareness campaigns (awards for CBOs, EDCs, Celebration of Nanda Devi Day, etc)	X	X	X	X	PA	25000	100000	2173.91
3.4.4.4	Establish Park-People Management. Committee for regular dialogue, roles, responsibilities, etc.	X	X	X	X	PA	12500	50000	1086.96
3.4.4.5	Engage "Social motivators" to work on developing/maintaining community relations	X	X	X	X	PA	60000	240000	5217.39
	Subtotal							**490000**	**10652.17**
3.4.5	*Improved Motivation & Commitment of Staff (Staff Welfare & Incentives)*								
3.4.5.1	Field Equipment								
	Personal (25 Nos.)	X				PA	1000000	1000000	21739.13
	High altitude gear (25 Nos.)	X		X		PA	625000	1250000	27173.91
	- Patrolling/ monitoring equipment	X				PA	550000	550000	11956.52
3.4.5.2	Staff Welfare								0.00
	- Housing			X		PA	900000	900000	19565.22
	- Insurance	X	X	X	X	PA	0	0	0.00
	Provision of high altitude allowance for 150 staff @ Rs 400/month	X	X	X	X	PA	720000	2880000	62608.70
3.4.5.3	UNESCO WHB awards for outstanding staff	X	X	X	X	PA	250000	1000000	21739.13
	Subtotal							**7580000**	**164782.61**
3.4.6	*Develop a Rational Ecotourism Policy*								
3.4.6.1	*Acceptance of Mountaineering Ban Inside Core by Pressure Groups (Tourists, Mountaineering, Locals)*								
3.4.6.1.1	Research on impacts of ban over 20 yrs	X				EA	400000	400000	8695.65
3.4.6.1.2	Awareness raising among different groups on impacts		X	X	X	PA, EA	66667	200000	4347.83
	Subtotal							**600000**	**13043.48**
3.4.6.2	*Effective & Well-Managed Ecotourism Operating in Buffer (& Parts of Core)*								

3.4.6.2.1	Feasibility assessment of ecotourism (circuits, markets, carrying capacity, income/fees, guidelines, rules, monitoring, infrastructure, etc)	X				PA, EA	100000	100000	2173.91
3.4.6.2.2	Capacity building for staff & communities on ecotourism (training, study tours)		X	X		PA, EA	50000	100000	2173.91
3.4.6.2.3	*Infrastructure for ecotourism*								0.00
	a. Interpretation cum Research Centre			X		PA	750000	750000	16304.35
	b. Trekking cum Monitoring trails (10 km)		X			PA	900000	900000	19565.22
3.4.6.2.4	Seed money for micro credit for taking up economic activities in the ecotourism zone	X	X	X	X	PA, EA	400000	1600000	34782.61
3.4.6.2.5	Provision for 6 rain sheds in different trekking routes		X	X		PA	150000	300000	6521.74
3.4.6.2.6	Provision for garbage disposal in seasonal camping sites	X	X			PA	50000	100000	2173.91
3.4.6.2.7	Provision for resting places in the eco tourism zone	X	X	X	X	PA	10000	40000	869.57
3.4.6.2.8	Signages in the ecotourism zone	X	X			PA	20000	40000	869.57
3.4.6.2.9	Provision for drinking water in seasonal camping sites	X	X	X	X	PA	150000	600000	13043.48
	Subtotal							**4530000**	**98478.26**
3.4.7	Improve Protection Measures								
3.4.7.1	*Address International Market Demand for Important Wildlife Species (Musk Deer, Snow Leopard, Black Bear)*								
3.4.7.1.1	Conduct research on key species, demands, trade routes, market, income, etc.	X				PA, EA	50000	50000	1086.96
3.4.7.1.2	Work with other agencies (TRAFFIC) to develop campaign on poaching	X	X	X	X	PA, EA	25000	100000	2173.91
	Subtotal							**150000**	**3260.87**
3.4.7.2	*Improved Intelligence & Information on Poaching*								
3.4.7.2.1	Provision for legal cell and services	X	X	X	X	PA, EA	200000	800000	17391.30
3.4.7.2.2	Training of staff on intelligence gathering, etc.	X				PA, EA	75000	75000	1630.43
3.4.7.2.3	Training of other agencies (customs, police, etc.)		X	X	X	PA, EA	15000	45000	978.26
	Subtotal							**920000**	**20000.00**
3.4.7.3	*Improve Ability to Apprehend & Prosecute*								
3.4.7.3.1	Develop network of informants & provide incentives for intelligence gathering	X	X	X	X	PA, EA	200000	800000	17391.30
3.4.7.3.2	Training on judicial/legal process/law enforcement	X				PA, EA	75000	75000	1630.43
3.4.7.3.3	Setting up of anti-poaching unit		X			PA	300000	300000	6521.74
	Subtotal							**1175000**	**25543.48**
	Component subtotal							**22120000**	**480869.57**

4 Enhancing the Role of Local Communities in Conservation

4.1 Background

With more than one billion people exerting pressure on its natural habitats, the future of biodiversity in India, to a very great extent, depends on developing a broad based constituency of support for programs aimed at biodiversity conservation. Almost all the protected areas, including the World Heritage Biodiversity Sites, have substantial human populations living in close proximity to the protected areas. These populations exert tremendous pressure on biodiversity in and around the protected areas to fulfill their basic subsistence needs. The protected areas in turn exert considerable pressure on the livelihoods of local communities as the wild animals often raid their crops and livestock. Furthermore, protected areas curtail the access of local communities to areas rich in biomass and other ecosystem products and services. The curtailment of use of resources in protected areas by the local communities and the damage to their crops and livestock by the animals from protected areas often results in conflict between managers of protected areas and the people living close to these areas. This conflict increases the cost, and lowers the prospect of conservation.

The four World Biodiversity Heritage Sites have a substantial number of human settlements abutting the sites. As in the case of other protected areas, the local communities at these sites rely on a wide variety of products inside the parks to sustain their livelihoods. Apart from consumption pressures, other pressures at the WHB sites are conflict arising from damage from animals in the park, poaching, encroachment, and social and political unrest. Much of the wildlife in the Manas World Heritage Site, for example, has been decimated as a result of poaching and insurgency in the region.

Local communities often also do not perceive or realize much benefits from the World Biodiversity Heritage Sites. Ecotourism for example can benefit rural people around the sites, but most sites lack plans to involve resident communities in ecotourism. Communities around protected areas indeed benefit from ecosystem services such as water and fishing grounds downstream, but they are not often aware of the monetary value of such benefits.

4.2 Objectives

The principal objective of this component of the project is then to enhance the prospect of conservation by building partnerships between local communities and the managers of protected areas. Specifically, the goals are:

1. to enhance the benefits but reduce the cost of conservation to local communities
2. to reduce the conflict between local communities and the park management
3. to increase the awareness in local communities about the value of goods and services provided by protected areas.

4.3 Activities

The scope of activities at various sites will vary, according to the extent, nature and intensity of interactions between local communities and the sites. The 'indicators of success; and the 'means of assessment' of all the proposed activities in the four sites are given in **Annexure 3.1 to 3.4**. However at all sites a participatory approach that involves rural residents around the parks will be used. Before any activity starts, a full socio-economic profile of the households and villages impacting the protected areas will be compiled. Communities and households having the greatest impact on the park will be initially identified and targeted for interventions. A range of stakeholders consultations organized during the planning phase at the four WHB sites have provided a broader picture of the activities required to be undertaken for enhancing the role of local communities in conservation.

4.4 Enhancement of Benefits

Benefits can flow to local communities in several forms. At a basic and minimum level, the communities can benefit from the infrastructure such as health clinics and schools provided for the park staff. Other benefits can accrue from ecotourism and employment opportunities associated with management and protection of the park. The value of benefits such as ecosystem services in the form of abundant water, lower siltation, productive and clean fishing grounds, provision of natural enemies of crop pests as well as pollinators, nutrient downloads, and spiritual and aesthetic importance ought to be actively conveyed to civil society. Thus specific activities for enhancing benefits would include:

a. active involvement of local communities in development and implementation of plans for ecotourism.
b. enhanced recruitment of local residents in efforts to manage and protect parks

c. use of facilities such as health clinics and schools developed for park staff by local communities.

d. launch of awareness campaign to highlight the benefits of protected areas.

The eco-tourism potential of sites such as Kaziranga can be considerably enhanced if there is a concerted effort to draw attention to the areas outside the original park boundary and traditional large mammal bias. These include the Brahmaputra riverine area and the forests in the Karbi Anglong to the south. There can be new activities such dolphin and bird watching boat trips, bird watching and gibbon watching nature trails in the Karbi Anglong, which can generate opportunities for local people. Once Manas is restored the potential for diverse and meaningful eco-tourism can be considerable. Recently, the Government of Uttaranchal has permitted regulated eco-tourism in a very small area of the Nanda Devi National Park, which has opened livelihood opportunities through eco-tourism for the local communities. In addition to this, there is a proposal to include the Valley of Flowers National Park (VOFNP) in Uttaranchal State as a cluster nomination to the existing Nanda Devi National Park World Heritage Site. The VOFNP is a very important tourist destination and there is a good potential to organize community lead eco-tourism activities.

4.5 Reduction of Conflict

The reduction of conflicts arising out of interactions between the people on the one hand, and the park authorities as well as the wildlife in parks on the other, requires communication and other means to resolve conflicts. Conflicts also arise over the access to and use of resources. In those cases where local communities have traditionally relied on the products or services from ecosystem within parks to sustain their livelihoods, the provision of alternate livelihoods should be explored. Since the program proposed here is modest and cannot reach all households and communities impacting the protected areas, households and communities having the maximum impact must be first identified through the use of socio-economic profiles (see above). The following specific activities will be undertaken to minimise conflict:

a. establish joint committees consisting of representatives from park management, voluntary organisations and village level institutions to periodically resolve conflicts and to undertake other activities described below.

b. enhance livelihoods that rely on the use of protected areas such as ecotourism

c. explore and develop alternate livelihood options for those households that rely on the use of biological resources from protected areas.

d. establish and engage women self-help groups in promotion of alternate livelihoods.

e. outline mechanisms for timely compensation for damage to crops and livestock.

f. provide alternative livelihoods to people who agree to voluntarily relocate from isolated pockets in and around existing and proposed WHB sites (see chapter on habitat connectivity).

4.6 Increase of Awareness

Apart from creating the awareness about the benefits of protected areas, general awareness about the value of biodiversity in civil society is needed to curtail the loss of biodiversity. Thus, it is necessary to communicate the importance and value of protected areas to the general populations living in the vicinity of the park. Thus, at least two following specific activities will be undertaken:

a. emphasis on the value of biodiversity through folklore, drama and other cultural events.
b. involvement of school teachers in development of curriculum materials based on local biodiversity and protected areas.

4.7 Evaluation & Monitoring of Community Level Interventions

Criteria and viable indicators of success must be defined to evaluate the effectiveness of local interventions. Surveys would be conducted before and after interventions to evaluate their effectiveness. Interventions relating to benefits will be evaluated in terms of number of households that are involved in ecotourism activities and in direct employment by the park authorities. The number of households and communities impacted will determine the utility of the awareness campaign. Conflict resolution will be evaluated by the number of times the joint committee(s) meet and the number of times they intervene. Other measures will include the number and proportion of households that reduce or eliminate reliance on the harvest of wildlife products, and develop alternate livelihoods. Parameters such as the reduction in the number of poaching incidents and the number of incidents that result in confrontation between the local communities and the park staff will also be taken into account. Interventions related to general awareness will be evaluated in terms of cultural events organized and the educational programs initiated. The effectiveness of these activities will be determined by specific questionnaires that will be prepared and responded to by community leaders and educators.

4.8 Activities & Budget Lines

Based on the series of stakeholder consultations organized during the planning phase, in which the local communities have actively participated and contributed, the following activities are proposed at the four WHB sites under this component. Some of these activities may have to be further refined on the basis of actual availability of funds and institutional support needed at the time of implementation. The 'indicators of success; and the 'means of assessment' of all the proposed activities are given in **Annexure 3.1 to 3.4**. The budget for this component is given in **Tables 4.1 to 4.4**. The overall cost of this component is Rs.7,75,90,000 and USD 16,86,739.13.

Table 4.1. Activity, timeline, Implementing Agency and budget for enhancing the role of local communities in conservation in Kaziranga National Park.

S. No	Activity	Year				Agency	Cost/Year (Rs.)	Total Cost 4 years (Rs)	Total Cost 4 years (US$)
		1	2	3	4				
4.1.1	*Provide health care and veterinary benefits*								
4.1.1.1	Mobile Medical Clinic	X				EA	900000.00	900000.00	19565.22
4.1.1.2	Free medical camp 4 times a year/range	X	X	X	X	EA	360000.00	1440000.00	31304.35
4.1.1.3	Free veterinary camp 2 times a year/range	X	X	X	X	EA	180000.00	720000.00	15652.17
	Subtotal							**3060000.00**	**66521.74**
4.1.2	*Resolve people-park conflicts*								
4.1.2.1	Compensation for crop damage	X	X	X	X	EA, PA	270000.00	1080000.00	23478.26
4.1.2.2	Compensation for livestock loss and human casualties to predators and elephants	X	X	X	X	EA, PA	270000.00	1080000.00	23478.26
4.1.2.3	Livestock improvement measures	X	X	X	X	EA, PA	90000.00	360000.00	7826.09
4.1.2.4	Establishment of community based measures for minimizing human-wildlife conflicts	X	X	X	X	EA, PA	225000.00	900000.00	19565.22
	Subtotal							**3420000.00**	**74347.83**
4.1.3	*Develop Viable & Acceptable Alternative Livelihoods*								
4.1.3.1	Vocational Training for 4 youths per village/year for 4 villages/year	X	X	X	X	EA	360000.00	1440000.00	31304.35
4.1.3.2	Nature guide training and promote ecotourism entrepreneurships on private land	X	X	X	X	EA	230000.00	920000.00	20000.00
4.1.3.3	Support for community based conservation including setting up of community reserves		X	X		EA, PA	690000.00	1380000.00	30000.00
	Subtotal							**3740000.00**	**81304.35**
4.1.4	*Build community assets*								
4.1.4.1	Community Centre	X				EA, PA	450000.00	450000.00	9782.61
4.1.4.2	Construction of a Primary school and health centre for forest staff and local communities		X	X		EA, PA	337500.00	675000.00	14673.91
4.1.4.3	Running costs of primary school for forest staff and village children			X	X	EA, PA	135000.00	270000.00	5869.57
4.1.4.4	Running costs of a primary health care centre for forest staff and nearby villages			X	X	EA, PA	225000.00	450000.00	9782.61
	Subtotal							1845000.00	40108.70
4.1.5	Improve Educational Facilities								
4.1.5.1	WHB Scholarships to 300 students of all grades @Rs. 500/Month	X	X	X	X	PA, EA	1800000.00	7200000.00	156521.74
	Subtotal							**7200000.00**	**156521.74**
	Component subtotal							**19265000.00**	**262282.61**

Table 4.2. Activity, timeline, Implementing Agency and budget for enhancing the role of local communities in conservation in Keoladeo Ghana National Park.

S. No	Activity	Year				Agency	Cost/year (INR)	Total Cost 4 Years (INR)	Total Cost 4 years (USD)
		1	2	3	4				
4.2.1	*Develop Viable and Acceptable Alternative Livelihoods*								
4.2.1.1	Review past attempts & assess/draw lessons	X				EA	50000	50000	1086.96
4.2.1.2	Feasibility assessment of selected livelihoods options & other activities [capacity needs, markets, benefits, targets, sustainability, etc.]	X				EA	100000	100000	2173.91
4.2.1.3	Promote the involvement of existing Non-Governmental Organizations / Community Based Organizations & Eco development Communities (NGOs/CBOs/EDCs) to assist in Livelihood Development	X	X	X	X	EA	25000	100000	2173.91
4.2.1.4	Strengthen capacity of Eco-development Committees (EDCs) (Management, Finance, etc.)- training & exposure visits	X	X	X	X	PA, EA	50000	200000	4347.83
4.2.1.5	Provide support for strengthening/adding value to ongoing livelihood initiatives (e.g. Honey, Pickle, Khus & its handicrafts products, Phoenix)		X	X	X	PA, EA	100000	300000	6521.74
4.2.1.6	Provide livelihood tools (binoculars) to nature guide/Rickshaw pullers	X				PA	600000	600000	13043.48
4.2.1.7	Design and conduct camps on bird identification and communication skills for the nature guides/rickshaw pullers (ca. 108 individuals)	X	X	X	X	PA, EA	50000	200000	4347.83
4.2.1.8	Design and conduct camps for existing work force in the hotels on hospitality management and also for local village youths (ca. 100 individuals per camp and two camps per year)	X	X	X	X	PA, EA	100000	400000	8695.65
	Subtotal							**1950000**	**42391.30**
4.2.2	*Resolve People - Park Conflict*								
4.2.2.1	To construct, repair and maintain the boundary wall of the Park	X	X	X	X	PA	800000	3200000	69565.22
	Subtotal							**3200000**	**69565.22**
4.2.3	*Build Community Assets*								
4.2.3.1	Improve/Provide access roads to select villages	X	X	X	X	PA, EA	1000000	4000000	86956.52
4.2.3.2	Feasibility of establishing Sulab toilets	X				EA	25000	25000	543.48
4.2.3.3	Construction of two Sulab toilets		X			PA, EA	1000000	1000000	21739.13
4.2.3.4	Techno-feasibility assessment for the development of community ponds	X				EA	50000	50000	1086.96
4.2.3.5	Development of community ponds (10 Nos.)		X	X	X	PA, EA	666667	2000000	43478.26
	Subtotal							**7075000**	**153804.35**
4.2.4	*Address Community Resource Needs*								
4.2.4.1	Provision of LPG connections (1000 Nos.)	X	X	X	X	PA, EA	500000	2000000	43478.26
4.2.4.2	Provision of Biogas connections (10 Nos.)	X	X	X	X	PA, EA	50000	200000	4347.83
4.2.4.3	Provision of Solar lanterns (1000)	X	X	X	X	PA, EA	750000	3000000	65217.39
	Subtotal							**5200000**	**113043.48**
4.2.5	*Improve Educational Facilities*								
4.2.5.1	WHB Scholarships for 300 students of all grades @Rs. 500/month	X	X	X	X	PA, EA	1800000	7200000	156521.74
	Subtotal						**1800000**	**7200000**	**156521.74**
	Component subtotal							**24625000**	**535326.09**

Table 4.3. Activity, timeline, Implementing Agency and budget for enhancing the role of local communities in conservation in Manas National Park.

S. No	Activity	Year				Agency	Cost/Year (INR)	Total Cost 4 years (INR)	Total Cost 4 years (USD)
		1	2	3	4				
4.3.1	*Improve medical facilities*								
4.3.1.1	Mobile Medical Clinic	X				EA	800000	800000.00	17391.30
4.3.1.2	Free medical camp 4 times a year/range	X	X	X	X	EA	400000	1600000.00	34782.61
4.3.1.3	Free veterinary camp 2 times a year/range	X	X	X	X	EA	300000	1200000.00	26086.96
	Subtotal							**3600000.00**	**78260.87**
4.3.2	*Improve educational facilities*								
4.3.2.1	WHB Scholarships to 300 students of all grades @Rs. 500/Month	X	X	X	X	PA, EA	1800000	7200000.00	156521.74
	Subtotal							**7200000.00**	**156521.74**
4.3.3	*Resolve people-park conflicts*								
4.3.3.1	Compensation for crop damage	X	X	X	X	EA,PA	400000	1600000.00	34782.61
4.3.3.2	Compensation for livestock loss and human casualties to predators and elephants	X	X	X	X	EA,PA	400000	1600000.00	34782.61
	Subtotal							**3200000.00**	**69565.22**
4.3.4	*Develop Viable & Acceptable Alternative Livelihoods*								
4.3.4.1	Vocational Training for 4 youths per village/year for 3 villages/year	X	X	X	X	EA	300000	1200000.00	26086.96
4.3.4.2	Nature guide training and promote ecotourism entrepreneurships on private land	X	X	X	X	EA	230000	920000.00	20000.00
4.3.4.3	Support for community based conservation	X	X	X	X	EA, PA	1200000	4800000.00	104347.83
	Subtotal							**6920000.00**	**150434.78**
4.3.5	*Build community assets*								
4.3.5.1	Assistance to nearby schools, clinics and other buildings for forest staff and local communities*	X	X	X	X	EA	300000	1200000.00	26086.96
4.3.5.2	Running costs of primary school for forest staff and village children*	X	X	X	X	EA	150000	600000.00	13043.48
4.3.5.3	Running costs of a primary health care centre for forest staff and nearby villages*	X	X	X	X	EA	250000	1000000.00	21739.13
	Subtotal						**700000**	**2800000.00**	**60869.57**
	Component subtotal							**23720000.00**	**515652.17**

Table 4.4. Activity, timeline, Implementing Agency and budget for enhancing the role of local communities in conservation in Nanda Devi National Park.

S.No	Activity	Year				Agency	Cost/year (INR)	Total Cost 4 years (INR)	Total Cost 4 years (USD)
		1	2	3	4				
4.4.1	Develop Viable & Acceptable Alternative Livelihoods								
4.4.1.1	Feasibility assessment of selected livelihoods options & other activities [capacity needs, markets, benefits, targets, sustainability, etc.]	X				EA	30000	30000	652.17
4.4.1.2	Strengthen capacity of existing Community Based Organisations (CBOs) to assist in Livelihood Development	X				EA	100000	100000	2173.91
4.4.1.3	Strengthen capacity of Ecodevelopment Committees (EDCs) (Management, Finance, etc.)- training & exposure visits	X	X	X	X	PA	25000	100000	2173.91
4.4.1.4	Study on loaning process in EDCs, assess and formulate effective systems with the community	X				EA	50000	50000	1086.96
4.4.1.5	Training of 60 rural youths in mountaineering	X	X			EA	500000	1000000	21739.13
2.1.6	Training of 30 rural youths for rescue operations		X			EA	600000	600000	13043.48
	Subtotal							**1880000**	**40869.57**
4.4.2	Resolve People-Park Conflict								
4.4.2.1	Research on extent of damage, key species, locations, impacts, etc. & development of mitigation strategies	X	X			EA	50000	100000	2173.91
4.4.2.2	Build awareness on simple measures to reduce livestock damage e.g. controlling free grazing	X	X	X	X	EA	25000	100000	2173.91
4.4.2.3	Implement mitigation / management measures for reducing man wildlife conflict		X	X	X	PA, EA	166667	500000	10869.57
4.4.2.4	Introduce and assess the effectiveness of 'Gandhi Guns' in selected villages. (14 villages, two guns per village)	X	X			PA, EA	100000	200000	4347.83
	Subtotal							**900000**	**19565.22**
4.4.3	Improve Educational Facilities								
4.4.3.1	WHB Scholarships for 300 students of all grades @Rs. 500/month	X	X	X	X	PA, EA	1800000	7200000	156521.74
	Subtotal						**1800000**	**7200000**	**156521.74**
	Component subtotal							**9980000**	**216956.52**

5 Proposal for Enhancing Habitat Connectivity

5.1 Background

The existing and proposed WHB sites like many other PA s throughout India are part of larger landscape units and have landscape ecological processes that operate well beyond the immediate park boundary. Many species need to use additional habitat and use corridors that are adjacent or near the existing or extended park areas. Often there are critical linkages that connect two chunks of relatively intact habitat. However many of these additional habitats, corridors and critical linkages have pockets of private land with land-uses that are incompatible with safe passage of wildlife often resulting in human-wildlife conflict as in areas adjacent to Kaziranga. In some cases, where Highways are crossed by wildlife as near Kaziranga, mitigation measures to reduce conflicts are required. In a few proposed sites in the Western Ghats, small pockets of isolated settlements exist where people live in considerable hardship due to human-wildlife conflict and because of lack of access to education, healthcare, markets and roads. Recent surveys in some of these areas indicate that a just, voluntary, creatively designed and implemented rehabilitation programme would benefit both people and the long-term conservation goals. In other situations as in Namdapha National Park a proposed WHB sub-cluster site, encroachment in the core by a small, disgruntled ethnic community whose activities have had a considerable negative impact on wildlife needs to be handled sensitively through a rehabilitation and alternative livelihood programme that ensures a participative mechanism. In some parts of the Western Ghats, tea, coffee and other estates near proposed WHB sites are sometimes sold off due to financial problems and many of these can potentially be acquired and help in consolidating existing and proposed WHB sites.

The existing and proposed WHB sites, which are state owned and managed by the Forest Department, protect many important areas for biodiversity against a background of conflicts with dependant communities and commercial interests. However, recent surveys of biodiversity in the Western Ghats at ATREE and elsewhere have revealed that considerable biodiversity occur outside the conventional PA system in coffee estates and riparian strips.

There is also a realization both in official and NGO circles that setting aside large areas under the strict categories such as National Parks will neither be feasible or practical and will be resisted by local communities and other stakeholders. Fortuitously, recent amendments to the Wildlife Protection Act 1972 (The Wildlife (Protection) Amendment Act, 2002 (16 of 2003)) passed by the Indian Parliament have included two new categories of Protected

Areas, the Conservation Reserve and the Community Reserve. These two categories for the first time recognize, encourage and legitimise the role of local communities and private landowners in conservation of biodiversity and ecosystem services.

Some additional areas adjacent or near WHB sites that cannot be declared under the strict categories can be potentially secured through these new categories that allow for participation of the community in conservation. There can be creative opportunities for enhancing livelihood opportunities and land-uses that are compatible with conservation of biodiversity including eco-tourism that is based on the spillover of wildlife as successfully demonstrated adjacent to Chitwan WHB site in Nepal.

The objectives of this component is to:

Consolidate habitat connectivity and enhance long-term security in and around existing and proposed WHB sites.

This will be achieved by:

1. Purchase of limited pockets of private land that are part of critical corridors adjacent to existing WHB sites in Assam as well isolated settlements within proposed WHB sites in the Western Ghats.

2. Support establishment of community and conservation reserves after careful survey, stakeholder consultation and feasibility studies.

3. Support alternative livelihoods for people who wish to voluntarily move out of isolated pockets in proposed WHB sites.

5.2 Kaziranga WH Site

The Kaziranga floodplains within the original WHB site, KNP (430 km^2) are linked to the riverine islands in the Brahmaputra as well as the Mikir hill forests in Karbi Anglong. There is faunal and nutrient exchange with the Brahmaputra and the islands as well as regular faunal movement between the hills and the floodplains. In addition during the annual monsoonal flooding large numbers of animals seek refuge in the nearby Mikir hills in Karbi Anglong. The inclusion of adjacent areas especially in Karbi Anglong that include evergreen forest with species such as the gibbon will add to the biodiversity attributes under one umbrella as well as ensuring that species such as the tiger and elephant that move freely between the floodplains and the hill forests can continue to do so (**Figure 5.1**). The

extended NP and the contiguous PAs in Karbi Anglong will cover an area greater than 1200 km^2.

There are long-standing proposals to extend the existing NP to include the riverine islands and adjacent grassland and forest corridors, some of which have been acquired.

There is one existing East Karbi Anglong WLS and a proposed Karbi Anglong WLS south of the existing KNP, which should receive assistance under this program. We have proposed 25 new camps in the floodplain extension areas and the existing and proposed sanctuaries in Karbi Anglong. There is also a provision to facilitate easier movement of wildlife across the NH-37 to the extension areas and corridors to Karbi Anglong by traffic speed control and public awareness.

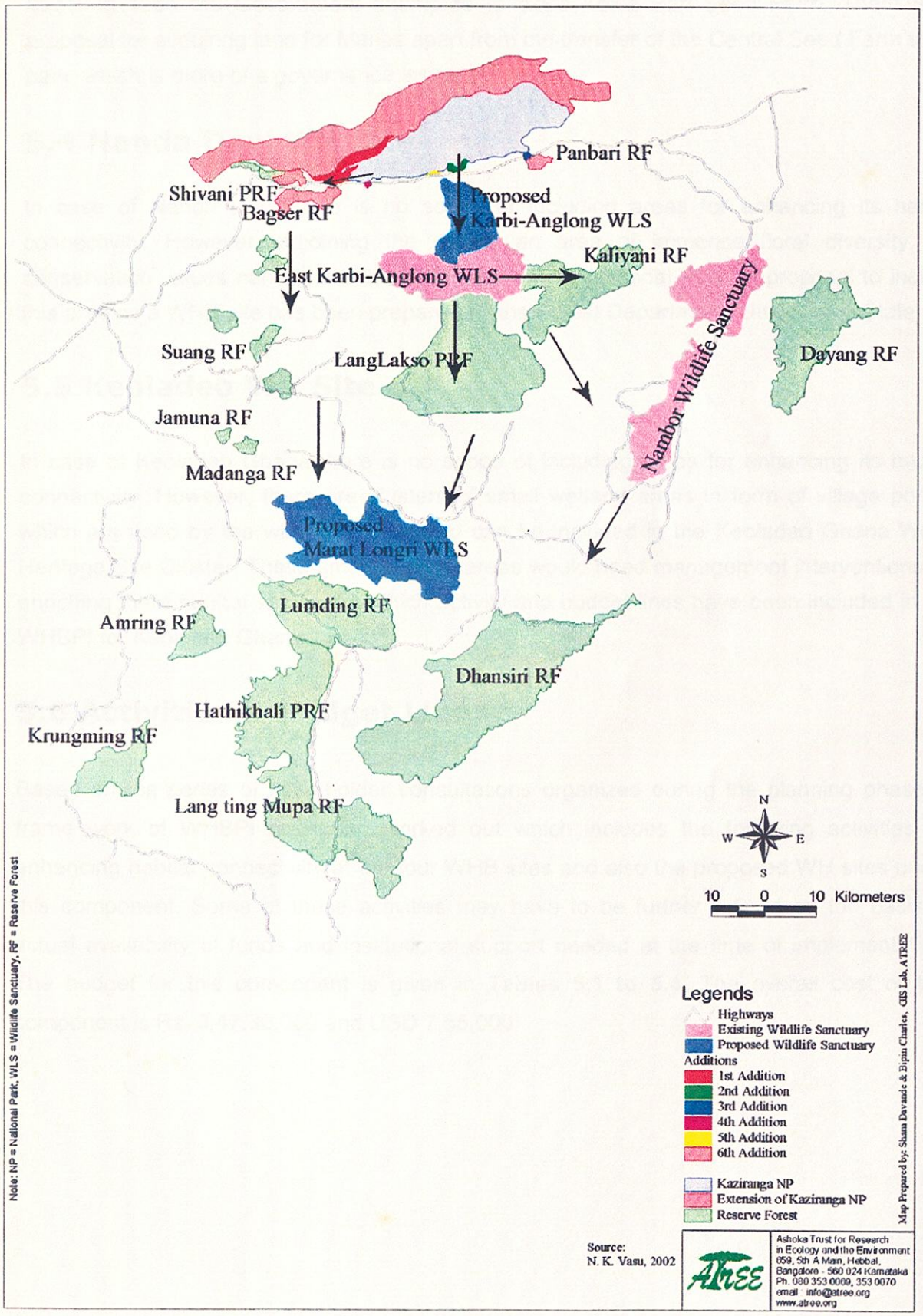
In addition there is a substantial provision for purchase of private land on both sides of the National Highway as well as in the Karbi Anglong hills to the south which will secure the larger Kaziranga-Karbi Anglong elephant and tiger conservation unit as well as provide a refuge for wildlife during the monsoon flooding.

5.3 Manas WH Site

The existing Manas National Park (520 km^2) including the original 390 km^2 Wildlife Sanctuary that was designated as a WHS is still to be secured and its attributes restored. We examined the habitat connectivity and encroachments in the larger Manas Tiger Reserve area as well as the connectivity with Royal Manas NP, Bhutan. The connectivity with the forests in Bhutan is still relatively intact, except for the disturbance and degradation due to the road in Bhutan adjacent to RMNP. Under no circumstances must regular traffic from and into Bhutan be allowed to pass through the Manas NP, India. If this were to be allowed, the resultant disturbance from vehicular traffic and road construction and maintenance works would surely endanger the Heritage attributes of Manas and put it in danger of being de-listed from WHB list.

It is evident that the establishment of satellite cores in Kochugaon and other areas assumes secondary priority since the main Park area is still not fully under the control of the Forest Department. Therefore we have no proposals for promoting habitat connectivity in the first two years. Once the park is secured after removal of encroachments and this is demonstrated within the first four years, other activities such as the development of satellite cores in Kochugaon and Barnadi to safeguard attributes such as the Golden langur, spotted deer and elephant can be taken up.

Fig. 5.1 Map showing habitat connectivity for Kaziranga World Heritage Biodiversity Site, Assam



Plantations were established along the southern border to provide a buffer against agricultural encroachment but this work ceased in 1977. Encroachment pressures from local people led the Government to set aside 8.09 km^2 from the sanctuary for a seed farm in 1971. In 1984 the Government attempted to close Kokla Bari Seed Farm. There is no proposal for acquiring land for Manas apart from the transfer of the Central Seed Farm to the park, which is more of a governance issue.

5.4 Nanda Devi WH Site

In case of Nanda Devi there is no scope of including areas for enhancing its habitat connectivity. However, adjoining the site is an area of immense floral diversity and conservation values namely *viz.* the Valley of Flowers National Park. A proposal to include this area as a WHB site has been prepared by the Forest Department, Uttaranchal State.

5.5 Keoladeo WH Site

In case of Keoladeo Ghana there is no scope of including areas for enhancing its habitat connectivity. However, there are clusters of small wetland areas in form of village ponds, which are used by the wintering birds and can be included in the Keoladeo Ghana World Heritage Site Cluster. These small wetland areas would need management interventions for enriching there habitat values, for which activity and budget lines have been included in the WHBPI for Keoladeo Ghana.

5.6 Activities & Budget Lines

Based on the series of stakeholder consultations organized during the planning phase, a frame work of WHBPI has been worked out which includes the following activities for enhancing habitat connectivity at the four WHB sites and also the proposed WH sites under this component. Some of these activities may have to be further refined on the basis of actual availability of funds and institutional support needed at the time of implementation. The budget for this component is given in **Tables 5.1 to 5.4**. The overall cost of this component is Rs. 3,47,30,000 and USD 7,55,000.

Table 5.1. Activity, timeline, Implementing Agency and budget for enhancing habitat connectivity component in Kaziranga National Park.

S. No	Activity	Year				Agency	Cost/Year (INR)	Total Cost 4 years (INR)	Total Cost 4 years (USD)
		1	2	3	4				
5.1.1	Construction and maintenance of rumble strips on highway near corridors	X	X	X	X	PA, EA	90000	360000	7826.09
5.1.2	Put up signboards and signages along strategic locations to educate road users and warn them of potential animal crossing zones	X		X		PA	45000	90000	1956.52
5.1.3	Put up forest check posts at sensitive zones to slow down night time traffic	X	X	X	X	PA	45000	180000	3913.04
5.1.4	Launch an awareness campaign among long distance heavy vehicle owners and drivers about the importance of this area and the need to slow down traffic for one month of the year along a narrow stretch	X	X	X	X	EA	45000	180000	3913.04
5.1.5	Acquire land in critical corridors adjacent to existing NP and in Karbi-Anglong hills		X	X	X	PA, EA	4983333	14950000	325000.00
	Subtotal							**15760000**	**342608.70**
	Component subtotal							**15760000**	**342608.70**

Table 5.2. Activity, timeline, Implementing Agency and budget for enhancing habitat connectivity component in Keoladeo National Park.

S. No	Activity	Year				Agency	Cost/year (INR)	Total Cost 4 Years (INR)	Total Cost 4 years (USD)
		1	2	3	4				
5.2.1	Conduct surveys for identification of satellite wetlands (using satellite imagery)	X				PA, EA	2000000	2000000	43478.26
5.2.2	Management interventions for improving status of satellite wetlands		X	X		PA, EA	5000000	10000000	217391.30
5.2.3	Documentation/preparation of proposal for nomination as WHB cluster site			X	X	PA, EA	500000	1000000	21739.13
	Subtotal							**13000000**	**282608.70**
	Component subtotal							**13000000**	**282608.70**

Table 5.3. Activity, timeline, Implementing Agency and budget for enhancing habitat connectivity component in Manas National Park.

S. No	Activity	Year				Agency	Cost/Year (INR)	Total Cost 4 years (INR)	Total Cost 4 years (USD)
		1	2	3	4				
5.3.1	*Restoration of enclosures within the Park*								
5.3.1.1	Restoration of Central Seed Farm inside Manas to the National Park	X				PA	970000	970000	21086.96
	Subtotal							**970000**	**21086.96**
	Component subtotal							**970000**	**21086.96**

Table 5.4. Activity, timeline, Implementing Agency and budget for enhancing habitat connectivity component in Nanda Devi National Park.

S.No	Activity	Year				Agency	Cost/year (INR)	Total Cost 4 years (INR)	Total Cost 4 years (USD)
		1	2	3	4				
5.4.1	Conduct species-habitat surveys in Valley of Flowers NP		X	X	X	PA, EA	1000000	3000000	65217.39
5.4.2	Documentation/preparation of proposal for nomination as WHB cluster site			X	X	PA, EA	1000000	2000000	43478.26
	Subtotal							**5000000**	**108695.65**
	Component subtotal							**5000000**	**108695.65**

6 Restoring Lost Attributes

6.1 Background

Kaziranga may have the single largest population of several endangered mammals such as the rhino, Wild Buffalo and the eastern swamp deer (*Cervus duvacelli ranjitsinghi*) but the long-term conservation goals cannot be achieved by investing in Kaziranga alone because of the dangers that affect single populations over time. We must draw lessons from successful restocking and reintroduction efforts in South Africa and closer home in Nepal and consider Manas, Burachapori, Laokhowa, Orang, Sonai-Rupai, Nameri and Dibru-Saikhowa as a network of sites in combination with Kaziranga that enhance the long-term survival of these grassland species. Manas may still have a remnant rhino population and its immediate protection after a detailed survey and enhancement through restocking from Pabitora and Kaziranga is of the highest priority since it can potentially contribute to genetic diversity because of its Brahmaputra North bank isolated population status unlike many of the Reserves on the South Bank. Similarly, eastern swamp deer is more or less restricted to Kaziranga and is highly endangered after the decimation of the Manas population. This is another species that needs immediate active management besides the Wild Buffalo.

The restoration of the lost attributes of Manas and other sites cannot be delinked from the management of these species throughout Assam.

We propose that under the WHBPI seed funding to restock and reintroduce should be available to all these sites which we consider as managed metapopulations. Suitable models such as the Pygmy Hog Conservation Programme and the Nepal government's Rhino Population Management Programme may be followed.

Manas is a WHB site in danger because of past insurgency, poor relations with surrounding communities, breakdown of government authority, damage to infrastructure and low morale of Park management. The main goals for Manas under the WHBPI will be to atleast secure the existing Manas National Park area (which includes the 390 km^2 Manas Wildlife Sanctuary which was designated as a WHB site), rebuild basic infrastructure, develop positive interactions with the surrounding communities and enhance its profile amongst political and cultural institutions such as the Bodo Territorial Council, the Bodo Sahitya Sabha and finally to restore its lost attributes without which it can longer be considered of WHB site stature. These lost attributes are basically species such as the rhino, eastern swamp deer and gharial as well as habitats such as managed grasslands. Manas may get be de-listed as a WHB site if faunal attributes continue to be lost and its unique grassland habitats allowed to deteriorate. The WHB activities and budgetary allocations after the first

year will be conditional on progress made on securing the Park attributes as well demonstrated commitment of the state government to restoring Manas. The recent initiatives in Assam and a renewed commitment shown by the State Government augur well for the WHB projects in Assam.

Specifically the activities for this component will cover the reintroduction and/or restocking of rhino, eastern Swamp deer and gharial in Manas, gharial in riverine areas of Kaziranga and other suitable sites. Reintroduction of rhino to create small populations in the Nameri-Sonai Rupai complex and Dibru-Saikhowa will also be undertaken after suitable feasibility study.

6.2 Activities & Budget Lines

Based on the series of stakeholder consultations organized during the planning phase, the following activities for restoring the lost attributes are proposed at the two sites in Assam. Some of these activities may have to be further refined on the basis of actual availability of funds and institutional support needed at the time of implementation. The budget for this component is given in **Tables 6.1 and 6.2**. The overall cost of this component is Rs.53,60,000 and USD 1,16,521.74.

Table 6.1. Activity, timeline, Implementing Agency and budget for the restoring lost attributes in Kaziranga National Park.

S. No	Activity	Year				Agency	Cost/Year (INR)	Total Cost 4 years (INR)	Total Cost 4 years (USD)
		1	2	3	4				
6.1.1	Pilot phase of reintroduction of gharial		X	X		EA, PA	230000	460000	10000.00
	Subtotal							**460000**	**10000.00**
	Component subtotal							**460000**	**10000.00**

Table 6.2. Activity, timeline, Implementing Agency and budget for the restoring lost attributes in Manas National Park.

S. No	Activity	Year				Agency	Cost/Year (INR)	Total Cost 4 years (INR)	Total Cost 4 years (USD)
		1	2	3	4				
6.1	Restore lost habitats								
6.1.1	Assessment of lost habitats using RS/GIS	X	X			EA	300000	600000	13043.48
6.1.2	Formulate an action plan for habitat restoration	X				EA,PA	50000	50000	1086.96
6.1.3	Habitat Restoration		X	X	X	PA, EA	300000	900000	19565.22
6.1.4	Research and Monitoring		X	X	X	EA,PA	50000	150000	3260.87
	Subtotal							**1700000**	**36956.52**
6.2	Restore lost species								
6.2.1	Assessment of populations of critically endangered species such as Rhino, Swamp deer and gharial	X	X			EA,PA	150000	300000	6521.74
6.2.2	Pilot phase of reintroduction of rhino/swamp deer/gharial			X	X	PA, EA	1150000	2300000	50000.00
6.2.3	Monitoring of reintroduced population			X	X	EA, PA	300000	600000	13043.48
	Subtotal							**3200000**	**69565.22**
	Component subtotal							**4900000**	**106521.74**

7 Research & Monitoring

7.1 Background

India's current PA network evolved in the 1970s and 1980s. The management plans of these PAs were largely based on extensions of the then existing forestry working plans and often traditionally oriented towards assumptions of vegetation climax and ignored the role of disturbance whether natural or anthropogenic in shaping the landscape and driving ecological processes. Most PAs include many non-forest landscapes such as grasslands and wetlands that have vital linkages with ecological and geomorphological processes and landscape dynamics outside the boundaries and often upstream through rivers. However, there existed a "compartmentalization" in thinking with an impregnable fortress approach to both ecosystems and communities within the reserve boundary. Unfortunately, even the establishment of research institutes at the national level and the growth of wildlife science as a discipline in India have largely not been able to bring complete rigour and serious scientific analyses in protected area management. Ecological monitoring as a tool for framing of management plans for PAs with complex and diverse ecosystems subject to temporal and spatial variability was never adopted and instead *ad hoc*, unscientific and inconsistent methodologies were often used. There have been many important developments in Conservation Biology, Sampling, Remote Sensing/Geographical Information Systems and Landscape Ecology in the 1990s and these new concepts and tools are yet to make a mark in the management of India's Protected Areas.

The approach to the research and monitoring aspects of this project was motivated by the lessons learned from the review of the activities at the operational level over the past two decades. We have drawn from this experience through the participation of scientists and researchers in the site level workshops as well as by consulting with an active wildlife biologist on the PCC, and researchers active in the proposed WHB sites. We have also looked at the management plans of existing World Heritage sites. In addition, recent field visits to existing and proposed WHB sites as well as other protected areas in the Western Ghats provided additional material. The issues discussed in this section have a bearing on the infrastructure component envisaged for this project.

Large sums of money have been allocated for various kinds of "wildlife management activities" by the wildlife departments of the states under funding from the central government schemes or other sources. Such activities include manipulation of vegetation, badly designed and located captive breeding facilities within parks, soil and water resources interventions, weed eradication, formation of roads in steep, high rainfall terrain, check dams

and other civil structures. These are often motivated by intention to "improve" the habitat for wildlife. However, it is evident that in a large number of cases, the activities actually are not based on scientific evidence, unnecessary, and wasteful of scarce conservation funds. In a particular case, Rs 70 lakhs ($ 150,000) were spent on hoe working the soil under wild bamboo culms in a well-known National Park in Southern India.

The basic problem results often from the inadequacy of management plans as many a times the best scientific and research expertise available in civil society is not brought to bear upon these plans. In addition, the training in wildlife management has also not been able to incorporate the modern principles of plant and animal ecology, the role of disturbance including fire, landscape processes and population ecology. There is also a general tendency to follow generic prescriptions of previous plans or ignore site specificity and in a few cases handle and expend large sums of money.

On the other hand, we also have examples of park managers who have worked with researchers and demonstrated their ability to incorporate their concerns in the management plans. This partnership and use of continuing feedback from interpretation of field observations is vital for improving the management effectiveness.

The objectives of the research and monitoring component of the WBH India programme are:

1. Involve the best available science and experience from civil society in the preparation of the management plans for the existing and any new World Biodiversity Heritage sites in India.
2. Support critical research needs directly and indirectly relevant for safeguarding the World Heritage attributes in the long-term.
3. Promote a long-term partnership between the scientific and academic community and the WBH site managers.
4. Monitor the success and failure of individual components of the WHB India program.

7.2 Activities & Budget Lines

Based on the series of stakeholder consultations organized during the planning phase, the following research and monitoring activities are proposed at the four WHB sites under this component. Some of these activities may have to be further refined on the basis of actual availability of funds and institutional support needed at the time of implementation. The 'indicators of success; and the 'means of assessment' of all the proposed activities are given in **Annexure 3.1 to 3.4**. The budget for this component is given in **Tables 7.1 to 7.4**. The overall cost of this component is Rs. 3,31,47,600 and USD 7,20,600.

Table 7.1. Activity, timeline, Implementing Agency and budget for the research and monitoring component in Kaziranga National Park.

S. No	Activity	Year				Agency	Cost/Year (INR)	Total Cost 4 years (INR)	Total Cost 4 years (USD)
		1	2	3	4				
7.1.1	*Research infrastructure*								
7.1.1.1	Setting up of a fully equipped field research station with a basic lab and library to be jointly run by PA and participating academic institutions		X			EA, PA	900000	900000	19565.22
7.1.1.2	Dedicated research vehicles (1 4WD)	X				EA, PA	450000	450000	9782.61
7.1.1.3	Field station manager		X	X	X	EA	135000	405000	8804.35
7.1.1.4	Maintenance and upkeep of field station and vehicles		X	X	X	EA, PA	45000	135000	2934.78
	Subtotal						**1530000**	**1890000**	**41086.96**
7.1.2	*Research Projects*								
7.1.2.1	*Long term Research projects on:*								
7.1.2.1.1	Effect of management practices (Burning of Grasslands and associated ecosystems)		X	X	X	EA	450000	1350000	29347.83
7.1.2.1.2	Estimation of large mammal densities every two years based on scientific methods	X		X		EA	180000	360000	7826.09
7.1.2.1.3	Monitoring and research on invasive species and their spread	X	X	X	X	EA	225000	900000	19565.22
7.1.2.1.4	Study hydrology and sedimentation processes of the floodplain ecosystem, including annual flooding cycles		X	X	X	EA	306667	920000	20000.00
7.1.2.1.5	Detailed habitat mapping using RS/GIS and multidate satellite imagery	X	X			EA	225000	450000	9782.61
7.1.2.1.6	Assess other components of biodiversity, and woodland and riverine habitats in extension areas & Karbi-Anglong		X	X	X	EA	450000	1350000	29347.83
7.1.2.1.7	Long term research on movement patterns of Elephants between Kaziranga floodplains and Karbi-Anglong hills		X	X	X	EA	900000	2700000	58695.65
7.1.2.1.8	Identification of crucial animal corridors and private land for purchase	X				EA	92000	92000	2000.00
7.1.2.1.9	Research on the Metapopulation dynamics of Rhinos with respect to Kaziranga and other Pas in Assam		X	X		EA	675000	1350000	29347.83
7.1.2.1.10	Assisted genetic exchange within the Rhino metapopulation by translocation			X	X	EA	900000	1800000	39130.43
7.1.2.1.11	Set up a database at the Park HQ to help in the collection and analysis of data pertaining to the biodiversity of the park			X	X	EA	90000	180000	3913.04
	Subtotal							**11452000**	**248956.52**
7.1.2.2	*Socio-economic aspects*								
7.1.2.2.1	Socio-economic assessment and resource use by dependent local communities in Karbi-Anglong and extension areas	X	X	X	X	EA	98900	395600	8600.00
	Subtotal						**98900**	**395600**	**8600.00**
7.1.2.3	*Documentation and dissemination*		X	X	X	EA	180000	540000	11739.13
7.1.2.3.1	Annual Research Seminar (combined for Kaziranga and Manas)	X	X	X	X	EA	115000	460000	10000.00
	Subtotal							**1000000**	**21739.13**
	Component subtotal							**14737600**	**320382.61**

Table 7.2. Activity, timeline, Implementing Agency and budget for the research and monitoring component in Keoladeo National Park.

S. No	Activity	Year				Agency	Cost/year (INR)	Total Cost 4 Years (INR)	Total Cost 4 years (USD)
		1	2	3	4				
7.2.1	*Research Infrastructure (Personal & Equipment)*								
7.2.1.1	Establishment of Research lab	X	X			PA, EA	250000	500000	10869.57
7.2.1.2	Equipment for Research Lab	X	X			PA, EA	250000	500000	10869.57
7.2.1.3	Specialized Wetland equipment gear	X	X			PA, EA	150000	300000	6521.74
7.2.1.4	Purchase of Research Boat & Accessories	X	X			PA, EA	150000	300000	6521.74
7.2.1.5	Maintenance & upkeep of Field station and other equipments purchased	X	X	X	X	PA, EA	100000	400000	8695.65
7.2.1.6	Contractual Engagement of Field Station Manager & Social scientist	X	X	X	X	PA, EA	300000	1200000	26086.96
	Subtotal							**3200000**	**69565.22**
7.2.2	Research Projects and Dissemination								
7.2.2.1	Project on Biodiversity Mapping & Monitoring	X	X	X	X	EA	400000	1600000	34782.61
7.2.2.2	Annual Research Seminar	X	X	X	X	PA	75000	300000	6521.74
7.2.2.3	Documentation & Dissemination	X	X	X	X	PA	50000	200000	4347.83
	Subtotal							**2100000**	**45652.17**
	Component subtotal							**5300000**	**115217.39**

Table 7.3. Activity, timeline, Implementing Agency and budget for the research and monitoring component in Manas National Park.

S. No	Activity	Year				Agency	Cost/Year (INR)	Total Cost 4 years (INR)	Total Cost 4 years (USD)
		1	2	3	4				
7.3.1	*Research infrastructure*								
7.3.1.1	Setting up of a fully equipped field research station at Bansbari with a basic lab and library to be jointly run by PA and participating academic institutions	X				EA, PA	1000000	1000000	21739.13
7.3.1.2	Dedicated research vehicle	X				EA, PA	500000	500000	10869.57
7.3.1.3	Field station manager		X	X	X	EA	150000	450000	9782.61
7.3.1.4	Maintenance and upkeep of field station and vehicles		X	X	X	EA, PA	100000	300000	6521.74
	Subtotal							**2250000**	**48913.04**
7.3.2	*Research Projects*								
7.3.2.1	Long term Research projects on:								
7.3.2.1.1	- Habitats (Grasslands, riverine forests, savannah woodlands)	X	X	X	X	EA	400000	1600000	34782.61
7.3.2.1.2	- Indicator species (Pygmy hog, hispid hare, Bengal florican etc)	X	X	X	X	EA	400000	1600000	34782.61
	Subtotal							**3200000**	**69565.22**
7.3.2.2	Socio-economic aspects								
7.3.2.2.1	- Resource use by local communities			X	X	EA	200000	400000	8695.65
7.3.2.2.2	- Effectiveness of outreach programs			X	X	EA	50000	100000	2173.91
7.3.2.2.3	- Effectiveness of welfare programs			X	X	EA	50000	100000	2173.91
7.3.2.2.4	- Profiling of wildlife offenders	X	X	X	X	EA,PA	100000	400000	8695.65
	Subtotal							**1000000**	**21739.13**
7.3.2.3	Annual Research Seminar (combined for Kaziranga and Manas)		X	X	X	EA, PA	153333	460000	10000.00
7.3.2.4	Documentation, website and dissemination		X	X	X	EA, PA	300000	900000	19565.22
	Subtotal							**1360000**	**29565.22**
	Component subtotal							**7810000**	**169782.61**

Table 7.4. Activity, timeline, Implementing Agency and budget for the research and monitoring component in Nanda Devi National Park.

S.No	.Activity	Year				Agency	Cost/year (INR)	Total Cost 4 years (INR)	Total Cost 4 years (USD)
		1	2	3	4				
7.4.1	*Research Infrastructure (Personal & Equipment)*								
7.4.1.1	Establishment of Research lab	X	X			PA, EA	250000	500000	10869.57
7.4.1.2	Equipment for Research Lab	X	X			PA, EA	250000	500000	10869.57
7.4.1.3	Contractual Engagement of Field Station Manager	X	X	X	X	PA, EA	150000	600000	13043.48
7.4.1.4	Maintenance & upkeep of Field station and other equipments purchased	X	X	X	X	PA, EA	100000	400000	8695.65
	Subtotal							**2000000**	**43478.26**
7.4.2	*Research Projects & Dissemination*								
7.4.2.1	Project on Biodiversity Mapping and Monitoring	X	X	X	X	EA	400000	1600000	34782.61
7.4.2.2	Project on NTFP Assessment, Cultivation & Marketing	X	X	X	X	EA	300000	1200000	26086.96
7.4.2.3	Annual Research Seminar	X	X	X	X	PA	75000	300000	6521.74
7.4.2.4	Documentation & Dissemination	X	X	X	X	PA	50000	200000	4347.83
	Subtotal							**3300000**	**71739.13**
	Component subtotal							**5300000**	**115217.39**

8 Identification of Potential World Biodiversity Heritage Clusters

8.1 Background

India harbours two out of 25 global hotspots of biodiversity and is one of the megadiversity countries in the world. It has many sites that combine scenic beauty, unique ecosystems, fascinating ecological processes, interesting geology, biodiversity and cultural attributes. However, it has only five natural World heritage Sites. This component seeks to:

1. Select potential sites in the Western Ghats, eastern Himalayas and the Terai eco-region to propose as World Biodiversity Heritage clusters.

2. Ensure successful nomination of the proposed clusters after detailed surveys and consultations within four years.

As outlined in **Table 2.1** WII and ATREE were given specific regions for the identification of potential sites. ATREE covered the Western Ghats and the Eastern Himalayas and WII covered the Terai eco-region. This section first begins with a brief methodology, summary of the proposed sites and then moves on with details of the proposed sites.

The activities related to one above were part of the planning phase and the activities related to two will be implemented as part of the implementation phase of this project.

8.2 Methodology

The selection of new areas to add to an existing conservation network has been attempted at various spatial scales from sub-regional to global (Rodgers & Panwar 1988, Bawa et al., 1997, Ramesh et al., 1997, Menon et al., 2000). These have usually been based on a gap analysis of an existing PA network based on various criteria such as biogeographical representativeness, biodiversity attributes such as endemism, presence of viable populations of endangered species and presence of unique ecosystems. The new sites can be assessed through a cumulative, metapopulation or a stand-alone basis.

The selection of potential World Biodiversity Heritage Sites however differs from the expansion of the Protected Area network in many ways. WHB sites, especially the core areas are likely to be selected from existing notified protected areas so there may be no

incremental addition to the existing PA network. In general, potential WHB sites are likely to be biased in favour of the better-protected and more pristine areas. In addition, the new trend is for cluster nominations rather than nomination of individual parks or reserves. The cluster of sites would together represent the best and most unique attributes of the entire biogeographic unit.

The background material for this section utilises ongoing work at ATREE and WII as well as recent published material on the region (such as Pawar and Birand, 2001 & IIRS, 2002).

8.2.1 Identification of potential WHB sites for Western Ghats and Eastern Himalayas

Consultant reports

ATREE wrote to consultants (37) familiar with individual or clusters of sites in each of the two regions and explained the four UNESCO criteria. A total of 13 consultants sent in their nominations with detailed reports and another was consulted in person. The potential sites in the these two regions were based on (apart from the four WHB criteria) habitat integrity and contiguity, absence of large settlements and pressures, absence of conflicts with existing or proposed development projects and selection in other lists such as Important Bird Areas program, Project Tiger and Project Elephant. The consultants were also asked to comment on socio-cultural aspects of the communities and presence of sites of historical value in and around the sites, which enabled a separate ranking on the mixed natural-cultural attributes.

Conservation values methodology for Western Ghats

The Western Ghats being so rich in biodiversity and other attributes presents a challenge to selection of areas to propose as WHB sites. ATREE adopted a two-pronged approach that combined consultants' assessments with an objective spatial data based approach.

We took advantage of the spatial mapping of biodiversity that is being done as part of the preparation of a conservation profile of the Western Ghats for the Critical Ecosystem Partnership Fund as well as ATREE's project on Gap Analyses for the Western Ghats being done for the Ministry of Environment and Forests, Government of India.

The area within the Western Ghats hotspot boundary considered to have natural vegetation and biodiversity attributes and for which spatial data and remotely sensed data were available was defined as the area of analyses. This area was divided into grid cells to correspond to Survey of India 1:25,000 (about 175 km^2 each) topographic maps. The administrative boundaries of existing PAs as well as Reserved Forests were used to

delineate polygons within which presence of species could be located. These thus constitute all known sites within the Western Ghats that merit conservation attention. The known presence of IUCN Red Listed species belonging to mammals, birds and amphibians in each of these polygons or sites was based on published literature, consultation and field experience of the team. The grids cells were overlaid on these polygons and each grid cell was allotted the IUCN species based on their location within the sites. The total number of IUCN presences was summed up for each grid cell and this was rescaled over 0-100 by dividing by the maximum grid value and multiplying by hundred.

In addition to the species attribute each grid cell was allotted two other conservation values based on percentage of unique and rare habitats and the percentage of high quality forest and other natural vegetation. This was done by dividing the area of analyses into sub-regions based on physiography and limits of individual remotely sensed imagery. An index of evergreeness as well as a detailed vegetation map was prepared for each sub-region. The detailed vegetation map for each sub-region was also aggregated to generate a vegetation classification map for the entire area of analyses. Unique habitats were identified on the basis of the index of evergreenness. The wettest and most evergreen sites, which are closely associated with presence of close canopy evergreen forest or unique evergreen communities such as the *Mrystica* swamps, were identified in each sub-region. The rarest vegetation type in each sub-region was identified using the vegetation map. The quality of the forest cover was based on a "edginess" factor derived from analyses of remotely sensed data and the top 25% on this index was considered high quality. The percentage of this high quality forest cover within each grid cell made up the third conservation value. These two additional conservation attributes were also normalized on a scale of 100 as described earlier.

A combined conservation value was generated by summing up the conservation values from each of the three individual components i.e. IUCN species index, unique and rare habitat index and the high quality forest index and this was also rescaled over 0-100. All the proposed World Heritage Biodiversity subclusters rank high on the conservation value scale (**Figure 8.1**) and are also relatively well connected to other to each other within each sub-cluster (**Figure 8.2**). The maximum conservation value obtained for the different components in a subcluster was used to rank them relatively for the Threatened species/ Biodiversity basis.

The potential sites in the Western Ghats were also marked on existing 1:250,000 vegetation maps (French Institute, Pondicherry).

Fig. 8.1 The relative conservation values of the Western Ghats WHB Cluster

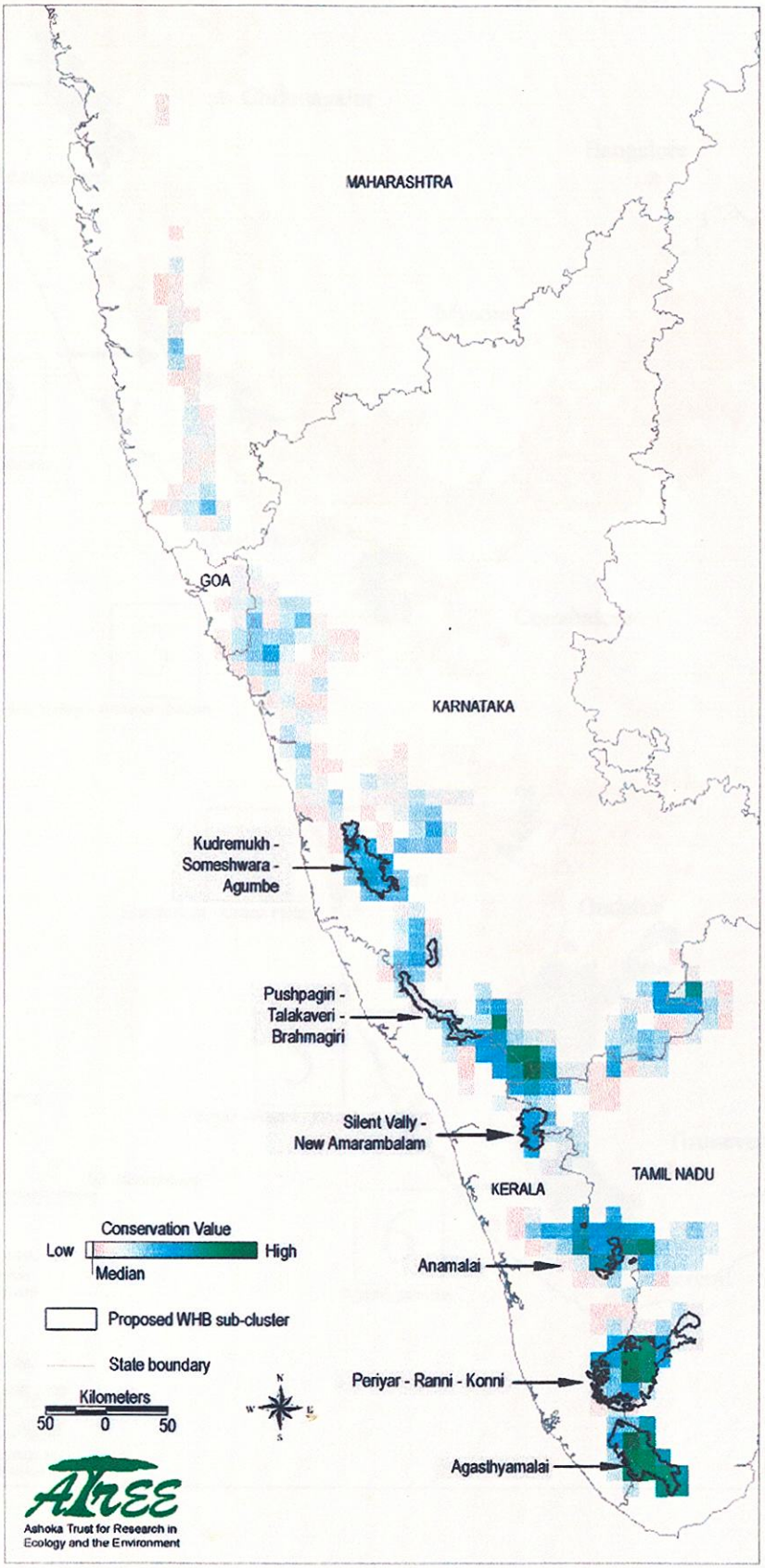
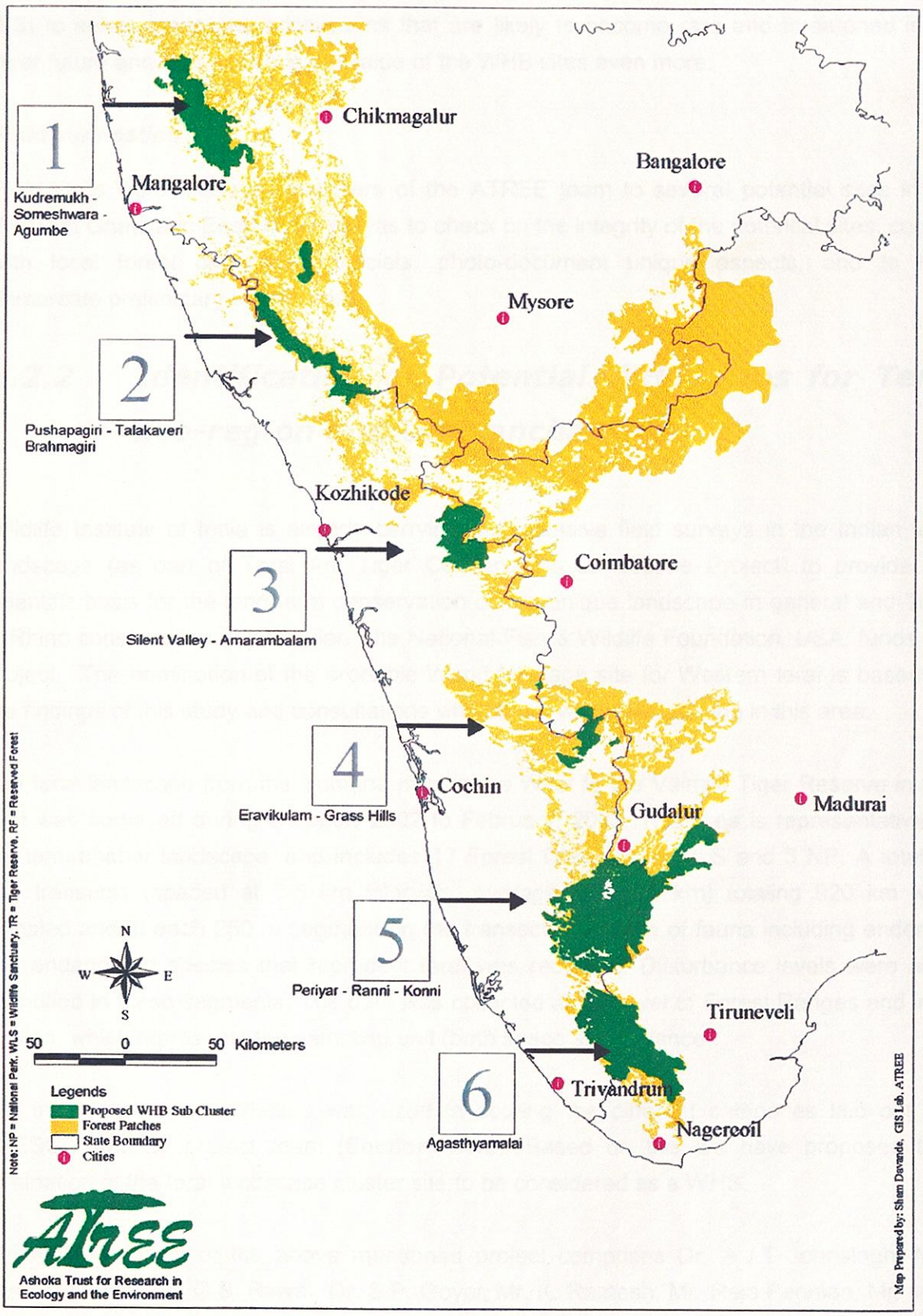


Fig. 8.2 Connectivity map of the Western Ghats WHB Cluster



Eastern Himalayas

In the case of the Eastern Himalayas we used the sensitivity to deforestation map (**Figure 8.3**) to select areas and ecosystems that are likely to become rare and threatened in the near future and thus enhance the value of the WHB sites even more.

Field verification

Field visits were made by members of the ATREE team to several potential sites in the Western Ghats and Eastern Himalayas to check on the integrity of the potential sites, consult with local forest department officials, photo-document unique aspects, and to help demarcate preliminary boundaries.

8.2.2 Identification of Potential WHB Sites for Terai Eco-region and Uttaranchal Hills

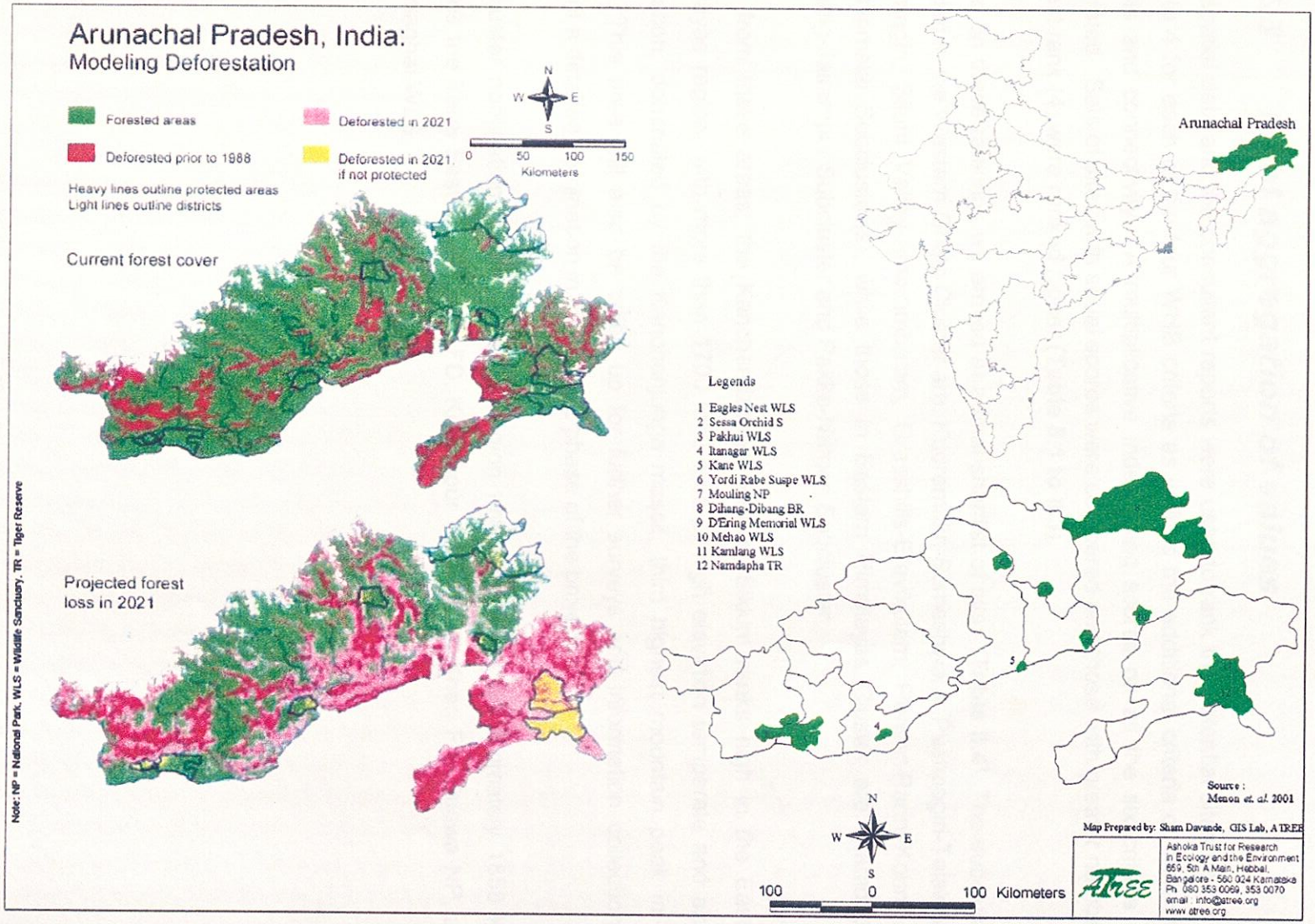
Wildlife Institute of India is already carrying out intensive field surveys in the Indian terai landscape (as part of Terai Arc Tiger Conservation Landscape Project) to provide the scientific basis for the long-term conservation of this unique landscape in general and Tiger & Rhino conservation in particular. The National Fish & Wildlife Foundation, USA, funds the project. The nomination of the probable World Heritage site for Western terai is based on the findings of this study and consultations with conservationists working in this area.

The terai landscape from the Yumuna river in the West to the Valmiki Tiger Reserve in the east was surveyed during October, 2002 to February, 2003. This area is representative of the terai-bhabar landscape, and includes 17 Forest Divisions, 5 WLS and 3 NP. A total of 220 transects (spaced at 3-5 km intervals, average length 5 km) totaling 920 km was sampled and at each 250 m segment on the transect, presence of fauna including endemic and endangered species that represent terai was recorded. Disturbance levels were also quantified in these segments. The data was collected at the level of Forest Ranges and in a fashion, which represents the sampling unit (both space and distance).

The information thus collected was used in scoring the different categories laid out by UNESCO and by project team (**Section 9.1.3**). Based on this we have proposed the nomination of the terai landscape cluster site to be considered as a WHS.

The research team of the above mentioned project comprises Dr. A.J.T Johnsingh, Mr. Qamar Qureshi, Dr. G.S. Rawat, Dr. S.P. Goyal, Mr. K. Ramesh, Mr. Raja Pandian, Mr. Md. Yasin, and Mr. Ramsaran.

Fig. 8.3 Map of Arunachal Pradesh, showing deforestation threats



The Forest Department, Government of Uttaranchal has already submitted a proposal for nominating the Valley of Flowers National Park as a World Heritage Site and we have also endorsed and included this proposal in the WHBPI (refer **Annexure 8.1**). We have extensively used the information contained in the Uttaranchal Forest Department proposal for nominating the Valley of Flowers National Park as the World Heritage Site.

8.2.3 Final aggregation of values

The spatial data and the consultant reports were used to rank the potential sites on a scale of 1 to 4 for each of the four WHB criteria as well as the additional criteria of buffer from threats and connectivity. A multiplicative index using scores on all the six criteria was generated. Sets of sites with equal scores were compared and those with greater number of highest rank (4) were ranked higher (**Table 8.1 to 8.3**).

Based on these rankings we arrived at a final shortlist of sites (**Table 8.4**). The subclusters included in the Western Ghats Cluster are: Kudremukh-Someshwara, Pushpagiri-Talakaveri-Brahmagiri, Silent Valley-Amarambalam, Grasshills-Eravikulam, Periyar-Ranni-Konni and Agastyamalai Subcluster(s), while those in Eastern Himalayas Cluster are: Namdapha-Kamlang-Jairampur Subcluster and Pakke-Nameri Subcluster.

Apart from these areas, the Kanchendzonga area of Sikkim ranks high in the Eastern Himalayas region, with more than 1700 km2 area of high elevation temperate and alpine vegetation, dominated by the Kanchenjunga massif, third highest mountain peak in the world. This area will also be taken up for further surveys and information collection to present a detailed nomination in the second phase of the project.

The cluster nomination for the terai eco-region with an area of approximately 1858 km^2 includes the Terai East FD Philibhit FD, Kishanpur WLS, North Kheri FD, Dudwa NP, and Katerniaghat WLS.

Table 8.1 Comparative ranking of potential WHBPI sites in the Western Ghats

The Proposed sites were relatively ranked on the World Heritage criteria. These criterion-wise ranks were used to determine the overall 'scores' for each of the sites. The Agastyamalai, Anamalai and Periyar-Ranni-Konni subclusters emerged as the highest three respectively.

Criteria	Heritage Criteria 1	Heritage Criteria 2	Heritage Criteria 3	Heritage Criteria 4	Heritage Criteria 5	Heritage Criteria 6	Heritage Criteria 7	Scores	
Name of Site	Physiographic / Geomorphic features.	Ongoing Ecological processes	Natural Phenomena/ Aesthetic importance	Threatened species/ Biodiversity	Habitat contiguity	Buffer from threat	Cultural Values	Multiplicative Index	Additive Index
Kudremukh-Someshwara subcluster	2	3	3	2	3	2	1	216	16
Pushpagiri-Talakaveri-Brahmagiri subcluster	2	2	2	1	1	2	4	64	14
Silent Valley-New Amarambalam RF subcluster	2	3	3	2	3	3	1	324	17
Anamalai subcluster	3	4	4	3	2	4	1	1152	21
Periyar-Ranni-Konni subcluster	2	2	3	3	4	2	4	1152	20
Agastyamalai subcluster	3	2	3	4	4	2	4	2304	22

Table 8.2 Comparative ranking of potential WHB sites in the Eastern Himalayas

Criteria	Heritage Criteria 1	Heritage Criteria 2	Heritage Criteria 3	Heritage Criteria 4	Heritage Criteria 5	Heritage Criteria 6	Heritage Criteria 7	Scores	
Name of Site	Physiographic/ Geomorphic features.	Ongoing Ecological processes	Natural Phenomena/ Aesthetic importance	Threatened Species / Biodiversity	Habitat contiguity	Buffer from threats	Natural Values	Multiplicative Index	Additive Index
Kangchen-dzonga (Sikkim)	4	1	4	3	3	3	2	864	20
Siang-Mishmi Hills (Arunachal Pradesh) (Debang-Dihang)	2	1	3	3	3	2	2	216	16
Namdapha / Kamlang / Jairampur	4	1	3	4	4	3	2	1152	21
Dibru-Saikhowa	3	4	2	2	2	3	1	288	17
Pakhui-Pakke, Eaglenest, Sessa, Nameri	3	2	3	3	3	3	2	972	19
Loktak lake	2	4	2	4	2	1	1	128	16
Barail RF	1	1	1	3	2	1	1	6	10
Meghalaya cliffs and canyons	3	1	4	1	2	4	1	96	16
Tale Valley	1	1	2	2	2	2	3	48	13

Table 8.3 Comparative ranking of potential WHB sites in the Terai eco-region

Criteria	Heritage Criteria 1	Heritage Criteria 2	Heritage Criteria 3	Heritage Criteria 4	Heritage Criterion 5	Heritage Criterion 6	Scores	
Divisions surveyed	Physiographic/Geomorphic features	Ongoing Ecological processes	Natural Phenomena/Aesthetic importance	Threatened species & Biodiversity	Habitat contiguity / corridor value	Buffer from threat	Multiplicative	Additive
Shivalik FD	2	2	2	2	3	2	96	13
Haridwar FD	1	1	1	2	3	1	6	9
Dehradun FD	1	1	1	2	3	2	12	10
Narendra Nagar FD	1	2	1	2	3	2	24	11
Bijnor FD	1	1	1	2	2	2	8	9
Kalagarh FD	2	2	2	2	3	2	96	13
Lansdowne FD	2	1	2	2	2	2	32	11
Terai west FD	1	1	1	2	2	1	4	8
Terai central FD	2	2	1	2	3	1	24	11
Haldwani FD	2	1	2	2	3	2	48	12
Ramnagar FD	2	2	2	2	2	3	96	13
South Kheri FD	2	1	2	1	3	2	24	11
Shajhanpur FD	2	1	1	1	2	1	4	8
Champawat FD	3	1	2	2	3	3	108	14
Rajaji NP	3	2	2	2	3	3	216	15
Corbett NP	3	2	3	2	3	3	324	16
Sonanandhi WLS	2	2	2	2	3	3	144	14
Suhelwa WLS	2	2	2	2	3	2	96	13
Sohagi Barwa WLS	2	2	2	2	1	1	16	10
Proposed Areas								
Terai east FD	3	3	3	3	3	3	729	18
Pilibhit FD	3	3	4	3	4	3	1296	20
Kishnapur WLS	4	3	3	3	3	3	972	19
North Kheri FD	2	3	1	2	4	2	96	14
Dudwa NP	4	3	3	4	3	3	1296	20
Katerniaghat WLS	4	2	4	3	2	3	576	18

Table 8.4. Proposed World Heritage Subclusters for India

Western Ghats Cluster

S. No	Name of the sub-cluster	Areas included	Location of site in state(s)	Biogeographic zone/province	Area (km^2) (Approx.)
1	Kudremukh-Someshwara-Agumbe sub-cluster	Kudremukh NP, Someshwara WLS, Someshwara RF, Balahalli RF, Agumbe RF	Karnataka	5A Western Ghats 5B Western Ghats: Western Ghats Mountains	1046 km^2
2	Pushpagiri-Talakaveri-Brahmagiri sub-cluster	Pushpagiri WLS, Brahmagiri WLS, Talkaveri WLS, Padinalknad RF, Kerti RF and Aralam WLS	Karnataka	5A Western Ghats 5B Western Ghats: Western Ghats Mountains	735 km^2
3	Silent Valley-Amarambalam sub-cluster	Silent Valley NP, New Amarambalam RF, parts of Kalikavu Range and Attapadi RF	Kerala	5A Western Ghats 5B Western Ghats: Western Ghats Mountains	522 km^2
4	Anamalai Sub-Cluster	Grass Hills NP, Eravikulam NP, Kariyan shola, Mankulam range, Mannavan shola and parts of Chinnar WLS	Kerala, Tamil Nadu	5A Western Ghats 5B Western Ghats: Western Ghats Mountains	236 km^2
5	Periyar- Ranni-Konni sub-cluster	Periyar Tiger Reserve, parts of Ranni, Konni, Achankovil and Tirunelveli forest divisions, Srivilliputtur WLS	Kerala, Tamil Nadu	5A Western Ghats 5B Western Ghats: Western Ghats Mountains	2760 km^2
6	Agasthyamalai Sub-Cluster	Kalakad-Mudanthurai WLS, Shendurney WLS, Peppara WLS, Neyyar WLS, Palode RF, Kulathupuzha RF	Kerala, Tamil Nadu	5A Western Ghats 5B Western Ghats: Western Ghats Mountains	1541 km^2

Eastern Himalayas Cluster

S. No	Name of the sub-cluster	Areas included	Location of site in state(s)	Biogeographic zone/province	Area (km^2) (Approx.)
1	Namdapha – Kamlang-Jairampur Sub-Cluster	Namdapha NP Kamlang WLS and part of Jairampur FD	Arunachal Pradesh	2D Himalaya: East Himalaya	3075 km^2
2	Pakke-Nameri Sub-Cluster	Pakhui NP Nameri NP, Eagle's Nest Wildlife Sanctuary, Sessa orchid Sanctuary	Assam Arunachal	2D Himalaya: East Himalaya 9A North-East: Brahmaputra Valley	2808 km^2

Terai Eco-region Cluster and the Uttaranchal Hills

S. No	Name of the site	Areas included	Location of site in state(s)	Biogeographic zone/province	Area (km^2) (Approx.)
1	Terai eco-region Cluster	Terai East FD Philibhit FD Kishanpur WLS North Kheri FD Dudwa NP Katerniaghat WLS	Uttaranchal Uttar Pradesh	7A Gangetic Plain: Upper Gangetic Plain	1858 km^2
2	Valley of Flowers	Valley of Flowers NP	Uttaranchal	2B Himalaya: West Himalaya	87.5 km^2

8.3 The Western Ghats Biodiversity cluster

Background

The Western Ghats hotspot is one of the 25 global priority hotspots for conservation, and one of the two on the Indian subcontinent. The WGSL hotspot covers the coastal and mountain regions of approximately 150,000 km^2 in five states of southern India. Of this less than 10 % is assumed to be intact or covered by relatively undisturbed natural vegetation at present. The area is extraordinarily rich in biodiversity. Although the total area is less than 3% of the land area of India WGSL contains more than 30% of all plant, bird and mammal species found in India. The WGSL like other hotspots has a high proportion of endemic species. The region also has a spectacular assemblage of large mammals and is home to several nationally significant wildlife sanctuaries, tiger reserves and national parks. The WGSL also contains numerous medicinal plants and important genetic resources such as the wild relatives of grains (rice, barley, *Elucine coracana*) fruits (mango, garcinias, banana, jackfruit), and spices (black pepper, cinnamon, cardamom, and nutmegs).

Being largely a montane area that receives from 2000-8000 mm annual rainfall within a short span of 3-4 months, WGSL hotspot performs important hydrological/watershed functions. Approximately 245 million people live in the peninsular Indian states that have their main rivers originating in the Western Ghats. Thus, the soils and waters of this hotspot sustain the livelihoods of millions of people. With the possible exception of the Indo-Malayan region, no other hotspot impacts the lives of so many people as does the WGSL.

Geology and climate of the Western Ghats

The peninsular plateau of India is an ancient landmass, formed during the Archaean and Precambrian period more than 2500 million years ago. The Western Ghats constitutes the western edge of the plateau that gently slopes eastwards. The Western Ghats, as a part of the India landmass, was a part of the Gondwanaland land until late Jurassic, some 152

million years ago. The Indian plate started drifting eastwards 130 million years ago and collided with the Asian plate approximately 50 million years ago, thrusting up the Himalayas. The tectonic activity also continued in peninsular India as late as the Tertiary and is assumed to be responsible for the upliftment of the high plateaus in parts of the Western Ghats such as Nilgiris, Palnis and the Anamalais (Nair, 1991).

The latitudinal extent of the Western Ghats spans approximately 12 degrees and has few parallels in the tropics (Ramesh et al 1997). The influence of this hill range on regional climate, biota and hydrology is seminal. The hills create a significant orographic effect, especially with regard to the southwest monsoon winds. The western slopes of the Ghats receive heavy rainfall ranging from 2,000-6,000 mm per year, with the highest amount of precipitation - 7,460 mm - occurring at Agumbe, Karnataka. Rainfall decreases rapidly towards the east, in some instances from over 7,000 mm to 4,000 mm within 15km and to 2,000 mm in 50 km (Ramesh et al 1997). This decrease varies across latitude, with the transition being more rapid at higher latitudes (Ramesh et al 1997). This east-west gradient in rainfall is one of the most influential factors in determining the distribution of forest types across this region (Ramesh et al 1997).

At 15° N latitude the decrease in rainfall from west to east is so great that 25 km beyond the summit, rainfall levels are too low to support the growth of evergreen forests. Here moist deciduous forests replace them and 30 km further east, the latter are replaced by dry deciduous formations (Ramesh et al 1997). Moist forests are generally confined to the humid regions with a rainfall of more than 2,000 mm – a narrow belt between the coast and 20-40km east of the summit. The length of the dry season- determined by the rapid advance and gradual withdrawal of the southwest monsoons - is another critical latitudinal gradient that influences the distribution of vegetation types in this region. The number of dry days increases from south to north. Endemic evergreen species, which require continually moist environments, are therefore restricted to the southern parts of the W. Ghats (Daniels, NBSAP).

Biological importance of the Western Ghats Hotspot

The forests of the Western Ghats, India, are some of the best representatives of non-equatorial tropical evergreen forests in the world. The Ghats have evolved into one of the richest centres of endemism owing to their isolation from other moist areas. The Ghats are embedded in a landscape that has much drier climatic conditions (Ramesh et al. 1997). The portion of the W. Ghats south of Coorg district in Karnataka has very high hills with several enclaves, which have acted, as refugia for species over the years, as surrounding areas have steadily grown drier. Variation in the degree of endemism in the W. Ghats depends on both the latitudinal length-of – the –dry season gradient as well as the temperature-elevation

gradient, with a greater number of endemics found in areas with a short dry season and higher altitudes (Ramesh et al. 1997).

The total number of endemic flowering plant species in India is estimated to be 1,500 (Ramesh et al. 1997). Nearly 63% of India's woody evergreen taxa are endemic to the Western Ghats. Of the 58 endemic genera largely confined to the Western Ghats, 47 are monotypic. Gramineae (Poaceae) has the highest number of endemic genera and the genus *Nilgirianthus* has the maximum number of endemic species – 20 (Nair 1991). Of the nearly 650 tree species found in the Western Ghats, 352 (54%) are endemic (Daniels, NBSAP). The tree genera that are endemic to the Western Ghats include *Blepharistemma*, *Erinocarpus*, *Meteromyrtus*, *Otenophelium*, *Poeciloneuron* and *Pseudoglochidion*. Other genera endemic to the Western Ghats include; *Adenoon, Griffithella, Willisia, Meineckia*, *Baeolepis, Nanothamnus, Wagatea, Campbellia* and *Calacanthus* (Nair 1991). Out of the 8 species found in genus *Ocholandra* (family -Bambusae), six are from the W. Ghats.

There are several centers of plant endemism and species richness within the Western Ghats. For instance, of the 280 woody endemic species found south of the Karnataka, 70 species are endemic to the southernmost Travancore region (Nair 1991). Herbaceous species richness is the highest in the stretch of hills to the south of Coorg district in Karnataka (Nair 1991). Seventy-seven of the 175 species of *Impatiens* reported from India occur here. The greatest diversity of ferns is seen between 600 and 900m asl, in this portion of the southern Western Ghats (Daniels, NBSAP). The Nilgiri mountains are one of the most important centers of speciation for flowering plants in the W. Ghats, with 82 species restricted to this area alone (Daniels, NBSAP). The Palni hills and the Anamalai hills are also important centers of endemism and species richness, primarily because they hold unique ecosystems of 'shola-grassland' or montane forests interspersed with grassland savannahs. Shrub and herb diversity in these systems is very high (Daniels, NBSAP). Four species in the tree genus *Myristica* are found in the southern W. Ghats as well (Nair 1991). Fifty-eight of the orchid species found in the Western Ghats occur in Kerala and 15 of these are endemic to that state. Six of the 15 endangered orchid species found in the Western Ghats are restricted to Kerala and areas along the Kerala- Tamilnadu border. The Silent Valley National Park – particularly the Sispara pass area also stands out as one of the richest areas in plant diversity and endemism in the Western Ghats.

The Western Ghats supports a diverse fauna. Among the vertebrates, the largest number of species is in birds (508 species), followed by fishes (218), reptiles (157), mammals (127), and amphibians (121). Many of these species are endemic to the W. Ghats region. The most number of endemics is to be found among the amphibians (78%) followed by reptiles (62%), fish (53%), mammals (12%) and birds (4%). In terms of affinities, there are differences among taxa: freshwater fish show remarkable similarities with the fish fauna of the Eastern

Himalaya and the Indo-Malayan region while also sharing genera with some African species. Many land birds and mammals were derived from the Eastern Himalayan- Malayan regions. Ethiopian elements in the fauna include the hyena and pythons, while Mediterranean elements (e.g. *Hemitragus*) are poorly represented. In addition there are autochthonous groups that evolved in isolation in the region and are represented by genera unique to the W. Ghats (e.g. *Melanobatrachus* and *Nyctibatrachus*) or common to the southern W. Ghats and Sri Lanka such as the shield-tail snakes (Family: Uropeltidae) (Mani 1974, Daniels-NBSAP).

It is estimated that 325 globally threatened (Red Data List) species occur in the Western Ghats. The globally threatened flora and fauna in the Western Ghats are represented by 229 plant species, 31 mammal species, 15 bird species, 43 amphibian species, 5 reptile species, 1 insect species and 1 fish species. Of the total of 329 globally threatened species in the W. Ghats, 129 are Vulnerable, 145 are Endangered, and 51 are Critically Endangered. Adequate information on the Western Ghats freshwater fish and invertebrates from the IUCN list has not been compiled. This is due to lack of sources of published information on these species.

The landscape species identified in the W. Ghats are the Asian elephant, the tiger, the Asiatic wild dog, the greater spotted eagle, the white-backed vulture and the long-billed vulture. The conservation of these species cannot depend upon a site-based approach alone and requires the protection of larger landscapes.

Current Conservation Status

A total of 58 protected areas consisting of 14 National Parks and 44 Wildlife Sanctuaries fall within the boundaries of the Western Ghats hotspot. The total area covered by these protected areas is 13,595 km^2 representing 9.06% of the hotspot. Although protected area planning and design have not been based on biogeographic principles, the Western Ghats is one of two biogeographic zones (the other being the Andaman and Nicobar Islands) with the highest level of coverage by protected areas (Rodgers & Panwar 1988).

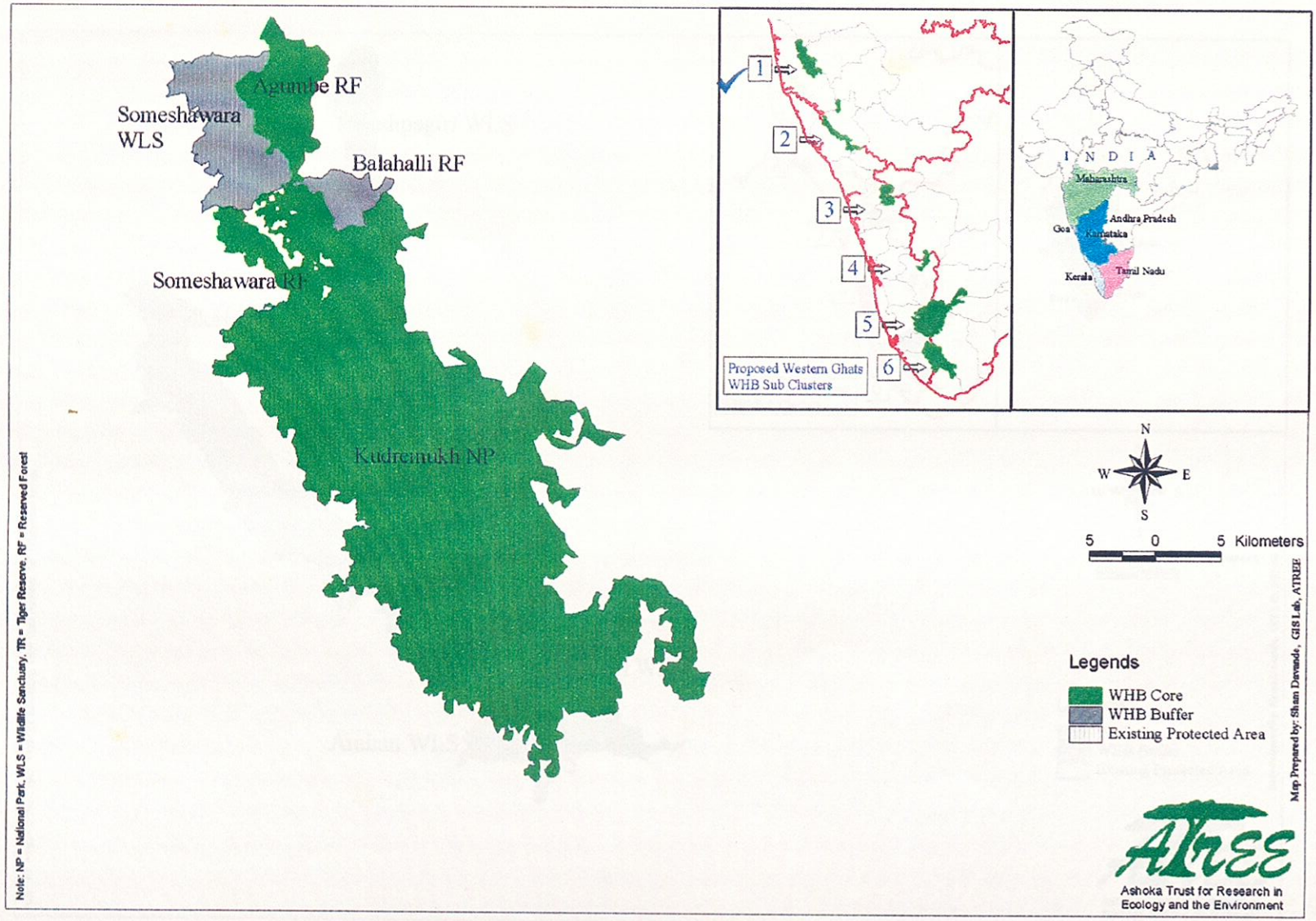
The legal notification status is preliminary and final for 19 and 29 protected areas respectively. [The preliminary notification is a notification of intent to constitute a protected area; the final notification is issued following the completion of the rights settlement process]. Although protected area establishment dates back to 1942, most of the protected areas in the hotspot were notified in the 1980s. Protected area establishment through final notifications continue, with the most recent notification being issued in 2001 for Kudremukh National Park in the State of Karnataka.

Protected areas in the Western Ghats including proposed World Heritage sites are embedded in a human-dominated landscape and hence subject to intense land-use conflicts. Although the region has had human influence for several millennia, the most significant ecological changes occurred from the early 19th century onwards, following British colonisation and after Independence.

The Western Ghats World Heritage Biodiversity Cluster

The proposed Western Ghats WHB cluster (**Figure 8.4 to Figure 8.9 and Table 8.1**) covers a total area of 6,726 km^2 and includes known habitats for at least 131 IUCN Red listed species, which is approximately 40% in the entire Western Ghats for the three animal taxa considered. The cluster includes areas with high levels of plant diversity and endemism such as Agastyamalai, Ranni-Konni and Mankulam. Overall, the cluster covers large areas with the highest conservation values in the entire Western Ghats (**Figure 8.1**). The cluster also has substantial areas of habitat for landscape and flagship species such as the elephant and the tiger. Many of the sites are being designated as Important Bird Areas as part of an international program. The cluster has the best representatives of the Shola-Grassland ecosystem, which is a remnant from a palaeo-climate change episode as well as the best examples of mid-elevation rainforest left. It also includes the highest mountain (Anaimudi) in the Western Ghats, which is also the highest in India south of the Himalayas, and several other high peaks such as Agastyamalai and covers an elevation range from 200m to 1869m. The cluster includes sites of considerable cultural and spiritual significance including the origin of sacred rivers such as the Cauvery, Tunga and Bhadra as well as sites associated with Saint Agastya.

Fig. 8.4 Map of the proposed WHB Kudremukh – Someshwara – Agumbe sub-cluster



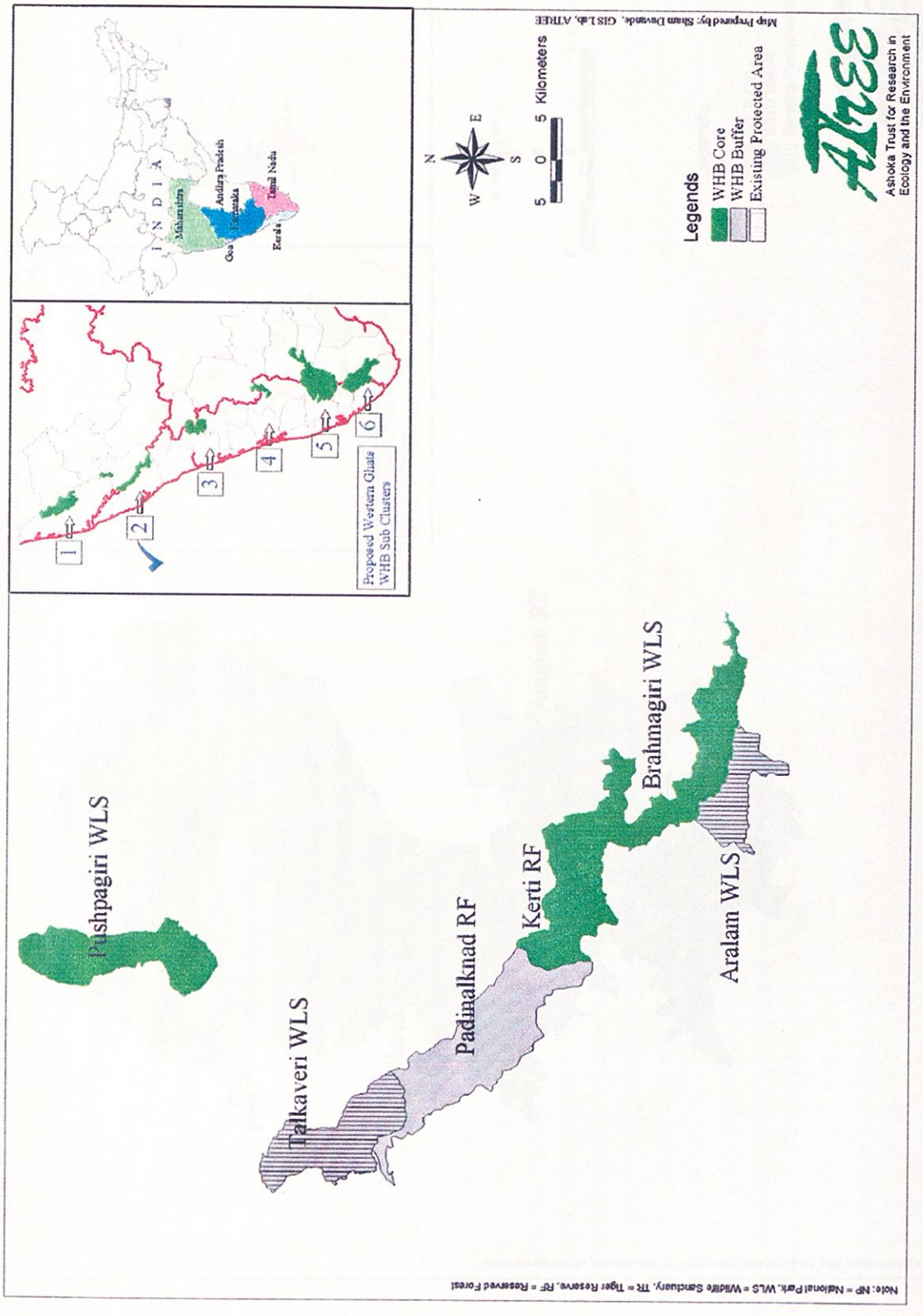
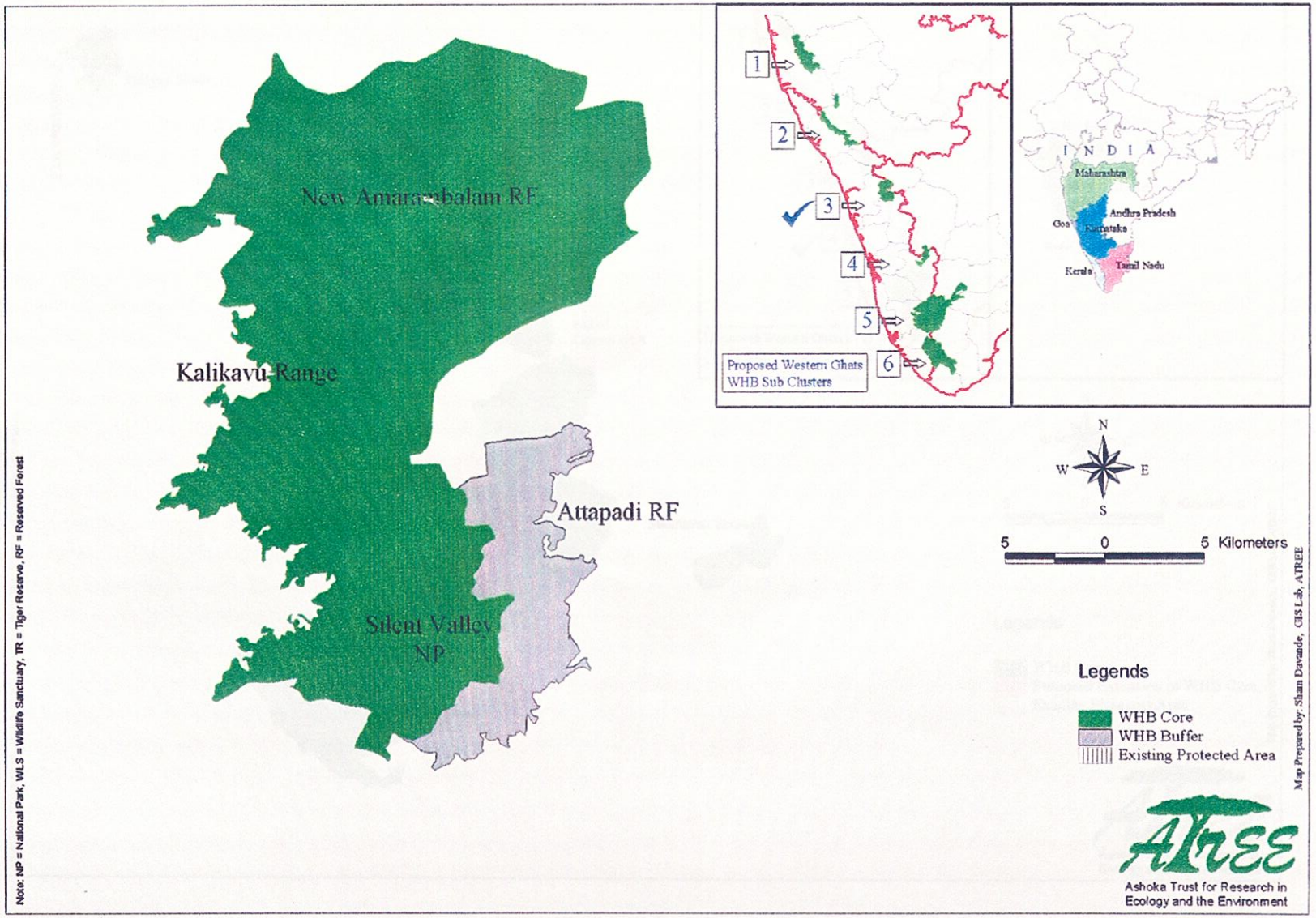


Fig. 8.5 Map of the proposed WHB Pushpagiri – Talakaveri – Brahmagiri sub-cluster

Fig. 8.6 Map of the proposed WHB Silent Valley – Amaramalam sub-cluster



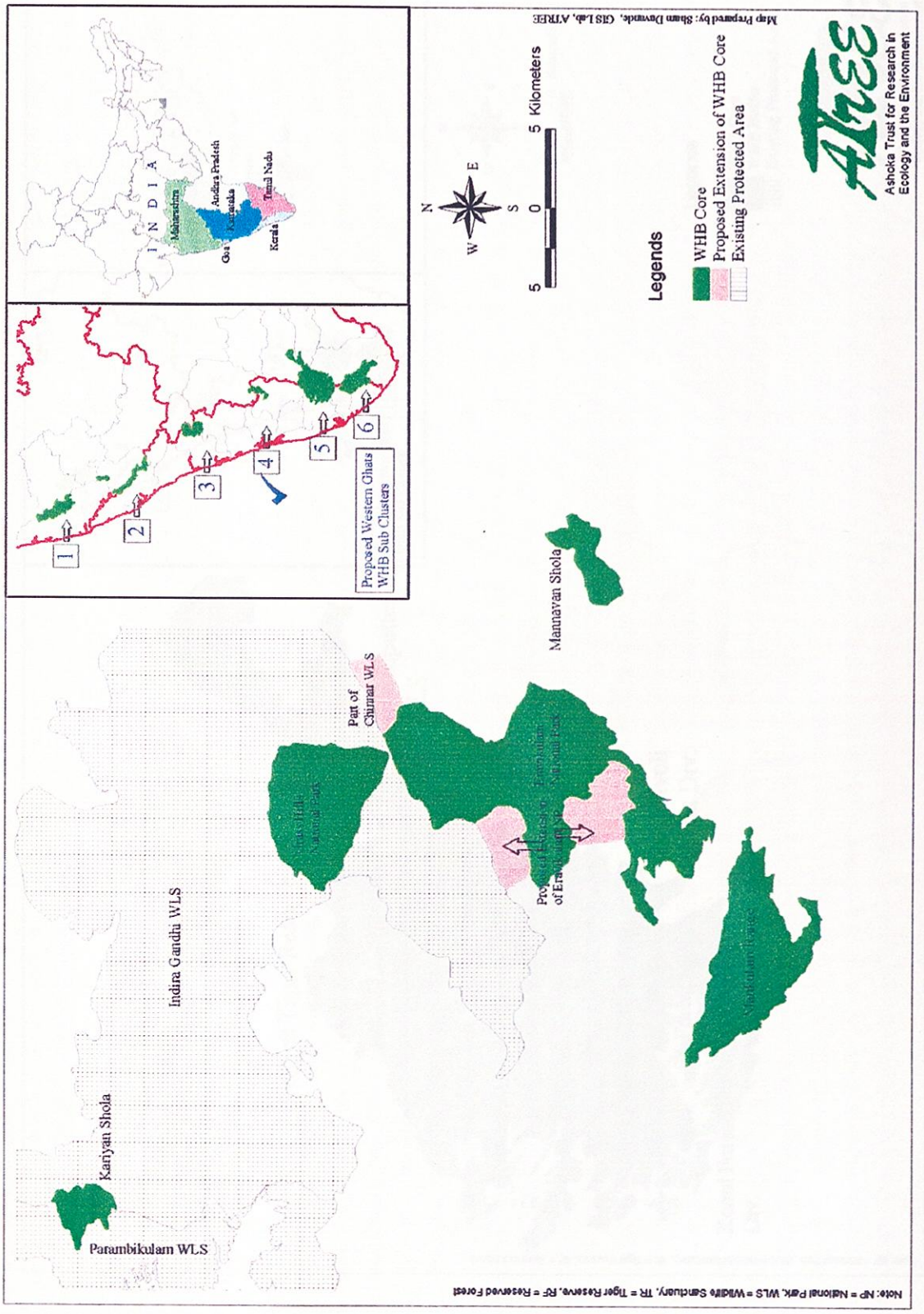


Fig. 8.7 Map of the proposed WHB Anamalai sub-cluster

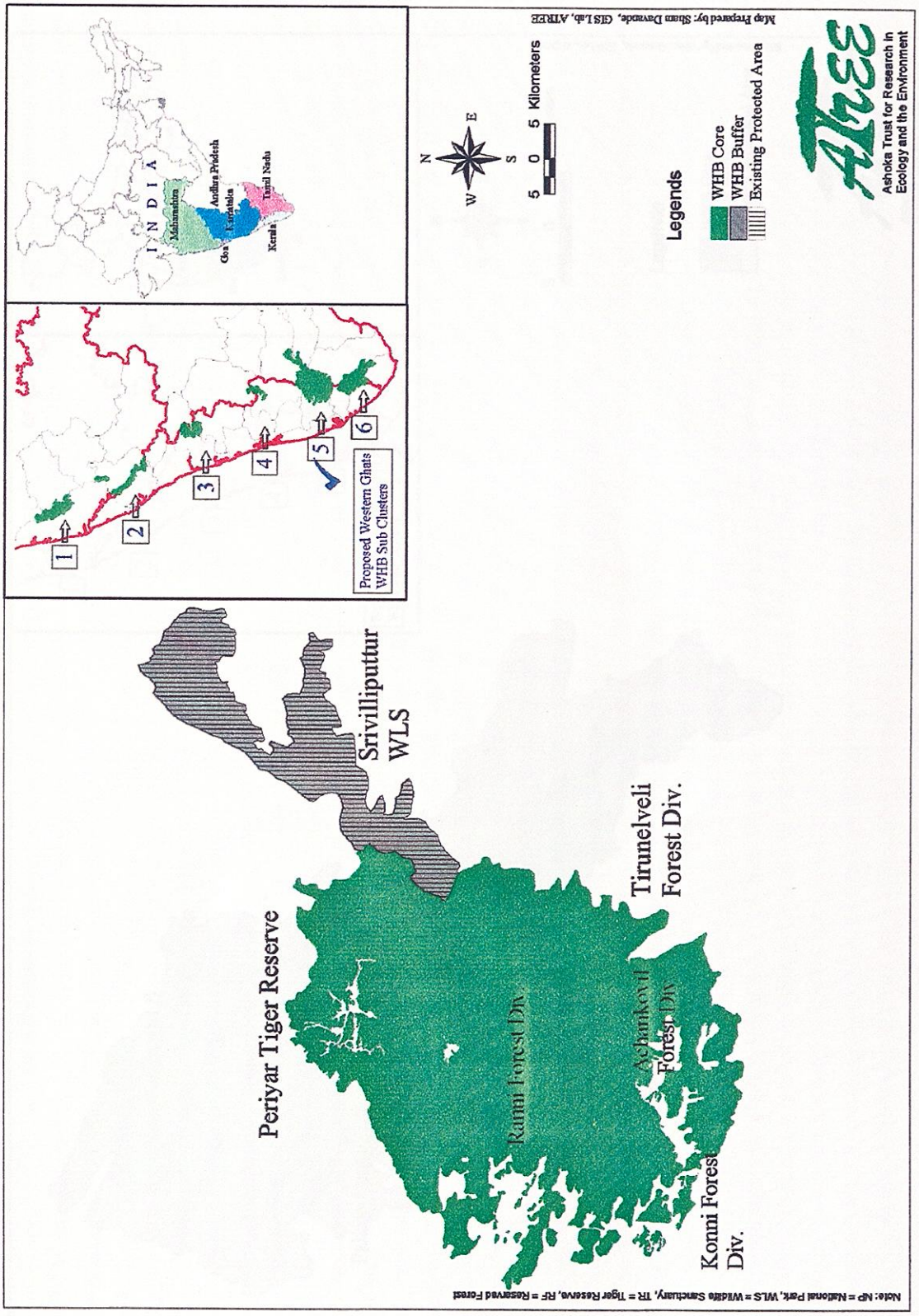


Fig. 8.8 Map of the proposed WHB Periyar – Ranni – Konni sub-cluster

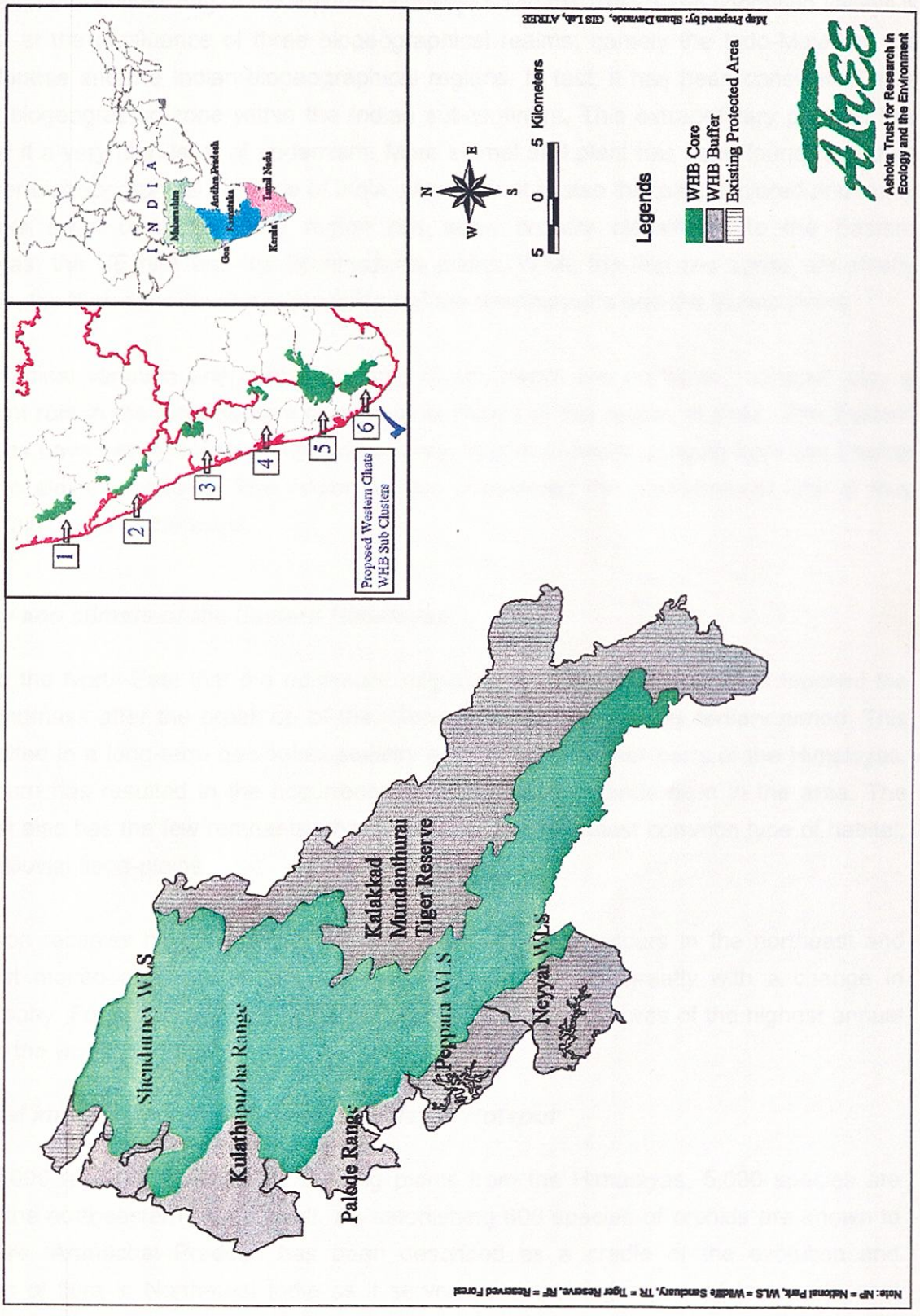


Fig. 8.9 Map of the proposed WHB Agasthyamalai sub-cluster

8.4 The Eastern Himalayas cluster

Background

North-East India consisting of the Eastern Himalayas and the associated floodplain valleys is situated at the confluence of three biogeographical realms; namely the Indo-Malayan, the Indo-Chinese and the Indian biogeographical regions. In fact, it has been considered as a distinct biogeographic zone within the Indian subcontinent. This extraordinary position has afforded it a very high level of endemism. More animal and plant has been found here than any other biogeographical province of India. Moreover, it is also the least explored and many new taxa await discovery. The region has been broadly classified into the Eastern Himalayas, the NE hills and the Brahmaputra plains. While the first two zones are chiefly montane, the third consists of the floodplains of the Brahmaputra and the Surma rivers.

The altitudinal variation and rainfall patterns of southwest and northeast monsoon play a significant role in the development of ecological niches in this region of India. The Eastern Himalayas have been described a region of great habitat diversity, ranging from wet tropical forests to alpine meadows. This region is also considered the northernmost limit of true tropical rainforests in the world.

Geology and climate of the Eastern Himalayas

It was in the North-East that the northward migrating "Deccan peninsula" first touched the Asian landmass after the break up of the, Gondwanaland in the early tertiary period. This has resulted in a long-term geological stability as opposed to other parts of the Himalayas. This in turn has resulted in the occurrence of a high level of endemism in the area. The northeast also has the few remnants what was historically the most common type of habitat; the wet alluvial flood-plains.

The region receives high rainfall (>2000 mm) most of which occurs in the northeast and southwest monsoons. Microclimate however, is found to vary greatly with a change in physiography. For instance, parts of the region have historical records of the highest annual rainfall in the world (>10,000 mm).

Biological importance of the Eastern Himalayas Hotspot

Of the 8,000 reported species of flowering plants from the Himalayas, 5,000 species are found in the northeastern region itself. An astonishing 600 species of orchids are known to occur here. Arunachal Pradesh has been described as a cradle of the evolution and speciation of flora in North-east India as it serves as a meeting region of temperate east Himalayan flora, palaeo-arctic flora of the Tibetan highland and wet evergreen flora of South-

east Asia and Yunnan. The Brahmaputra valley that runs between the Eastern Himalayas in the north, Garo/Khasi/Jaintia and Mikir/Cachar/Barail hills ranges in the south too acts as an ecotone between the temperate east Himalayan flora and the wet evergreen and wet deciduous floristic elements. *Rhododendron* (96 species) forms the major high altitude ornamental plant in the region. The region is also abundant in angiosperms with 82 (out of 167 species found in India) found in this region (Khoshoo, 1992 & 1993). Twenty taxa of gymnosperms occur in North-East (out of a total of 54 for India). Some of these such as *Amentotaxus*, *Cephalotaxus and Larix* are endemic to this region. This is also a major centre for crop diversity (Vavilov, 1951).

The region is characterised by a very high level of endemicity for faunal groups too. Out of approximately 1200 bird species found in India, 836 are found in this region (approximately 69.6%). Of these, the global distribution of 24 species is restricted to this region only. Two of the Indo-Burmese hotspot's eight endemic bird-areas have been recognised here. This richness principally reflects the diversity of habitats and the biogeographic continuity with SE Asia. Recent surveys have lead to 6 new rediscoveries and 7 new records for amphibian species (71) found in the region. The region also contains 175 species of reptiles, excluding crocodilians. Nine known species and three unconfirmed species of Primates occur here including the western most extent of India's only ape, the Gibbon. Small carnivore communities are said to have a species richness not found anywhere else in the world. The area is particularly represented by 5 small cats species whose range extensions end in the North-East region. It is also rich in terms of large mammal groups. Two new species of large mammals have been recorded for the first time in India. This area is also the western most extent of the Malayan sun-bear. North-East India also contains India's largest elephant populations, large enough to ensure long-term genetic viability. This is also the only region in India where all four large cat species are found.

Current conservation status of the Eastern Himalayas Hotspot

The natural landscapes in this region have been extensively modified in the recent past. Causes include pressure on the land, decreasing cycle of shifting cultivation, exploitation of forest for timber and absence of a sound and scientific forest management strategy. The ancient practice of shifting cultivation has been the single largest factor responsible for forest and land degradation, causing extensive changes in the landscape. As many as 0.45 million families in the region annually cultivate 10,000 km^2 forests. The total area affected by this practice (locally called *jhumming*) is believed to be as much as 44,000 km^2. The geometric increase in human population has led to a shortening in the *jhum* cycle from 20-30 years in the past to about 5 years and even up to 3 years in many areas. This in turn has led to an undue increase in pressure on land and accelerated the process of land degradation. Degraded secondary forests, bamboo thickets, weeds or simply barren lands dominate

jhumscapes (Toky and Ramakrishanan, 1981). This has set in a retrogressive successional trend resulting in loss of biodiversity.

The foothills and lowland forests along the Brahmaputra and Surma basins have extensive Teak and Tea (*Camellia sinensis*) plantations, which are an important source of revenue. The tropical vegetation of North-east India typically occurring at elevation up to 900 m (vegetation types like evergreen, semi-evergreen and moist deciduous forests) is facing maximum pressure due to human interventions. In Assam valley, the giant *Dipterocarpus macrocarpus*, *Terminalia myriocarpa* and *Shorea robusta* occur in gregarious forms. These occasionally attain a girth of up to 7m and a height of up to 50 m making them highly prized in the commercial timber market. This has resulted in large-scale fragmentation of these forests. Attempts have been made to plan a protected area network in the region. The PA network covers only 6.31 percent of the region's area. Moreover, most of these have become islands of conservation and constantly face confrontation with local inhabitants.

Eastern Himalayas World Heritage Biodiversity Cluster

The proposed Eastern Himalayas WHB cluster (**Figure 8.10 and 8.11. and Table 8.1**) covers a total area of 5883 km^2 and includes some of the most pristine and undisturbed areas in India. The cluster is comprised of two sub-clusters namely, the Namdapha-Kamlang-Jairampur Cluster and the Pakkei-Nameri Cluster. Namdapha National Park and tiger reserve has the widest altitudinal range for any protected area in the world (from 100 m to > 4000m). This results in an astonishing diversity of vegetation and habitat types, ranging from lowland wet evergreen to alpine and permanent snow covered peaks. Namdapha National Park is also the only PA in India that has recorded populations on all four species of large cats; tiger, leopard, snow leopard and clouded leopard. The Malayan Sun-bear, which has its western most limits in parts of North-East India, is another Malayan faunal element present here. Two new species of deer have been recorded for the first time in India in the forests of Jairampur FD and Namdapha. These have been the first additions to the large mammal fauna of India in a hundred years. The Pakkei Nameri subcluster contains the unique alluvial grasslands in the Nameri NP. The area also has among the highest densities of three species of hornbills, and the highly endangered White winged Wood Duck. This area, which is a tiger reserve, also has a large population of elephants and is a designated elephant reserve. Parts of the larger Pakkei-Nameri-Sonai-Rupai area are also suitable for reintroduction of the rhino and other grassland mammals, which have become locally extinct. The sites are being designated as Important Bird Areas as part of an international program.

Fig. 8.10 Map of the proposed WHB Namdapha – Kamlang – Jairampur sub-cluster

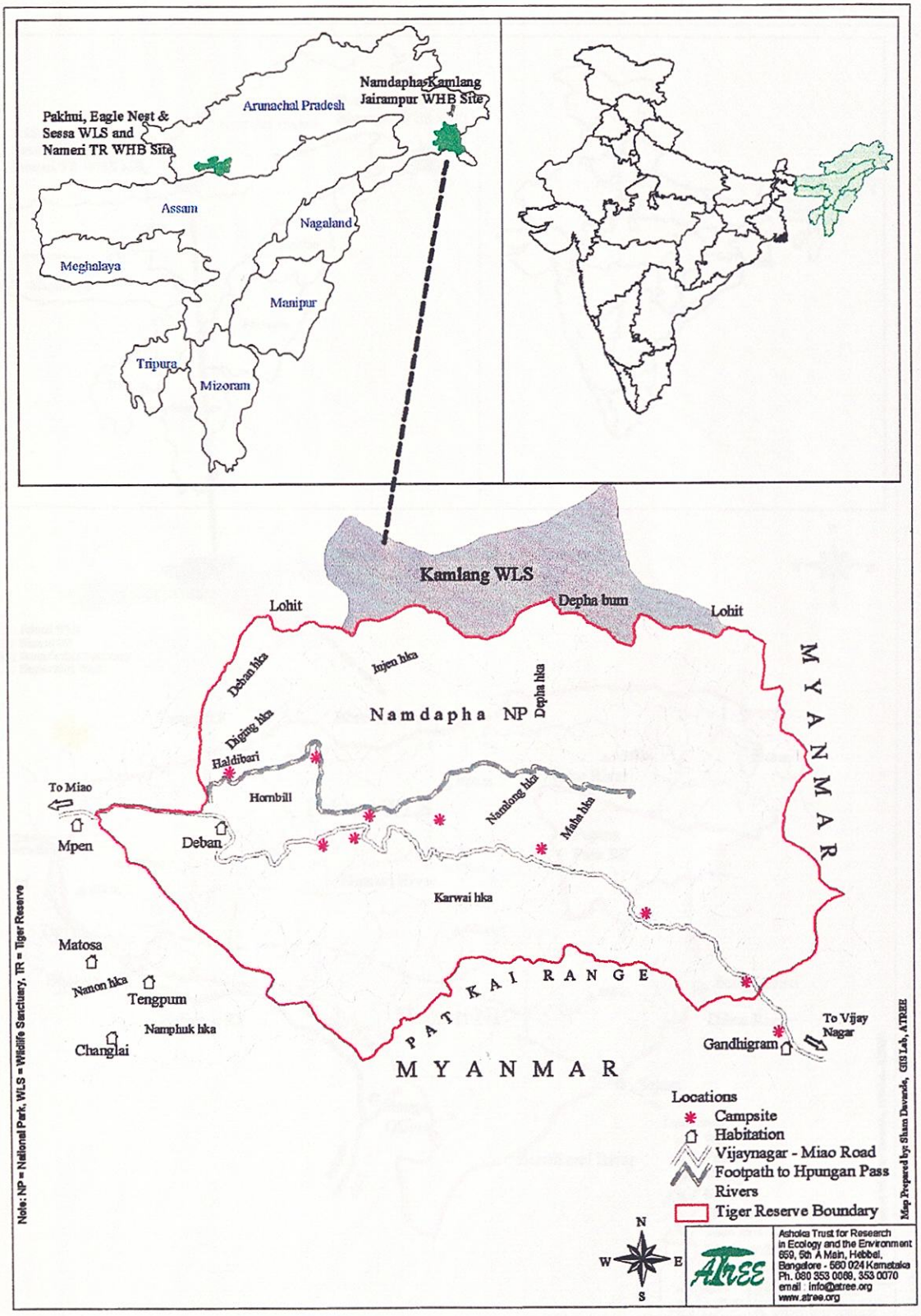
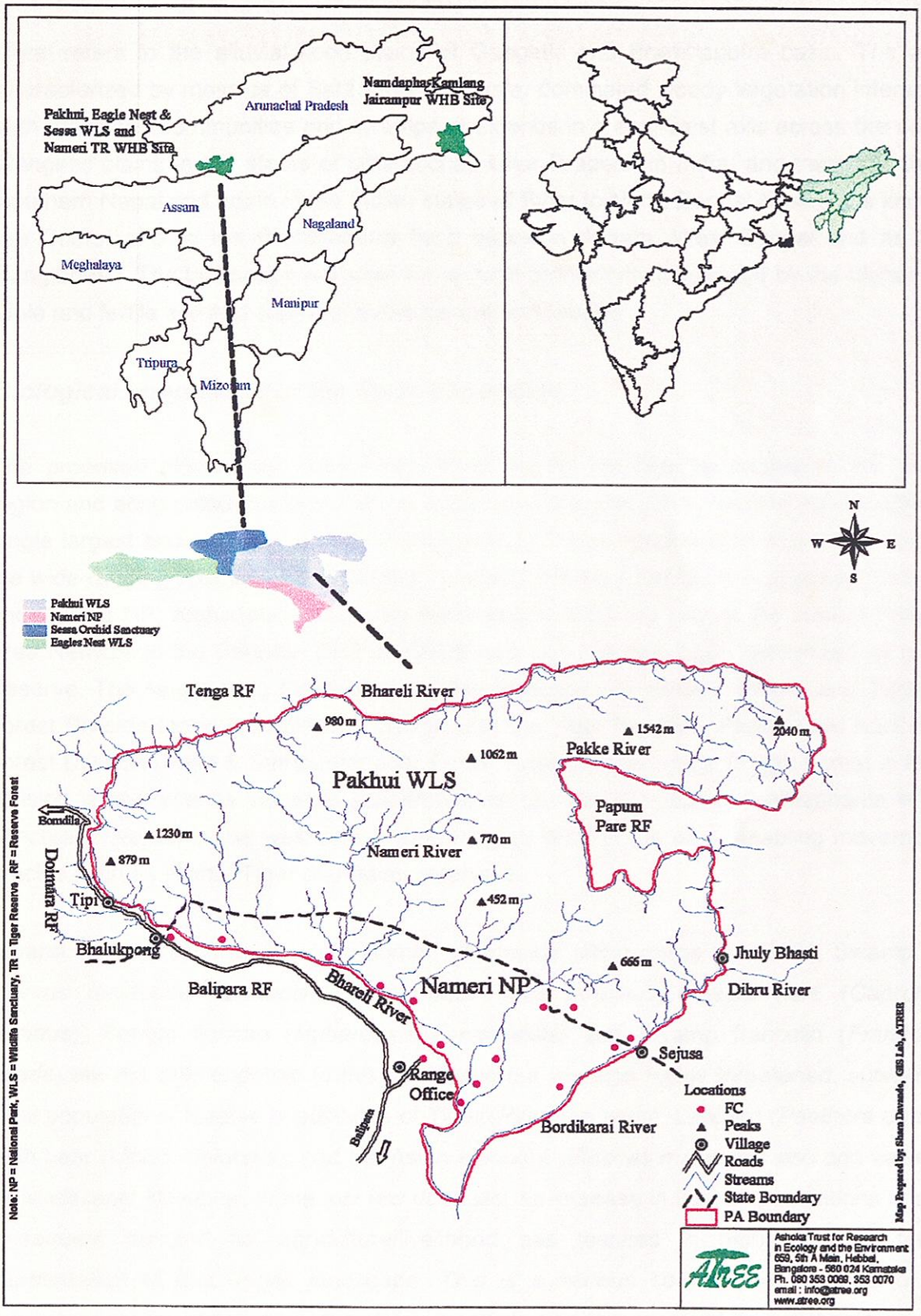


Fig. 8.11 Map of the proposed WHB Pakke – Nameri sub-cluster



8.5 The Terai eco-region Biodiversity cluster

Background, Geology and climate of the Terai eco-region

Terai refers to the alluvial flood plains of Gangetic and Bramhaputra basin. The area is characterized by mosaics of Sal (*Shorea robusta)* dominated woody vegetation interspersed with grassland communities and swamps. It extends in a east-west axis across the northern Gangetic plains in the states of Uttaranchal, Uttar Pradesh in India, and traverses through Southern Nepal and again in the Indian states of Bihar to North Bengal (where it is known as the *Duars*) and to the Brahmaputra flood plains in Assam, West Bengal and as far as Bangladesh. The landscape is known for its high productivity influenced by the higher water table and fertile soil and supports a diverse and rich wildlife

Biological importance of the Terai Eco-region

The proposed biodiversity cluster represents the typical *terai* landscape in the western region and accommodates many of the endemic species in this system. It also provides the single largest and relatively continuous habitats for these species, and acts as corridors for the wide-ranging species. The biological values of the area has been recognized Nationally, and Dudwa NP, Kishanpur WLS, and Katerniaghat WLS are part of the current Protected Area Network in the Country. DNP & KWLS as a unit has also been recognized as a Tiger Reserve. The neighboring forest areas of the proposed site namely, Pilibhit and Terai east Forest Division forms a continuous habitat with the Tiger Reserve. Parts of the North Kheri Forest Division (Palia & Sampurnanagar Forest Ranges) and Lugga Bugga Forest in Pilibhit Division is of immense value as actual/potential corridor connecting Sukhlaphanta Wildlife Sanctuary (Nepal) in the west and & Katerniaghat WLS in the east, enabling movement of species such as Rhino, Tiger and Asian elephants.

Several species such as the One-horned rhinoceros (*Rhinoceros unicornis*), Swamp deer (*Cervus duvaucelli duavaucelli*), Hog deer (*Axis porcinus*), Hispid hare (*Caprolagus hispidus*), Bengal florican (*Hubaropsis bengalensis*) and Swamp francolin (*Francolinus gularis*) are not only endemic to this landscape but are also highly threatened, surviving in small populations. Sizable populations of Tiger (*Panthera tigris*), Leopard (*Panthera pardus*), Sloth bear (*Ursus melursus*), and the Asian elephant (*Elephas maximus*) also add values to the landscape. However, in the last few decades, an increase in human populations and the consequent demand for agriculture/livelihood has resulted in high rates of habitat fragmentation of this fragile landscape. This is a serious concern as the loss of this landscape and the last home of the above mentioned endemics would be a global loss.

The endemic *Tharu* tribes (Mongolian in origin) inhabit the northern boundary of the Dudwa NP and are considered to be among the most ancient people of the *terai*. The tribes maintain a distinct cultural identity and unique tribal religion, and believed to be the decedents of the Rana's of Rajasthan who settled in Nepal. They are settled cultivators maintaining herds of livestock and live close to forest areas.

The Sharada Reservoir (ca. 45 km^2) within the Pilibhit FD is not only a major source of water for the area, but also sustains large and diverse flocks of migrant water birds.

Apart from the biological values, the site also boosts of a number of ancient/historical forest rest houses dating back to the 1800s and would enhance the historical and heritage values.

The Government of Uttar Pradesh has laid out plans for the reintroduction of the rhino's in the Surai Forest Range in Terai East FD. Recent field surveys suggest that the Mohaf and Barahi Forest Ranges (Pilibhit FD) adjacent to the Surai Forest Range have large tracts of potential rhino habitat and these areas together have the potential to support ca. 100 rhinos.

The Dudwa Tiger Reserve is one of the few recreational sites for the people of this region. Ensured sighting of the endemic Swamp deer and Rhino's attracts people from far away places. The water birds congregation in Sharada Reservoir, wet lands in Kishanpur/Dudwa, & Dolphin/Gharial watch in the river Garua in Katerniaghat have immense tourist potential.

Current Conservation Status

The area, originally under the control of the Rajas as hunting reserves and for commercial use, came under the Government of India control in 1861. Scientific management of the area started with the development of the 1st Forest Working Plan in 1886. Dudwa was declared a Sanctuary in 1968 and upgraded as a NP in 1977, while Kishanpur WLS was declared in 1981 and the Tiger Reserve was declared in 1987. However, the other three sites, TEFD, PFD, NKFD are Reserve Forests.

In earlier times these reserve forests were managed for commercial and local needs, while wildlife was only of secondary importance. The human population surrounding the area was minimal, until 1947, when large number of people were resettled from Pakistan and provided with forestlands. In 1952, the Zamindar system was abolished and the land was distributed among the landless. The local population increased dramatically between 1991 and 2001 (ca. 32%). Presently, the *terai* stands out as one of the high human density areas in India

and their needs pose a significant threat to the continued existence of the *terai* landscape and their biological values.

The Terai Eco-region World Heritage Biodiversity Cluster

The proposed biodiversity cluster (**Fig 8.12 and Table 8.1**) covers an area of approximately 1858 km^2 in the Indian states of Uttaranchal and Uttar Pradesh. The monimation comes under the Biogeographic zone 7; Gangetic Plains and province 7A – Upper Gangetic Plains. The area represents the typical *terai* landscape in the western region and accommodates many of the endemic species in this system. It also provides the single largest and relatively continuous habitats for these species, and acts as corridors for the wide-ranging species.

The biological values of the area have been recognized nationally, and Dudwa NP, Kishanpur WLS, and Katerniaghat WLS are part of the current Protected Area Network in the Country. DNP & KWLS as a unit has also been recognized as a Tiger Reserve. The neighboring forest areas of the proposed site namely, Pilibhit and Terai east Forest Division forms a continuous habitat with the Tiger Reserve. Parts of the North Kheri Forest Division (Palia & Sampurnanagar Forest Ranges) and Lugga Bugga Forest in Pilibhit Division is of immense value as actual/potential corridor connecting Sukhlaphanta Wildlife Sanctuary (Nepal) in the west and & Katerniaghat WLS in the east, enabling movement of species such as Rhino, Tiger and Asian elephants.

The broad descriptions of the 10 WHB potential sites are placed in **Annexure 8.2a – 8.2i.**

The list of consultants whose inputs were used in identifying the potential WHB sites for the Western Ghats are placed in **Annexure 8.3.**

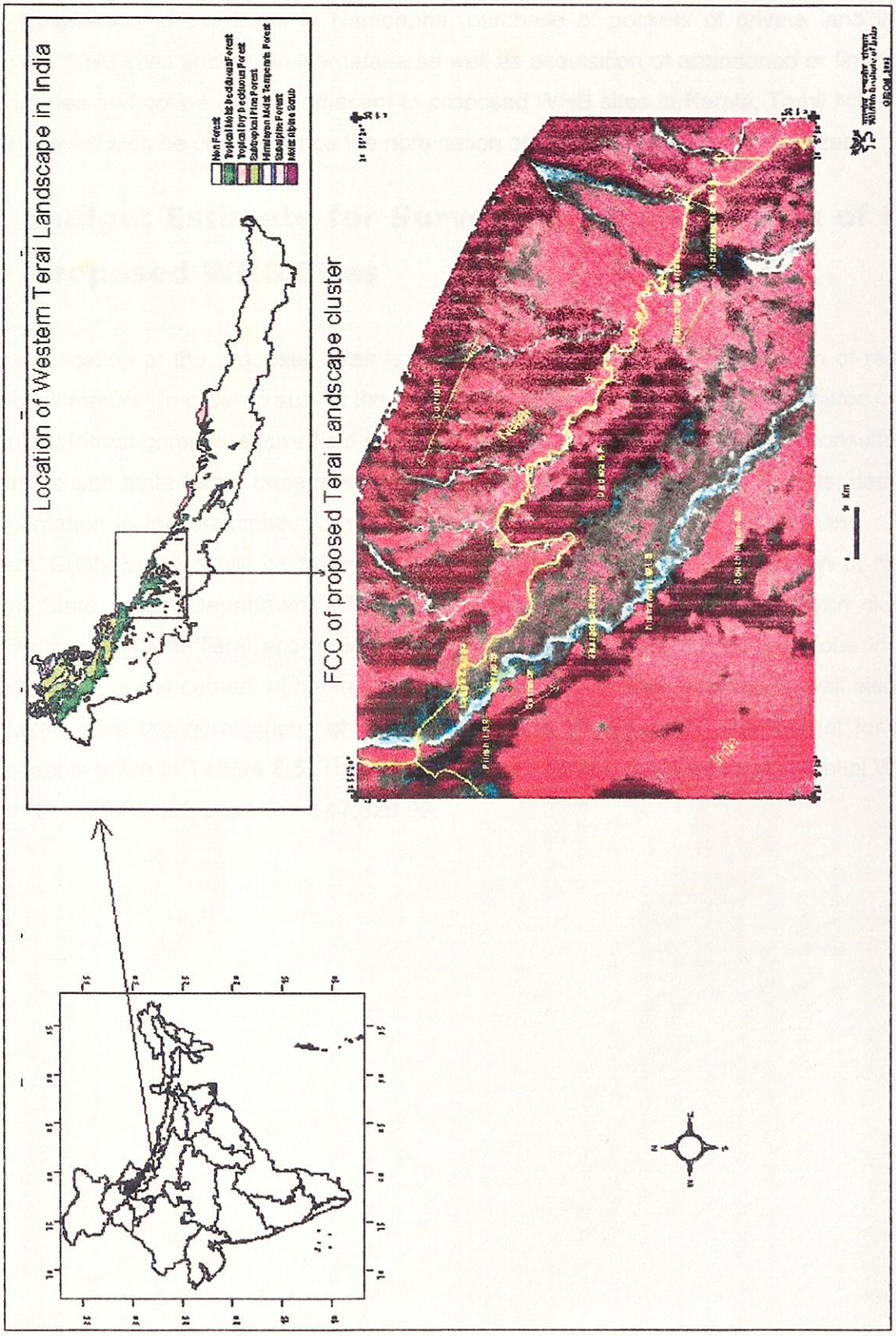


Fig. 8.12 Map of the proposed WHB Terai sub-cluster

8.6. Enhancing Habitat Connectivity in the Proposed WHB Sites of Western Ghats & Eastern Himalayas

The rehabilitation of the Lisus in Namdapha, purchase of pockets of private land in the proposed WHB sites such as in Karnataka as well as acquisition of abandoned or financially bankrupt tea and coffee estates adjacent to proposed WHB sites in Kerala, Tamil Nadu and Karnataka will also be covered once the nomination of the WHB clusters are finalized.

8.7 Budget Estimate for Survey & Documentation of the Proposed WHB Sites

The identification of the proposed sites is based on a rapid survey and collation of readily available literature. In order to submit the nomination to the World Heritage Committee in the prescribed format comprehensive field surveys for exact boundary demarcation, consultation workshops with state forest departments and Ministry of Environment and Forests, detailed documentation in the prescribed format and formal submission by the government. The Western Ghats process will be taken up in the first two years with participation of North Eastern State Forest Department officials as observers. The Eastern Himalayan cluster nomination along with Terai eco-region and the Valley of Flowers NP will be done in the second phase. Enhancement of habitat connectivity and rehabilitation measures will also be undertaken once the nominations of the WHB clusters are finalized. The budget for this component is given in **Tables 8.5**. The component total for the nomination of potential WHB sites is Rs. 3,90,00,000 and USD 8,47,826.09.

Table 8.5 Activity, timeline, Implementing Agency and budget for the nomination of cluster sites and enhancing habitat connectivity in Western Ghats, Eastern Himalayas, Terai eco-region and Uttaranchal Hills.

S. No	Activity	Year				Agency	Cost/Year (INR)	Total Cost 4 years (INR)	Total Cos 4 years (USD)
		1	2	3	4				
8.2.1	Nominations								
8.2.1.1	Nomination for Western Ghat cluster								
	Rapid assessment of habitat integrity, boundary demarcation and detailed mapping for 5 WG sub-clusters	x	x			EA	1250000	2500000	54347.8
	Workshop to finalize nominations for WG cluster		x			EA	500000	500000	10869.5
	Submission of nominations to UNESCO		x			MoE&F, FD, EA	100000	100000	2173.9
	Subtotal							**3100000**	**67391.3**
8.2.1.2	Nomination for Eastern Himalayas cluster								
	Rapid assessment of habitat integrity, boundary demarcation and detailed mapping for 2 EH sub-clusters		x	x		EA	1000000	2000000	43478.2
	Workshop to finalize nominations for EH cluster			x		EA	500000	500000	10869.5
	Submission of nominations to UNESCO				x	MoE&F, FD, EA	50000	50000	1086.9
	Subtotal							**2550000**	**55434.7**
8.2.1.3	Nomination for Terai eco-region cluster								
	Rapid assessment of habitat integrity, boundary demarcation and detailed mapping for terai eco-region cluster		x	x		EA	250000	500000	10869.57
	Workshop to finalize nominations for terai eco-region cluster			x		EA	250000	250000	5434.78
	Submission of nominations to UNESCO				x	MoE&F, FD, EA	50000	50000	1086.96
	Subtotal							**800000**	**17391.30**
8.2.1.4	Nomination for Valley of Flowers								
	Rapid assessment of habitat integrity, boundary demarcation and detailed mapping for Valley of Flowers		x	x		EA	100000	200000	4347.83
	Workshop to finalize nominations for Valley of Flowers			x		EA	100000	100000	2173.91
	Submission of nominations to UNESCO				x	MoE&F, FD, EA	50000	50000	1086.96
	Subtotal							**350000**	**7608.70**
	Component subtotal							**6800000**	**147826.09**
8.2.2	Enhancing Habitat Connectivity								
8.2.2.1	Acquire land in critical corridors in enclosures in and adjacent to PAs in the Western Ghats			x	x	PA, EA	11500000	23000000	500000.00
8.2.2.2	Rehabilitation of Lisu settlements in Namdapha NP			x	x	PA, EA	4600000	9200000	200000.00
	Subtotal							**32200000**	**700000.00**
	Component subtotal							**32200000**	**700000.00**
	Grand Total							**39000000**	**847826**

9 Communication and Advocacy Strategy

9. 1 Background

The designation of a site as a World Heritage Site confers several benefits: direct and indirect financial assistance, greater visibility of the site in world conservation circles, inhibition of destructive development and land use changes around these sites, and possibly increased benefits from eco-tourism due to international stature.

While designation of a site as a World Heritage Site brings in a slew of advantages as mentioned above, it also confers a tremendous responsibility on the nation to ensure that these sites continue to retain the heritage characteristics that brought them onto the list. This is however, only possible, through focused managerial and administrative actions on the ground and, not any less important, serious efforts at developing a robust public constituency that is able to influence the political and administrative decision making process for better maintenance of and improvements in the status of natural heritage sites.

A brainstorming session on ***"Communication and Advocacy Strategies for WHB Sites"*** was organized in ***New Delhi*** on ***January 4th, 2003*** at New Delhi. The purpose of the brainstorming session was to deliberate upon and identify key components of a communication and advocacy strategy that seeks for the WHB sites in India. The session was attended by a diverse mix of professionals from fields like PA management, conservation research, communication and media, environment education and interpretation. The specific objectives sought to be fulfilled by the strategy to be deliberated upon were identified as under:

- Raise the profile of conservation community involved with WHB sites.
- Raise the profile of WHB Sites and bringing on par with WH Cultural sites.
- Increase participation of and contribution from civil society partners.
- Integrate of education and awareness activities in WHB site management.

The sections below summarise the key issues that emerged with regard to communication and requirements of WHB sites as well as specific actions that can constitute a beginning to resolve these issues.

9.2 Profile of WHB Sites and the Associated Conservation Community

Key Issues

- Profile of the conservation community involved with WHB sites is a sub-set of the profile of the site itself. Success in improving the profile of WHB sites would, to a very great extent, automatically translate into improvement in the profile of the conservation community associated with the sites. It is indeed difficult to think of a policy that can make the profiles of sites and conservation professionals associated with WHB sites independent of each other.

- Protected Areas in general and WHB sites in particular, provide vital ecosystem services to adjoining and downstream communities and society at large. There has been no organised attempt to educate and raise awareness about these to increase the profile and support amongst decision makers, people's beneficiary representatives and communities.

- A critical difference between WHB sites and WHC sites is the number of people who interface with these sites each year (Taj Mahal vs Nanda Devi, for example). While WHC sites are actively promoted as tourist destinations, domestically and internationally, WHB sites are yet to develop a policy on how to enhance public interface without jeopardizing the core objectives of management of these sites. Effective communication that to highlight the characteristics that make WHB sites worthy of being on the UNESCO World Heritage, and a site-wise, scientific determination of visitorship capacity is necessary optimize the visitorship potential of WHB sites (in a qualitative and quantitative sense).

- Communication is a specialized function and it is unfair to expect the existing staff at WHB sites (who are trained for such responsibilities) to handle the same as an "additional responsibility". As a result, even low cost steps like appropriately designed

signage at highways approaching WHB sites, or at major regional/sub-regional gateways (airports/railway stations) leave a lot to be desired. This is also manifest in non-existent or under-utilized budgetary outlays for communication and advocacy in annual budgets of most PA's. Whatever little media coverage one sees on WHB sites is mostly undertaken by individuals/organizations that are not formal parts of WHB site management structures. No WHB site, leave alone other PAs, have the benefit of services of trained communication professionals (say a PRO) with a clear communication mandate and resources allocated to achieve that mandate. The potential of interpretation centers, if they exist at all is grossly underutilized, largely inability of staff indifference to do justice to communication and education as a key park management objective. The loss of opportunities to convert a section of visitors to WHB sites into roving ambassadors is significant.

- This is not to say that WHB sites have been completely deprived of advocacy efforts. To the contrary, some sites, especially Keoladeo, Kaziranga and Manas received extensive coverage in regional and national press during various points in time. However, these "bouts" of advocacy, especially during times of site specific crisis, did little to narrow the gap between WHB and WHC sites in terms of public engagement in the issues that impact the longevity of heritage values at these sites.

- Communication and advocacy efforts in the past, while most well meaning and dedicated, have more often been aimed influencing the state's decision-making apparatus for taking specific decisions. These efforts have, however, not very effectively sought to address the issues that may identify more closely with local communities and other groups, like young students. While such efforts may occasionally succeed in facilitating some remedial measures, they also tend to be a part of the top-down decision making process which often have short span of effectiveness.

Suggested Actions

- **Identify** communication as a key objective in Park management. Put in place, a flexible but dedicated structure to carry out the communication function on a sustained basis to help achieve conservation goals. Institutionalize the position of PRO's (individuals or organizations) with professional expertise in mass communication as an integral part of park management structures.

- **Educate** decision makers and visitors to WHB sites since it is extremely important. But also identify and target large homogenous groups (school students) which have a high receptivity to the communication and a longer retention span for the message. It is also important to take into account diverse needs in terms of communication content and delivery mechanisms.

- **Improve** signage at major airports, highways and railway stations that highlight the valued presence of WHB sites in the region and their heritage characteristics to create more awareness among those transiting as well as instill a sense of pride amongst the local populations.

- **Create and manage** regularly updated and dynamic official WHB websites that highlight the heritage characteristics, latest research results and ongoing research WHB sites, with profiles of researchers and key Park staff (past and present). Involve the corporate sector in sponsoring participative events on the websites thereby maximizing benefits from the internet media.

- **Publish** (conventionally and electronically) an official quarterly WHB site newsletter in local language as well as English, and make it available to as wide an audience as possible. Newsletters should also highlight the research and other efforts of conservation community.

- **Commission** short films, with multi-lingual background commentary, on each WHB site as well as the UNESCO World Heritage concept in totality. Make these films available to popular channels for broadcast at suitable time slots. Rope in TV-channels and/or institutional sponsors to bear production/broadcasting costs in part, if not in full.

- **Institutionalise** financial mechanisms that allow program specific contributions from individuals/corporate and other donors to implement these programs including strengthening communication/outreach efforts.

- **Initiate** work with state and national level tourism bodies to promote WHB sites as premium eco-tourism destinations in India and abroad, with specially designed Park-visitor interface packages that have a significant involvement local community institutions. An economic stake of local people in eco-tourism is critical to enlist their

support even for other conservation measures, which are often resented, largely for economic considerations (arising out of loss of livelihoods or access to resources). However, the activities so planned need to recognize the limits imposed by conservation considerations primary to the park.

9.3 Integration of WHB Sites with Civil Society Institutions/Educational Sector

Key Issues

- There is no conscious effort at WHB sites in India to aggressively seek skills and resources of other civil society institutions to enhance effectiveness of conservation efforts. The authorities in-charge of WHB sites management have mostly tended to react to offers of contribution by individuals/institutions (with much circumspection) rather than proactively seek the same. There is absence of long term plans for future development of WHB sites that can form the basis to seek support to from civil society institutions implement the same as per requirement.

- The educational potential of WHB sites, as in other PAs, is grossly underutilized since firstly, WHB Sites do not have an outreach policy/strategy and secondly, wherever some efforts have been made there is no conscious effort to link up with the educational systems at a local/regional levels. Educational Systems, especially schools, constantly lament the absence of professionally managed, logistically adequate and affordable outdoor environmental learning opportunities. This is a need that WHB sites can readily address with minimal incremental investments. Still, examples of dynamic contacts between WHB sites/PA's are indeed rare, if any.

- There is absence of effort to engage students and young professionals from various fields to understand and address WHB conservation issues through structured opportunities for volunteer work/professional internships at WHB sites.

- There have been impressive developments in conservation sciences, especially conservation biology. However, due to lack of dynamic and cross fertilizing linkages between WHB management structures with research institutions having specialist

expertise, park managers and other staff do get opportunities to get exposed to latest tools in conservation and allied areas.

Suggested Actions

- **Identify** outreach as a key WHB site management function supported by adequate budgetary provisions. Formulation of a defined outreach policy for each WHB site and mechanisms to deliver the same, with special focus on school children from surrounding communities as well as urban centers in the region.

- **Develop** short duration (1-4 days) structured, professionally designed in-park orientation modules (with necessary logistical provisions) targeting school/college students that link WHB outreach with environment education and awareness activities in schools/colleges. Dovetailed to activity calendars of schools/colleges these modules can be an excellent mechanism to draw in groups of young individuals and expose them to heritage and conservation concerns with specific reference to WHB site(s). India and worldwide.

- **Launch** a limited number of student exchange programs with WHB sites in other parts of the world having similar programs aimed at students.

- **Design** and distribute posters, monographs and CD-ROMS on salient aspects of WHB sites in schools and colleges around the WHB sites as well as other select locations in the country. Develop (WHB) Site-School networks in areas around the WHB sites and provide incentives to schools (modest infrastructure grants/scholarships) to develop a sense of stake holder ship an institutional/community level as well as at the level of individual beneficiaries.

- **Institutionalise** an annual All India UNESCO-WHB Internship Program for young scholars pursuing professional courses levels across the country. To be well publicized program to support 15-20 promising young professionals, selected through a rigorous and transparent process, for doing short-term research projects on various diverse issues related to WHB sites. Each year to conclude with an annual symposium for the young interns to present their work and interact with PA managers and other professionals from conservation sciences and media.

9.4 Conclusion

Any effort aimed at strengthening communication and advocacy has to essentially be a long-term enterprise. The steps outlined above can at best be a good beginning and are by no means an exhaustive list of prescriptions. However, if taken up with the required level of seriousness and effective cross-sectoral cooperation, these steps would provide a higher level platform to launch future initiatives in the communication and advocacy area.

The activity lines and budget for the advocacy and communications strategy is INR 1,65,00,000 and USD 3,58,695.65 and presented in **Table 9.1.**

Table 9.1. Advocacy and Communications Strategy

S. No	Activity	Year				Agency	Cost /year (INR)	Total Cost (INR)	Total Cost (USD)
		1	2	3	4				
1	Increasing awareness about WHB sites, and raising the profile of the conservation community								
1.1	Appointment of PRO/PR agency for WHB program/sites	X	X	X	X	PA	400000	1600000	34782.61
1.2	Assess limitations of current communication strategies on target audience groups	X				EA	250000	250000	5434.78
1. 3	Put up signage at airports, highways, railways etc. to highlight WHB presence, and heritage characteristics	X	X	X	X	EA	350000	1400000	30434.78
1. 4	Create and manage interactive, dynamic websites for WHB sites highlighting heritage values, management and research and profiles of current and past managers and researchers	X	X	X	X	PA, EA	250,000 for first year. 100,000 for sub-sequent years	550000	11956.52
1.5	Bring out official biannual WHB newsletter in English and regional languages	X	X	X	X	PA, EA	150000	600000	13043.48
1.6	Commission short films with multi-lingual commentary on each WHB site. Involve private TV-channels in production and broadcast	X	X			EA	500000	2000000	43478.26
1.7	Involve state and national tourism boards to promote WHB sites as premium eco-tourism destinations.			X	X	PA, EA	100000	200000	4347.83
1.8	Develop and highlight Park-visitor interfaces for education and awareness (awareness centres, signage @5 lakhs/site)	X	X			PA, EA	1000000	2000000	43478.26
	Subtotal							**8600000**	**186956.52**
2	Increasing participation of civil society partners								
2.1	Formulation of defined outreach policy for each site	X				PA	100000	100000	2173.91
	Subtotal							**100000**	**2173.91**
3	Integrating education and awareness in WHB site management								
3.1	Develop infrastructure for making WHB sites as education destinations	X				PA, EA	Clubbed with 1.1.8 above		
3.2	Develop short duration structured, professionally designed orientation modules aimed at school/college students for individual WHB sites	X	X	X	X	PA, EA	250000	1000000	21739.13
3.3	Design and distribute education material about WHB sites on posters, monographs and audio-visual information packets on CDs to schools and colleges	X	X	X	X	EA	Clubbed with 1.1.8 above		0.00
3.4	Each WHB site to adopt education institutions in its vicinity to involve students as volunteers for Park management activities, such as visitor control, awareness and research	X	X	X	X	PA, EA	500000	2000000	43478.26
3.5	Provide adopted educational institutions with infrastructure such as computers for dissemination of educational information on WHB sites	X	X	X	X	PA, EA	Combined with above		
3.6	Start an annual UNESCO-WHB heritage internship program for young scholars to pursue short-term research or outreach activities at WHB sites.	X	X	X	X	PA, EA	1200000	4800000	104347.83
	Subtotal							**7800000**	**169565.22**
	Component Total							**16500000**	**358695.65**

EA=External Agency

PA= Protected Area management

10 Management, Policies and Governance

10.1 Background

The management of existing and proposed WHB sites in India and many other PAs has been *adhoc*, divorced from science and monitoring, subject to the initiative of the individual officer and the staff with minimal training and capacity. The traditional management plan has often been an extension of the older working plan approach and is often the work of one single officer who may or may not have enough knowledge of the area rather than drawing from the experience of all those who could potentially contribute ranging from local people to researchers, scientists and former Park managers.

In spite of all the limitations, shortages of funds and infrastructure, remarkable standards of motivation, commitment and protection against poaching have also been demonstrated in several Indian PA's.

The scientific management of complex, dynamic and fragile landscapes requires a very different mindset and training and exposure to modern concepts in ecology, conservation biology and restoration. It also requires participation of many other members of civil society for long-term success. This is far beyond the expertise, experience and backgrounds of one officer, no matter how well meaning and committed. The management of WH sites needs to be professionalised in all respects with a core role for the Forest Department but with wider participation of scientists, other government departments and people's representatives at various levels.

We propose that each existing and proposed WH site be managed under the umbrella of a site management committee, which will attempt to bring in the best available talent, skills, creativity, experience, traditional knowledge and modern science. This committee will help the site manager to plan for long-term, tap professional expertise for specific tasks, and ensure continuity, accountability and transparency.

10.2 Objectives

Professionalise the management of the WHB sites to:

- Enable contribution of other civil society partners such as academia, research institutes, conservationists and other Government Departments
- Adopt long-term management approach incorporating rigorous field and socio-economic monitoring, experimental ecology, landscape ecology and participation oriented perspectives.
- Monitor periodically performance of the staff and implementation of the accepted management activities

10.3 Activities at the Site Level

The site management committee will be established at all the sites and appointed for a period of five years, subject to renewal on expiration. The committee will meet at least thrice a year and assist the site managers in all aspects of protected areas management. The budgetary requirements for this component are; Rs. 73,10,000 and USD 1,58,913.04 (**Table 10.1 to 10.4**).

The Site Management Committee will have the following members:

- Chief Wildlife Wardens of respective States
- Civil Administrators of respective states (Collector, District Magistrates)
- MPs/MLAs of respective constituencies
- Scientists with experience in the respective sites
- NGOs with experience in the respective sites

Table 10.1. Activity, timeline, Implementing Agency and budget for Management, Policies and Governance in Kaziranga National Park.

S. No	Activity	Year				Agency	Cost/Year (INR)	Total Cost 4 years (INR)	Total Cost 4 years (USD)
		1	2	3	4				
10.1.1	*Site Management Committee*								
10.1.1.1	Setting up of supervisory and advisory committee for park management consisting of FD, Civic administrators, Community representatives, NGOs, Academic institutions, Scientists and representatives from UNESCO and MoEF	X				EA, PA	90000	90000	1956.52
10.1.1.2	Administration and coordination of activities of the committee	X	X	X	X	EA, PA	180000	720000	15652.17
10.1.1.3	Contingency fund	X	X	X	X	PA, EA	200000	800000	17391.30
	Subtotal							**1610000**	**35000.00**
	Component subtotal							**1610000**	**35000.00**

Table 10.2. Activity, timeline, Implementing Agency and budget for Management, Policies and Governance in Keoladeo National Park.

S. No	Activity	Year				Agency	Cost/year (INR)	Total Cost 4 Years (INR)	Total Cost 4 years (USD)
		1	2	3	4				
10.2.1	*Site Management Committee*								
10.2.1.1	Setting up of supervisory and advisory committee for park management consisting of FD, Civic administrators, Community representatives, NGOs, Academic institutions, Scientists and representatives from UNESCO and MoEF	X				PA, EA	200000	200000	4347.83
10.2.1.2	Administration and coordination of activities of the committee	X	X	X	X	PA, EA	200000	800000	17391.30
10.2.1.3	Contingency fund	X	X	X	X	PA, EA	200000	800000	17391.30
	Subtotal							**1800000**	**39130.43**
	Component subtotal							**1800000**	**39130.43**

Table 10.3. Activity, timeline, Implementing Agency and budget for Management, Policies and Governance in Manas National Park.

S. No	Activity	Years				Agency	Cost/Year (Rs.)	Total Cost 4 years (Rs.)	Total Cost 4 years (USD)
		1	2	3	4				
10.3.1	*Interstate Heritage committee and Site Management Committee*								
10.3.1.1	Setting up of supervisory and advisory committees for park management consisting of FD, Civic administrators, Community representatives, NGOs, Academic institutions, Scientists and representatives from UNESCO and MoEF	X				FD, EA	200000	200000	4347.83
10.3.1.2	Administration and coordination of activities of the committees	X	X	X	X	FD,EA	200000	800000	17391.30
10.3.1.3	Contigency fund	X	X	X	X	PA, EA	200000	800000	17391.30
	Subtotal							**1800000**	**39130.43**
10.3.2	*Trans-boundary cooperation in Park Management*								
10.3.2.1	Joint patrolling by Bhutan and Indian Forest Dept.	X	X	X	X	PA	50000	200000	4347.83
10.3.2.2	Regular meetings between heads of two parks to strengthen protection	X	X	X	X	PA	25000	100000	2173.91
	Subtotal							**300000**	**6521.74**
	Component subtotal							**2100000**	**45652.17**

Table 10.4. Activity, timeline, Implementing Agency and budget for Management, Policies and Governance in Nanda Devi National Park.

S.No	Activity	Year				Agency	Cost/year (INR)	Total Cost 4 years (INR)	Total Cost 4 years (USD)
		1	2	3	4				
10.4.1	*Site Management Committee*								
10.4.1.1	Setting up of supervisory & advisory committees for Park management consisting of FD, Civic administrators, Community representatives, NGOs, Academic institutions, Scientists and representatives from UNESCO and MoEF	X				PA, EA	200000	200000	4347.83
10.4.2.2	Administration and coordination of activities of the committee	X	X	X	X	PA, EA	200000	800000	17391.30
10.4.2.3	Contingency fund	X	X	X	X	PA, EA	200000	800000	17391.30
	Subtotal							**1800000**	**39130.43**
	Component subtotal							**1800000**	**39130.43**

10.4 Activities at the National Level

The constitution of a high-level technical advisory panel composed of active scientists, managers and researchers with a good track record of peer-reviewed publications and field experience in various facets of biodiversity conservation and protected area management to steer the WHBPI and give their critical feedback to the site management committees and park managers.

In order to implement the WHBPI, it is proposed to set up a Programme Management Unit (PMU) under the full time supervision of a senior Programme Management Officer and other necessary staff. The PMU would be located in the UNESCO, New Delhi office. The budget for this component will be Rs. 1,54,56,000 and USD 3,36,000.

11 Financial Strategy and Sustainability of the Program

11.1 Establishment of World Heritage Biodiversity Trust Fund (WHBTF)

Sustainability of programmes and projects initiated during the first 4 years of implementation of the WHBPI is an important issue. To address this, it is proposed to establish a long-term sustainable financing mechanism in the form of a World Heritage Biodiversity Trust Fund (WHBTF) that would enable self-reliance in not only meeting the recurring costs of the project activities but also to fund new initiatives.

The objectives of the WHBTF would be:

- Support *in situ* conservation initiatives in existing and proposed WHB sites in India
- Strengthen integrated conservation and development planning in and around existing and proposed WHB sites based on rigorous scientific research monitoring
- Improve the professional, social and political profile of the Protected Area management community and its civil society partners in existing and proposed

It is proposed to get an endowment of US$10 million to begin with through grants from UNF, UNDP, GEF, WWF and other bi- and multilateral donors. The WHBTF would be a duly established and fully empowered legal entity and would be professionally managed through transparent financial management processes. The mission, goals, trustee roles and responsibilities would be clearly defined. While the flow of earnings from the invested capital will vary from year to year, depending upon the volatility of the capital market and performance of the WHBTF's asset mangers, the trust fund's guidelines for preserving its capital should minimize any adverse impact of the fund's asset value and income potential over the long term.

It is important to consider the following lessons from other countries especially Bhutan, where such trust fund has been in operation since 1996.

- Government commitment and sound financial management are vital for the success of trust fund operation.
- A sound legal framework to formalize relationships between donors and recipients makes decision-making and implementation as transparent as possible and ensures that trust fund management is accountable for its actions.
- It is important to set up "indicators of achievements' and mechanisms to mobilize 'donor support'.
- During the initial period of trust fund establishment it is essential to have reliable funding that does not depend on investment income from the trust fund.
- Donors' valuable skills may be suitably used in designing and implementing the trust fund.
- Establishing internationally respected asset management arrangements and addressing financial issues immediately and openly are essential. Dealing with financial issues should have primacy over programme issues. Given the unique characteristics of trust funds, design and appraisal teams should include expertise in financial asset management, trust fund institutional development, and trust fund programme operation.
- Trust fund performance should be evaluated from long-term perspective, recognizing that it is a financial vehicle designed to serve the needs of future generations. Performance criteria normally used in more traditional investment projects are generally not appropriate.

The composition and detailed Terms of Reference for the Trust Fund Management Board, Technical Advisory Panel and Site Management Committee will be worked out once an approval of the WHBPI has been obtained.

A sum of Rs. 12,000,000 has been allocated in the WHBPI budget for the establishment and management costs for a four-year project period.

11.1 Consolidated WHBPI Budget

The consolidated WHBPI budget abstract is shown in **Table 11.1** and **Figure 11.1**.

Table 11.1 Consolidated WHBPI Budget

Components	Kaziranga	Keoladeo	Manas	Nanda Devi	Component Total (INR)	Component Total (USD)
Strengthen Capacity for Effective Management	22050000	20520000	50500000	22120000	115190000	2504130.43
Enhance the Role of Local Communities in Conservation of Biodiversity	19265000	24625000	23720000	9980000	77590000	1686739.13
Enhancing Habitat Connectivity	15760000	13000000	970000	5000000	34730000	755000.00
Restore Lost Attributes	460000	0	4900000	0	5360000	116521.74
Research & Monitoring	14737600	5300000	7810000	5300000	33147600	720600.00
Identification of Potential WHB Sites	0	0	0	0	39000000	847826.09
Communication & Advocacy Strategy	0	0	0	0	16500000	358695.65
Management, Policies & Governance (Site level)	1610000	1800000	2100000	1800000	7310000	158913.04
Management, Policies & Governance (National level)	0	0	0	0	15456000	336000.00
Trust Fund Operation and Management	0	0	0	0	12000000	260869.57
Monitoring & Evaluation	0	0	0	0	3200000	69565.22
Grand Total (INR)	**73882600**	**65245000**	**90000000**	**44200000**	**359483600**	
Grand Total (USD)	**1606143.48**	**1418369.57**	**1956521.74**	**960869.57**	**7,814,860.87**	

Figure 11.1 Consolidated Component-wise WHBPI Budget

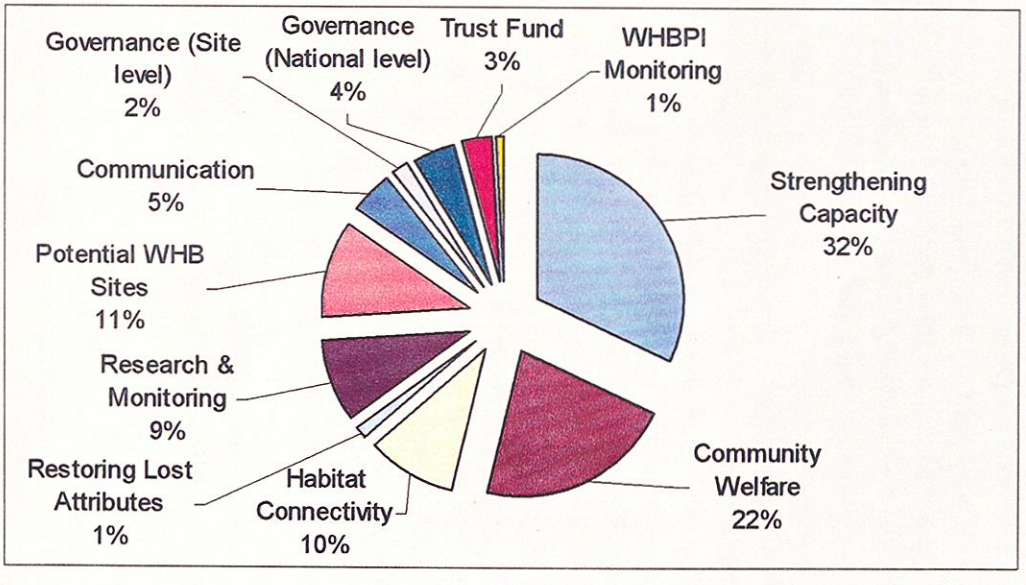
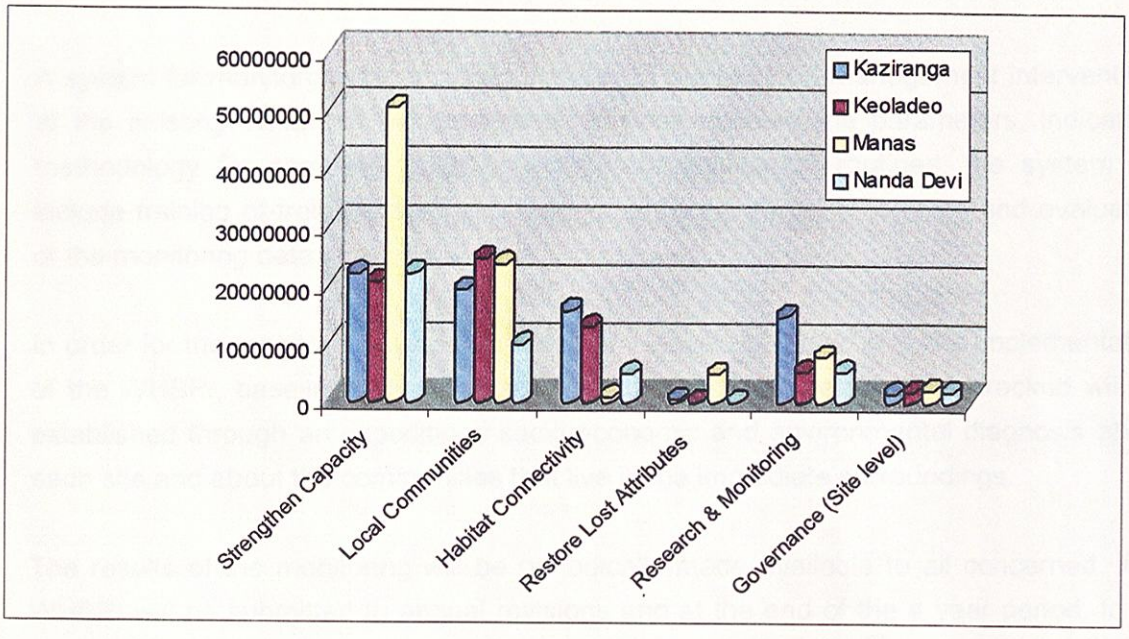


Figure 11.2 Consolidated site-wise WHBPI budget



12 Monitoring and Evaluation of WHBPI

A system for monitoring the results/outcomes of the planned management interventions at the existing WHS will be developed. Besides defining the parameters, indicators, methodology for sampling, data collection and evaluation routines, the system will include training of frontline staff and researchers for collection, collation and evaluation of the monitoring data.

In order for the monitoring system to detect the results obtained with the implementation of the WHBPI, baseline values for all indicators and parameters to be tracked will be established through an expeditious socio-economic and environmental diagnosis about each site and about the communities that live in the immediate surroundings.

The results of the monitoring will be periodically made available to all concerned. The WHBPI will be submitted to annual revisions and at the end of the 4 year period, to be carried out by the designated representatives including participating NGOs and donors. These revisions will be the main justification for changes that might be incorporated through annual action plans.

For all the proposed management interventions under WHBPI success indicators and means of assessment/verification have been developed. These indicators and means of verification will allow for an evaluation of the efforts deployed by the implementing agencies to put in place the necessary framework to achieve the WHBPI objectives.

Of particular relevance to monitoring and evaluation, is the development of appropriate linkages with the UNF/UNESCO/IUCN project Enhancing Our Heritage - Monitoring and Managing for Success in World Natural Heritage Sites .The specific aim of this project is to demonstrate how using an assessment, monitoring and reporting framework can enhance effective management of World Heritage Sites. Based on the results of this project currently in operation in about 15 selected sites in Africa, Latin America and South Asia (the pilot sites are Keoladeo Ghana National Park. Kaziranga National Park in India and the Royal Chitawan National Park in Nepal), IUCN will provide recommendations to the World Heritage Committee on a consistent approach to assessment, monitoring and reporting on the state of conservation and management effectiveness of World Heritage sites that could be applied on an on-going basis. This

project has published a manual and a workbook (Enhancing our Heritage Toolkit - Book 1 and 2), which will be distributed to all concerned with the implementation of the WHBPI. Lessons learnt from the WHBPI approach to strengthening the protection and enhancing the management of World Heritage sites and other key areas will be shared with the global conservation community.

The Trust Fund Board, Technical Advisory Panel, Site Management Committees, WII and ATREE with have designated responsibilities for the monitoring and evaluation of the WHBPI. The overall budget for this component is Rs. 3200000 and USD 69565.22.

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Annexure 1.1

Kaziranga World Heritage Site

1.1.1 Introduction

Area details

Kaziranga National Park is situated in Nagaon and Golaghat districts, in the state of Assam in Northeastern India (26°30'-26°45'N, 93°05'-93°40'E). The area of the designated National Park is 430 km^2 An addition of 454.50 km^2 is proposed and includes the Brahmaputra River to the north and part of the Mikir Hills to the south (Figure 1.1.1; Plate 1).

Additions to Kaziranga NP

Realising the necessity to extend the current areas of KNP, the forest department of Assam has proposed the following extension of habitat (Table 1.1.1) for better conservation and protection of rhinos, elephants and tigers.

Table 1.1.1 Extension areas of the Kaziranga NP

Name of Additions	Approximate area (km^2)	Notification status
1st Addition (Burapahar)	43.70	Final
2nd Addition (Sildubi)	6.47	Preliminary
3rd Addition (Panbari)	0.69	Preliminary
4th Addition (Kanchanjuri)	0.89	Final
5th Addition (Haldibari)	1.15	Preliminary
6th Addition (Brahmaputra & Chapories)	376.5	Final

Kaziranga lies in the flood plains of the Brahmaputra River. The riverine habitat consists primarily of tall, dense grasslands interspersed with open forests, interconnecting streams and numerous small lakes or '*bheels*'. Three-quarters or more of the area is submerged annually by the flood waters of the Brahmaputra. Soils are alluvial deposits of the Brahmaputra and its tributaries (Spillett, 1966).

History of establishment

The final notification as a national park was issued on 11 February 1974, following the first notification in 1969. Kaziranga was originally established as a Reserved Forest in 1908, a Game Sanctuary in 1916 and a Wildlife Sanctuary in 1950. It was inscribed as a World Heritage Natural site under the World Heritage Convention of UNESCO in December 1985 under WHC criteria (ii) and (iv).

Fig. 1.1.1 Location of Kaziranga World Heritage Biodiversity site, and proposed extensions, Assam

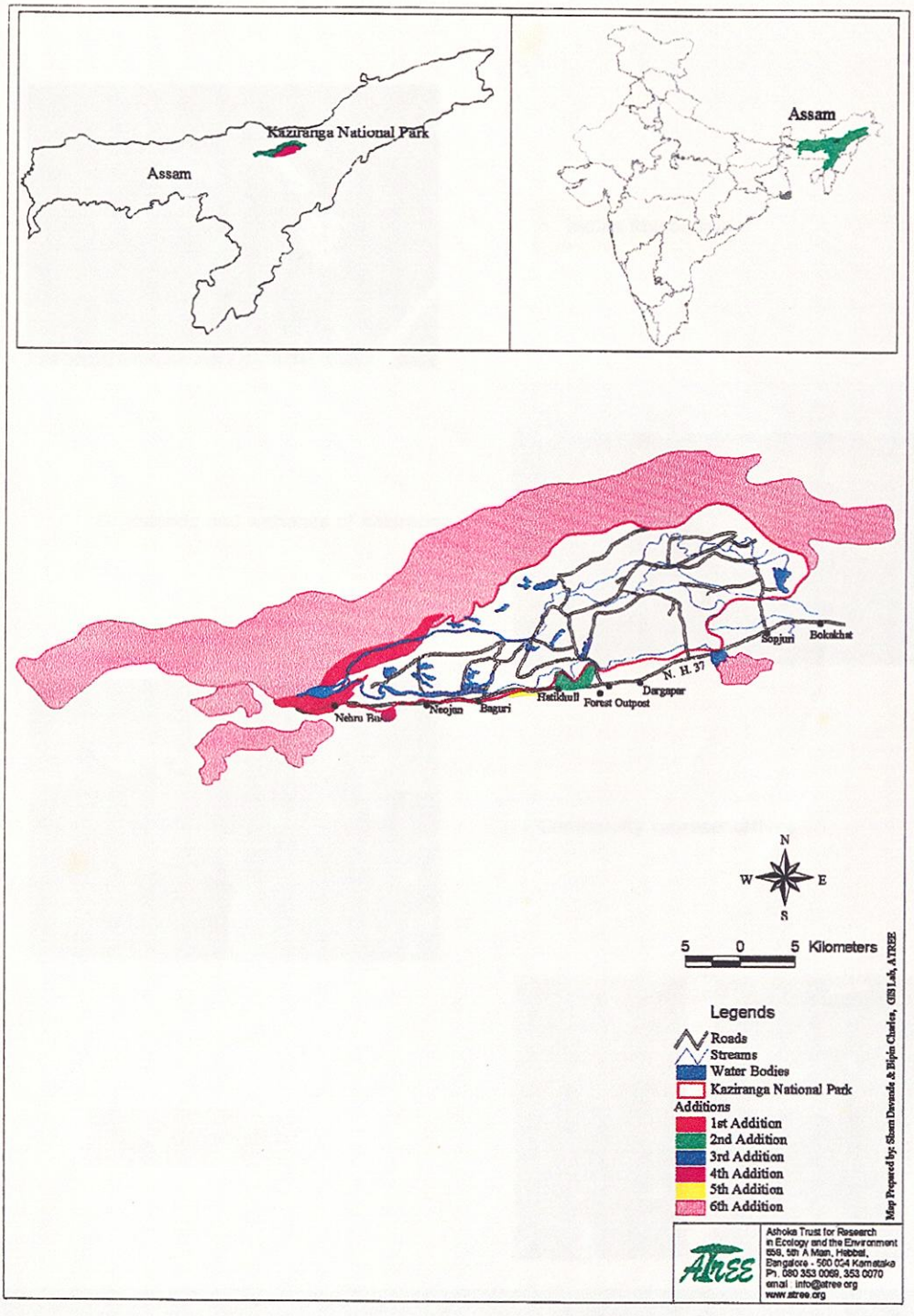
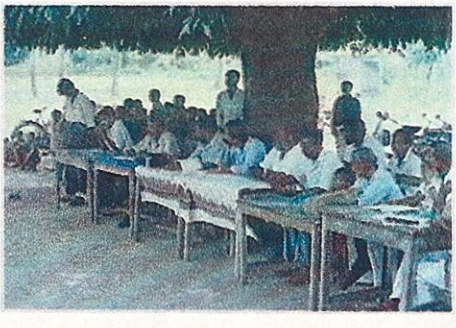


Plate 1 : Kaziranga World Heritage Site

Indian Rhinoceros

Grasslands and wetlands of Kaziranga



Community representatives

WHBI Consultation

1.1.2. Conservation Values

Criteria ii. Be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals.

Kaziranga meets this criterion because it is one of last intact flood plain alluvial ecosystems in the country, representative of the once extensive Indo-Gangetic floodplains known as the *terai*.

The annual flooding by the Brahmaputra River maintains and enriches the alluvial grasslands, and its assemblage of large mammalian herbivores, at densities considered among the highest in the world.

Criteria iv. 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

Kaziranga has the world's largest population of the highly endangered greater one-horned Rhinoceros (*Rhinoceros unicornis*), along with significant populations of other globally endangered species such as the Asiatic water buffalo (*Bos bubalis*), the swamp deer (*Cervus duvauceli*), the tiger (*Panthera tigris*) and the Asian elephant (*Elephas maximus*).

Floral and faunal values

Flora: There are three main types of vegetation: alluvial inundated grasslands, tropical wet evergreen forests and tropical semi-evergreen forests (Jain & Sastry, 1983). Grasslands predominate in the west, with tall 'elephant' grasses on the higher ground and short grasses on the lower ground surrounding the '*bheels*' (small water bodies). They have been maintained by annual flooding and burning over thousands of years. Amidst the grasses are numerous forbs and scattered trees of *Bombax ceiba*, *Dillenia indica*, *Careya arborea* and *Emblica officinalis*. Tropical wet evergreen forests, near Kanchanjhuri, Panbari and Tamulipathar blocks, are dominated by trees such as *Aphanamixis polystachya*, *Talauma hodgsonii, Dillenia indica*, *Garcinia tinctoria*, *Ficus rumphii*, *Cinnamomum bejolghota*, and species of *Syzygium*. Tropical semi-evergreen forests occur near Baguri, Bimali and Haldibari. Common trees and shrubs are *Albizzia procera*, *Duabanga grandiflora*, *Lagerstroemia speciosa*, *Craeteva unilocularis*, *Sterculia urens*, *Grewia serrulata*, *Mallotus philippensis*, *Bridelia retusa*, *Aphania rubra*, *Leea indica* and *L. umbraculifera*.

Fauna: The Park contains about 15 species of India's threatened mammals. It harbours the world's largest population of greater one-horned rhinoceros *Rhinoceros unicornis* and Asiatic water buffalo *Bubalus bubalis.* Other mammals include capped langur *Presbytis pileata*, a small population of hoolock gibbon *Hylobates hoolock*, tiger *Panthera tigris* , leopard *P. pardus*, sloth bear *Melursus ursinus,* Indian elephant *Elephas maximus,* Ganges dolphin *Platanista gangetica*, otter *Lutra lutra*, wild pig *Sus scrofa*, , gaur *Bos gaurus,* sambar *Cervus unicolor,* swamp deer *C. duvauceli*, hog deer *Axis porcinus,* and Indian muntjac *Muntiacus muntjak*. Elephants and other animals migrate

with the advent of the monsoon and head southwards to the Mikir Hills and beyond to avoid the annual flooding of the National Park.

The numerous water bodies are rich reservoirs of food (including fish) and thousands of migratory birds, representing over 100 species, visit the Park. There is a grey pelican *Pelecanus philippensis* rookery near Kaziranga Village. Other birds of interest include black-necked stork *Ephippiorhynchus asiaticus*, lesser adjutant stork *Leptoptilos javanicus*, Pallas's fish eagle *Haliaeetus leucoryphus*, grey-headed fish eagle *Icthyophaga icthyaetus*, Bengal florican *Houbaropsis bengalensis*, swamp partridge *Francolinus gularis*, grey peacock-pheasant *Polyplectron bicalcaratum*, great pied hornbill *Buceros bicornis*, green imperial pigeon *Ducula aenea*, silver-breasted broadbill *Serilophus lunatus* and Jerdon's bushchat *Saxicola jerdoni*. The avifauna comprises over 480 species.

1.1.3 Socio-cultural values and socio-economic profiles

Cultural Heritage

The Karbi-Anglong Hill district lies to the south of the Kaziranga NP, and is inhabited mainly by the Karbi tribes. Racially the Karbis are a mongoloid tribe, while linguistically they belong to the Tibeto-Burman group. Karbis are a patrichial tribe having five exogamous clans called Kur. They are agro-pastoralists and practice a form of slash and burn shifting cultivation called *jhum*. Their principal crop is rice, and they also rear cows and buffaloes, though they rarely consume milk. They are masters at spinning and weaving of a traditional silk variety called Endi Silk.

The Karbis are a colourful tribe in their traditional dresses, ornaments, dances, music and folk songs. They have their own religious book, the Masira Kohir, the verses of which are chanted with beautiful folk music during death ceremonies called Chomagkan. Karbi folk dances are also very colourful and are accompanied with drum beating and songs.

It is difficult to know the origin, history and path of migration of Karbi's as they do not maintain any written records. As it stands today, they are being educated in Assamese and have adopted various Assamese cultures (Ghosh 1992)

Local human population and their socio-economic profile

There are no villages inside the National Park but it is bordered on three sides by human settlements and tea plantations. There are 39 villages within a 10 km radius of the Park. The people of these villages come from various ethnic groups and backgrounds, and include Assamese, Bangladeshi immigrants, Miri and Nepalese settlers. Most of these villagers are agro-pastoralists, cultivating rice and keeping herds of cattle and buffaloes. Their dependence on the National Park is mainly for grazing lands for their livestock, and for thatch grass for their houses.

1.1.4 Status of Research and Monitoring

Anecdotal references and popular articles have been written mainly about the rhino and its conservation in Kaziranga over the last fifty years (Gee 1952, Spillett 1966, Lahan

1973, Lahan & Sonowal 1973, Patar 1980, Martin & Vigne 1991, Roy 1993 and Menon 1996 among others).

Scientific research however, has been carried out only recently, and includes work on the population genetics of the Asiatic water buffalo (Muley, 2001), habitat use by rhino and sympatric species (Banerjee 2001), and estimation of predator and prey densities (Karanth & Nichols 2000).

Long term studies especially on the population dynamics of the large mammalian species, grassland ecology and management and the hydrological dynamics of the floodplain ecosystem have to be given top priority in the coming years.

1.1.5 Management Issues and Threats

Kaziranga was originally designated a Reserved Forest in 1908 with the primary objective of preserving the rhinoceros and other large mammals. No rights or privileges to exploit forest produce are now exercised. Limited grazing was permitted until the final notification declaring the area as a National Park. Kaziranga has a long history of management and practices include annual burning of the grasslands by wildlife staff (Lahan & Sonowal, 1973).

Threats to wildlife in the KNP comes from poaching of wild animals, mainly the greater one-horned rhino for their horns, annual flooding, which claims the lives of many species along with heavy traffic on the national highway. Threats to the habitat comes from erosion of the banks by the Brahmaputra River, siltation of the *bheels*, invasive species such as *Eichornia crassipes and Mimosa* spp. and livestock grazing, mainly in the addition areas. Erosion due to the shifting of the river course has resulted in the loss of 22 $km^2$of the national park from 1974 to 1998 (Vasu 2002).

Staff

Kaziranga National Park comes under the authority of a Park Director, who is aided by a Deputy Conservator of Forests, two Assistant Conservators of forests, seven rangers and more than 400 lower level staff.

Tourism

Kaziranga is a world famous destination for tourists, and attracts more than 40,000 visitors annually. The Park is open for tourists from mid-November to mid-May, and tourists are allowed in for motor safaris on designated tourist routes. There are several government and private run lodges and tourist resorts on the outskirts of the Park that cater to this demand.

Anti-poaching measures

Kaziranga has among the strictest anti-poaching measures for any Park in the country. There are more than 150 anti-poaching camps setup in the Park, with a strong network of informants and intelligence backup. Poaching of rhinos has come down drastically since the mid 1980s, and only rare cases are reported nowadays.

1.1.6 Rhino and other species metapopulation management

Kaziranga may have the single largest population of several endangered mammals such as the rhino and swamp deer but the long-term conservation goals cannot be achieved by investing in Kaziranga alone because of the dangers that affect single populations over time. We must draw lessons from successful restocking and reintroduction efforts in South Africa and closer home in Nepal and consider Manas, Burachapori, Laokhowa, Orang, Sonai-Rupai, Nameri and Dibru-Saikhowa as a network of sites in combination with Kaziranga that enhance the long-term survival of these grassland species. Manas may still have a remnant rhino population and its immediate protection after a detailed survey and enhancement through restocking from Pabitora and Kaziranga is of the highest priority since it can potentially contribute to genetic diversity because of its Brahmaputra North bank isolated population status unlike many of the Reserves on the South Bank. Similarly, swamp deer is more or less restricted to Kaziranga and is highly endangered after the decimation of the Manas population. This is another species that needs immediate active management besides the Wild Buffalo.

The restoration of the lost attributes of Manas and other sites cannot be delinked from the management of these species throughout Assam.

We propose that under the WHBPI seed funding to restock and reintroduce should be available to all these sites which we consider as managed metapopulations. Suitable models such as the Pygmy Hog Conservation Programme and the Nepal government's Rhino Population Management Programme may be followed.

Annexure 1.2

Keoladeo World Heritage Site

1.2.1 Introduction

Area Details

At the confluence of the Gambhir and Banganga Rivers in the Bharatpur district, Rajasthan, is the low lying area of about 29 km^2, the Keoladeo Ghana National Park (KGNP) (27°7'6" to 27°6'2"N and 77°29'5'to 77°33'9"E; Figure 1.21; Plate 2). KGNP is part of the Indo Gangetic plain with elevations ranging from 173-176 meters above sea level. The area is semi arid with an average rainfall of 500-700 mm, though rainfall can vary greatly from year to year. The NP supports a diversity of habitats ranging from marshes, woodlands, scrublands, grasslands and denuded saline patches, and sustains an amazing diversity of fauna and flora.

History and Establishment

KGNP is known as the '*Ghana*' (dense forest) by the locals and as the Bharatpur Bird Sanctuary to others. The area was declared a National Park on the 26th, August 1981 with an area of 28.72^2 km.

The presence of Kadam (*Mitragyna parvifolia*) groves, a climax vegetation of swamps or riverbeds, probably indicates the existence of the Keoladeo wetland's centuries ago (Sankhla 1990). The area occupied by the Park constitutes a natural depression believed to be part of a riverbed, probably that of the Yamuna, which subsequently changed its course. Old records describe the depression as supporting dense forest (hence the name '*Ghana*'), which was subjected to seasonal flooding. Keoladeo wetland (*jheel*) was modified considerably in the 18th century by regulating water from the Rivers Banganga and Gambhir through a system of canals and dykes, built for flood control and irrigation purpose (Irrigation Department Report 1979). The present National Park appears to have had its beginning some time between 1726 and 1763 when the Ajan Bandh was constructed by Suraj Mal, the then ruler of the erstwhile princely state of Bharatpur (Gasquire, 1927; Pandey, 1970). The historic events of the NP have been listed chronologically in Box 1.

It is important to note that the year, 1981, is critical in the Park's history, as after the declaration of the NP, the Forest Department was required to end all forms of floral and faunal utilization. In accordance with the provisions of the IWP Act, 1972, grazing of livestock inside KGNP was banned in 1982. Violence erupted in opposition to this ban and atleast seven villagers lost their lives. Access through the Park was stopped and gates along the boundary wall were closed. This resulted in the alienation of people from the Park and its management and seems to continue till present.

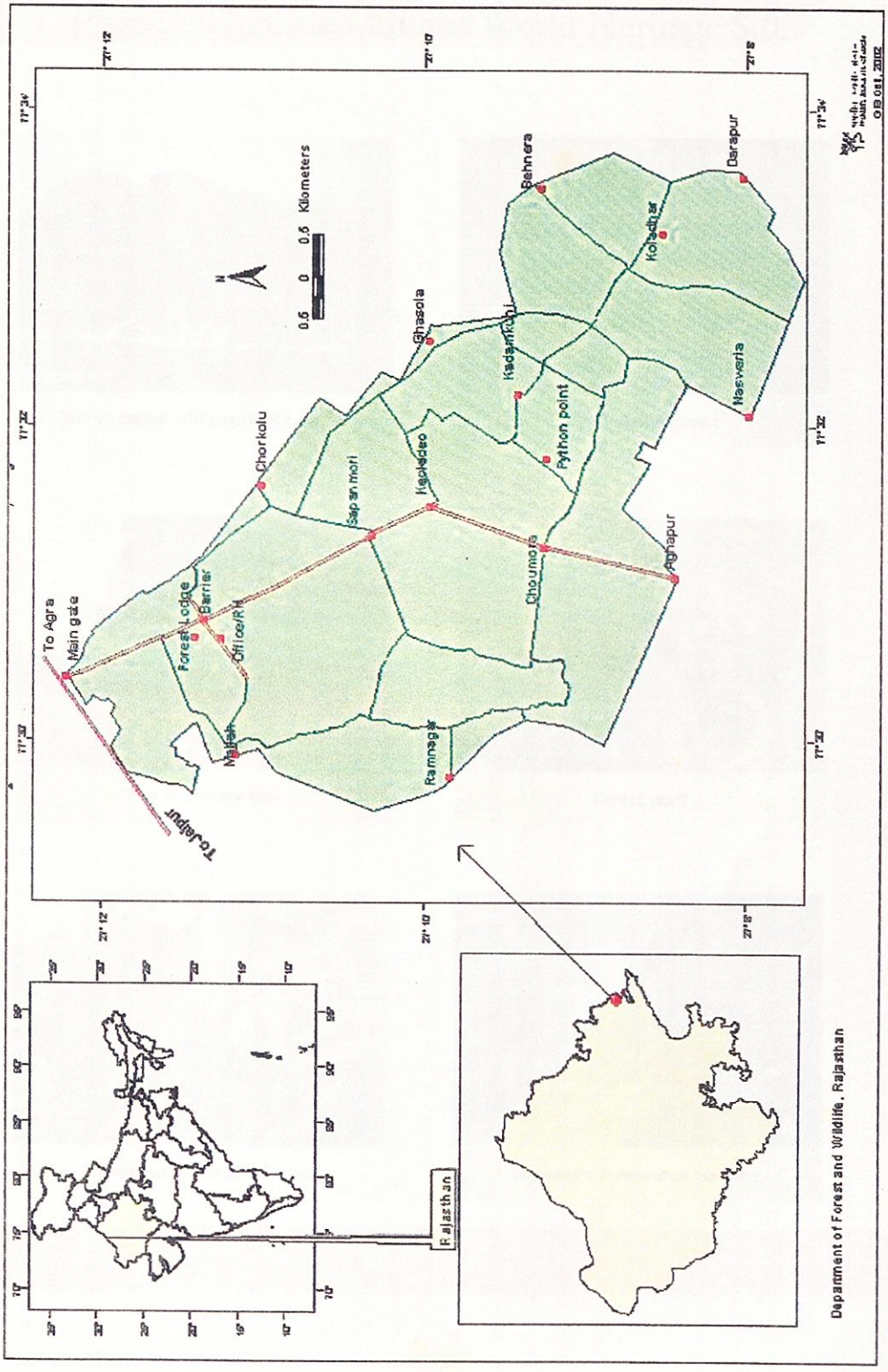


Fig. 1.2.1 Location of Keoladeo World Heritage Biodiversity site, Rajsthan

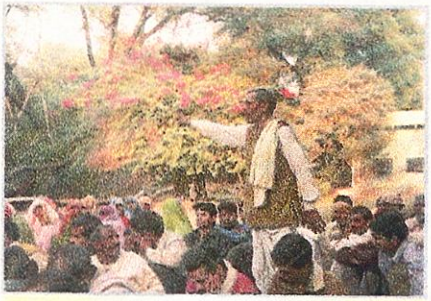
Plate 2 : Keoladeo Ghana World Heritage Site

Sarus canes and migratory ducks

Bar headed geese

The boundary wall

Forest staff



Community representative

Managers & resource persons

Box. 1. Major Historical Events in Keoladeo Ghana National Park

1726-1763	Ajan Bandh was constructed by Maharaja Suraj Mal, the then ruler of the princely state of Bharatpur on the River Gambhir.
1850-1899	The present area of natural depression inside the Park was converted into a protected deer shooting site.
1899	Prince Harbhanji of Morvi state in Gujarat was appointed as an administrator for Bharatpur state. He was responsible for converting this depression into a duckshoot reserve by getting bandhs and dykes constructed in order to increase the water holding capacity of the area.
1901	The reserve area was flooded for the first time and a regular water distribution system was devised. The inundation resulted in production of a lot of aquatic vegetation, which attracted a very large number of migratory birds.
1902	The artificially created duckshoot reserve was formally inaugurated by the then Viceroy of India, Lord Curzon when a duck shoot was organized in his honour on 2nd December, 1902.
1919	Boundaries of the duck shooting reserve were clearly demarcated.
1925	The Forest Act of Bharatpur was passed, and the erstwhile Shikar Department brought under the Forest Department.
1938	A shooting party headed by the then Viceroy of India, Lord Linlilthgow shot a maximum of 4,273 birds on 12th November as shown in shooting record inscribed on the pillar near Keoladeo temple.
1956	Keoladeo Ghana was notified as a Protected Area and a Bird Sanctuary. Hunting rights remained with the Maharaja of Bharatpur, his guests, and a few state guests till 1972.
1967	Keoladeo Ghana was declared as a Reserved Forest under the Rajasthan Forest Act, 1953.
1972	Ruler's hunting rights withdrawn.
1977-81	A masonry wall was constructed all around the Park (*evidence of conservation initiatives*).
1981	Keoladeo Ghana was declared as a Ramsar site under the Convention on Wetlands of International Importance.
1981	Keoladeo Ghana Sanctuary was upgraded to a National Park. Ban imposed on cattle grazing inside the Park.
1985	The Park was declared as World Heritage site under the World Heritage Site Convention.

Source: KGNP Management Plan, 2002

tragocamelus (Nilgai), feral cattle, *Axis axis* (Chital) and *Cervus uniocolor* (Sambar) are abundant. The lone mammalian predator inside the Park from 1999 is a tiger feeding mainly on cattle, other ungulates and wild boar.

1.2.3 Socio-cultural Values and Socio-economic Profiles

Cultural Heritage

The Park is named after the Keoladeo (Shiva, a Hindu God) temple located in the Park's centre. Some other places of historical and cultural interest within the Park are the Duck shooting inscriptions, Kadam Kunj Shikargah and Shanti Kutir Shikargah (which is now a forest rest house). KGNP's location within the golden triangle of Indian tourism (New Delhi - Jaipur - Agra) attracts a large number of domestic as well as international visitors each year.

Local Human Populations and their Economic Profile

About 21 villages and hamlets are located around KGNP with an approximate population of 14,500 people. Bharatpur city, with a total population of ca. 1,50,000 is also on the periphery of the Park. The entire economy of the villages outside the Park is based on agriculture and dairying. The basic needs of local communities residing in the villages adjoining the Park are fodder, fuel-wood, small timber, thatching material, and non-wood forest produce.

1.2.4 Status of Research and Monitoring

KGNP is one of the most studied of all PAs in India, with innumerable theses, reports, papers, and books being published out of studies carried out on KGNP. The section in the reference provides a selected list of these publications. Apart from the very strong and impressive presence of research organizations, the NP itself has a research wing, coordinated by a Junior Research Officer. The mandate of the wing is to collect data on parameters relevant to Park management. These include waterfowl counts, abundance estimation of mammals and other taxa, and the collection of meteorological data. Bombay Natural History Society conducted a landmark study on wetland ecology of the Park over a period of ten years. Other subsequent studies have been carried out on specific bird species as also aspects of wetland ecology. Regular training programmes for the staff are also organized to apprise them of developments in habitat management.

1.2.5 Management Issues and Threats

Staff

The Park has three Ranges, *viz* a tourism range, a wildlife range and the flying squad range. The wildlife range is responsible for the protection of wildlife and management of the habitat, while the tourism range handles Park entry, ticketing and other visitor facilities. The Park has a wireless network with eight permanent stations. This effective communication network helps in the prevention & control of fires and other forest offences. The strength of the Park is ca. 123 individuals with a Deputy Chief Wildlife Warden who manages the Park and his support staff of guards and daily wage laborers.

Cattle Management

Feral cattle within the Park is an serious issue for the Park management. Local people follow a system of dumping their useless cattle inside the Park and retrieving them once they start giving milk. These cattle compete with wildlife for forage. Feral cattle is confiscated by the Park authorities and intermittently transported to ravines in the adjoining areas. This has in the past given rise to conflicts with the villagers who in turn have broken the boundary wall and sometimes even set fire to the grassland areas.

Water Management

Water is an issue of prime concern for the Park. The Park requires a total of 540 million cubic feet for flooding and this water comes from the Ajan Bandh, the flow being controlled by the Irrigation Department. The years 1997, 2000, 2001 and 2002 have been drought years and the Park at present is completely bereft of water. Several ways of augmenting the water supply for Bharatpur and surrounds are already being considered at the State level. The recently completed management plan for the Park discusses this in greater detail. Suggestions range from bringing water from Chambal/Yamuna to dovetailing the requirement of water for the Park with the proposal for supply of drinking water to Bharatpur being executed by the PHED.

Anti-poaching Measures

Poaching is not a major issue in the Park.

Tourism

On a average ca. 95,000 people visit the Park annually, largely for birding while a small percentage of the tourist are picnickers. Vehicles are not allowed inside the Park, and the Park management has allowed cycle rickshaw pullers to operate inside the Park, as these are not only ecofriendly but also are a source of livelihood to locals. The cycle rickshaw pullers also double up as naturalists and help the visitors to identify the wintering birds. There are two distinct peak seasons for the domestic tourist coinciding with the holidays in October - November and the winter vacations in December – January. For the foreign tourist the peak seasons are November and February.

Annexure 1.3

Manas World Heritage Site

1.3.1 Introduction

Area Details

The Park lies in the districts of Barpeta and Kokrajhar, in the northeastern Indian state of Assam (26°37'-26°50'N, 90°45'-91°15'E). It spans the Manas River and is bounded to the north by the international border with Bhutan, to the south by the populated regions of North Kamrup district, Assam and to the east and west by Forest Reserves. The Park comprises the 520 km^2 core of the 2,837 km^2 Manas Tiger Reserve and is contiguous with Royal Manas National Park (658 km^2), Bhutan (Figure 1.3.1; Plate 3).

Lying in the foothills of the Outer Himalaya, the area is low-lying and flat. The Manas River flows through the western portion of the park, where it splits into three separate rivers, and joins the Brahmaputra 64 km further south. These and other rivers running through the Park carry an enormous amount of silt and rock debris from the foothills, resulting from the heavy rainfall, fragile nature of the rock and steep gradients of the catchments. This leads to the formation of alluvial terraces, comprising deep layers of deposited rock and detritus overlain with sand and soil of varying depth, shifting river channels and swamps. The northern portion is represented by the *'Bhabar'* formation, which is very porous due to the deep deposits of coarse detritus overlain by sandy loam and then a thin layer of humus. The *'Terai'* tract in the south consists of fine alluvial deposits with underlying pans. Here, the water table lies very near to the surface. The area of the Boki basin, in the west of the park, is sometimes inundated during the monsoon but never for very long due to the sloping relief (Anon., 1974).

History of establishment

Manas was declared a Sanctuary on 1st October 1928, parts of it having been notified as Reserved Forests in 1907 and 1927. It was established as the core of the Manas Tiger Reserve with effect from April 1973. The Park was inscribed on the World Heritage Site in 1985 as the Manas Wildlife Sanctuary. The Sanctuary was upgraded to National Park status on 7 September 1990, and enlarged from 391 km^2 to 500 km^2 by the inclusion of the former Panbari, Koklabari and Kahitama Forest Reserves in the eastern sector (Oliver, 1993). Due to civil unrest and subsequent damage to infrastructure in the late eighties and early nineties, it was placed on the List of World Heritage in Danger in 1992.

1.3.2. Conservation Values

Criteria ii. Be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals

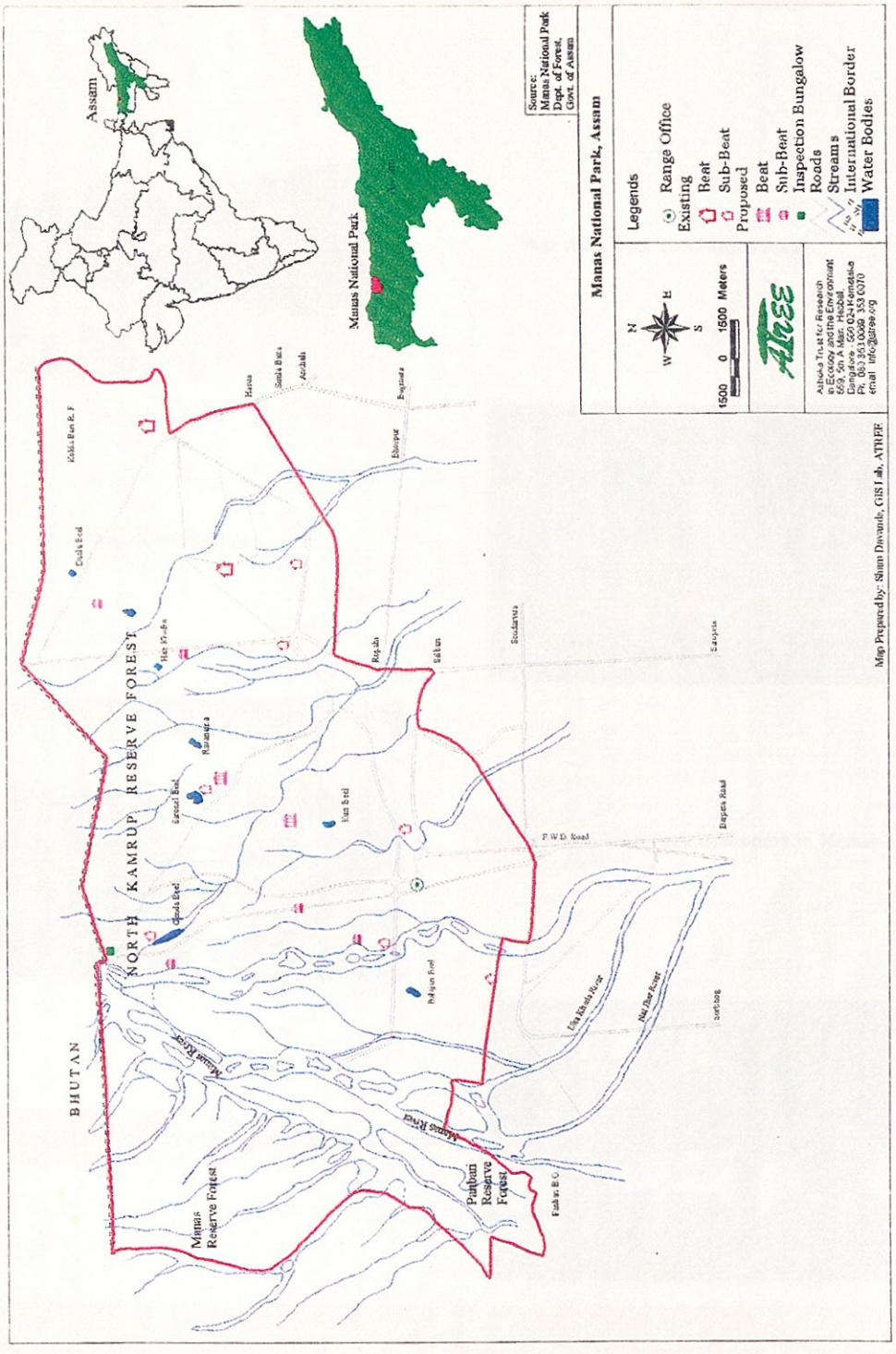


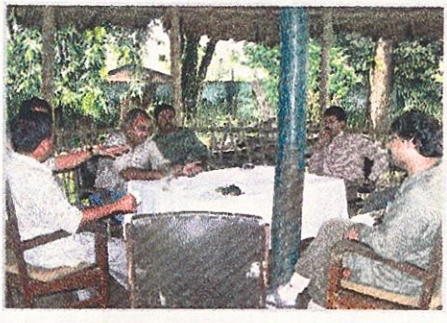
Fig. 1.3.1 Location of Manas World Heritage Biodiversity site, Assam

Plate 3 : Manas World Heritage Site

Mist rises over the Manas River

Hog deer in Manas

Consultations with Park managers in Manas



Consultations with NGOs and Scientists in Manas

Manas represents a unique example of the Bhabar-Terai ecosystem, with on-going ecological processes such as flood and fire maintained grasslands, erosion and deposition of alluvium and coarse materials from the catchment areas, and examples of various seral stages from grassland to woodland.

Criteria iii. Contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance

The Manas River as it flows down from the Himalayan foothills of Bhutan into the Manas National Park creates a panorama of breath taking scenery with lush forests clothing the slopes and a savannah woodland marking the river's path through the plains.

Such scenic beauty is to be found in many parts of the Park, especially along the rivers, and in the expanse of the many grasslands.

Criteria iv. 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

The diversity of habitat types and the highly productive grasslands of Manas had resulted in an incredible collection of 21 of India's highly endangered mammals, including the greater one horned rhino, Asian elephant, tiger, swamp deer, and Asiatic water buffalo being found in one area. Manas is also home to the endemic golden langur, found only in Manas, and the adjoining forests in Assam and Bhutan.

1.3.3 Socio-cultural values and socio-economic profiles

Cultural Values

The people living around the Manas National Park consist primarily of the Bodo-Kachari tribe. The Bodos are primarily agriculturists and rice is their staple corp. They are well versed in the art of preserving paddy seeds and digging indigenous canal systems to irrigate their fields.

Even though the Bodos are primarily patriarchal, their women enjoy an equal social status with the men as written down in their manuscripts called the Pandulipis. Traditionally the Bodos had their own religion, which was later influenced by Hinduism and Vaishnavism.

Bodo men are famous for their cane and bamboo work, producing nets, baskets and furniture, while the women traditionally spin and weave Endi Silk.

Traditional Bodo festivals and ceremonies are celebrated with dances, music and also involve animal sacrifices. The Bodos are perhaps the largest of the Assamese plains tribes. They were involved in a long and violent separatist agitation demanding their a separate Bodo homeland. They now have their own Bodo Territorial Council and Manas will pass onto BTC administration with the signing of the BTC accord.

Local Human Populations and their Economic Profile

The communities living around Manas, consist mainly of Bodos, Bangladeshi Muslims, Assamese, and in western part of Manas, the Chawtals. They are mainly cultivators, growing rice and jute. Chawtals and Bodos also venture into the forests for wild animal hunting. The Muslim communities are involved in fishing besides cultivation. All these communities depend on the Park for fuel wood and timber, thatch grass collection, grazing their livestock and also for poaching wild animals.

1.3.4 Status of Research and Monitoring

Even though Manas was known for its high diversity of large mammalian fauna, there has been surprisingly low amount of research investment in the Park. The vegetation has been surveyed by the BSI (Jain & Hajra, 1975). Status surveys of the Bengal florican were carried out by Narayan & Rosalind (1990) of the BNHS. An in depth study of the Pygmy hog, using radio-telemetry was also done by Narayan et al., (1998). In 1993, WWF initiated a project to identify the essential needs of the fringe villagers with the aim of providing alternatives to their dependence on the Park (WWF, 1993). The Pygmy Hog Conservation Centre has ongoing research projects on the effects of grassland management on grassland species such as the pygmy hog and the Bengal florican (Bibhuti Lahkar *pers. comm.*).

1.3.5 Management Issues and Threats

The Assam Forest Department is responsible for the administration of the Park. The Park is essentially a wilderness zone and forms the core of the Tiger Reserve. The rest of the Tiger Reserve is classified as Reserved Forest. Plantations were established along the southern border to provide a buffer against agricultural encroachment but this work ceased in 1977. Encroachment pressures from local people led the Government to set aside 8.09 km^2 from the sanctuary for a seed farm in 1971. In 1984 the Government attempted to close Kokla Bari Seed Farm, but this was vigorously opposed by Plains tribes, such as Bodo - kacharis, who have been employed there (Choudhury, 1986). Though there were efforts by subsequent managers to regain this area, the matter is still pending with the Government. Grazing by livestock was phased out from 1963 to 1965. No exploitation is allowed in the Park but tourists may visit the Mothanguri - Bansbari area. There is a new management plan for the Tiger Reserve (Rabha, 2002) but this has not been implemented yet. Controlled burning used to be the most important management practice for maintaining the composition of different habitats (Deb Roy, 1990).

In February 1989 the Park was occupied by members of the local Bodo Students Union, which were campaigning for autonomy for its people, who form about one-third of Assam's population (Jackson, 1989). During the period from 1989 to 1994, separatist groups attacked all three ranges of the National Park, and the Bhuyanpara and Panbari Ranges were completed destroyed. During this period about 28 patrol camps and several bridges were burnt or destroyed. Acts of arson, sabotage and the murder of more than a dozen wildlife guards by terrorists resulted in the forced evacuation of Sanctuary staff, leaving the Park open to opportunistic professional poachers, timber smugglers and fringe villagers. As a result, a number of animals including rhinoceros, elephants and valuable prey species were killed (Hussain, 1989; Rahmani et al., 1989).

Consequently, the site was placed on the World Heritage in Danger list in 1992. The damage to infrastructure and the destruction of guard posts in 12 areas of the Park are preventing normal protection and management from being re-established (Milne, 1997; UNESCO, 1997).

There has been enormous anthropogenic pressure on the land, especially on the southern, eastern and western boundaries of the Park. At present 16 km^2 of land in the north western sector of the Park has been encroached upon, and plans to evict the encroachers are underway. Ever since the Bhuyanpara and Panbari ranges were destroyed, these parts of the Park are almost out of the Forest Department's control. There are frequent reports of rampant illegal felling, poaching and encroachment of forest areas in these two ranges.

It is quite possible that Manas is in danger of losing or has already lost several of its attributes that put it on the World Heritage list. The greater one-horned rhinoceros may be extinct in Manas, the last confirmed record being of one that was killed in 2000. The swamp deer may also be on the way out, with the latest census detecting only a handful of them. Similarly the gharial has not been sighted for several years, and other species like the hog deer which occurred at fairly high densities have now been reduced to barely a couple of thousand.

Crop-raids by elephant and hog-deer are increasingly common, leading to further ill feeling amongst local residents (Rahmani et al., 1989). There was public concern over proposals to build two dams in the upper reaches of the Manas and Sankosh Rivers in neighboring Bhutan. The plans, which would have had a severe impact on the integrity of the whole Manas ecosystem, have since been cancelled by the Indian and Bhutanese Governments.

Tourism

Manas was a thriving tourist destination till the late eighties, when the Park had to be shut for tourists due to civil unrest. It has been reopened intermittently over the last 10 years, mainly for day tourists. The main tourist attraction of the Park is the scenic Mathanguri Guest house, situated on the banks of the Manas River as it enters the plains from the Himalayan foothills of Bhutan.

Annexure 1.4

Nanda Devi World Heritage Site

1.4.1 Introduction

Area Details

The Nanda Devi National Park is one of the two core zones of the larger conservation entity called the Nanda Devi Biosphere Reserve (NDBR). The Nanda Devi Biosphere Reserve (77° 44' to 80° 02' E and 30° 16' to 30° 32'N) is located in the northern part of western Himalaya in the newly formed state of Uttaranchal and covers an area of 5860.69 km^2 (Figure 1.4.1; Plate 4). The boundary of NDNP (712.12 km^2) is well defined and consists of high mountain peaks such as Lata Kharak, Jhandidhar, Dunagiri, Chanbang, Kalanka, Rishi Parwat, Nanda Devi East, Nandakhat, Mrigthuni, Trishul and Nandaghungti, within the Garhwal Himalaya (Negi, 2002).

History and Establishment

The first recorded attempt to enter the sacred basin (Rishi Ganga) was by W.W. Graham in 1883, but he was unable to proceed beyond the gorge of the lower Rishi Ganga. Subsequent attempts by Dr. T.G. Longstaff in 1870 and Hugh Ruttledge in 1926, 1927 and 1932 also met with failures. Finally, in 1934, Eric Shipton and H.W. Tilman pioneered a route to the *'Inner Sanctuary'* by forcing a passage up the gorge of the upper Rishi Ganga. Soon after, Tilman and N.E. Odell (1936) made the first ascent of the Nanda Devi peak the second highest peak (7, 817m) in India and considered the world's second toughest peak to climb. The climb was one of outstanding mountaineering success of the pre-Second World War era. It was their accounts of this natural sanctuary that first drew attention to the spectacular mountain wilderness (Tilman, 1935; Shipton, 1936), following which the area was established as a game sanctuary on 7th of January 1939.

The area was upgraded to a National Park in 1982. This accelerated the conservation inputs into the area. NDBR was created on 18th of January 1988. In 1992, NDBR received the recognition of a Natural World Heritage Site.

1.4.2. Conservation Values

Natural World Heritage Site - Criteria iii, iv

Criteria iii – Exceptional Natural Beauty
Criteria iv – Populations of rare and threatened mammals

Biogeographic Zone/Province – 02B Himalaya/West Himalaya

Fig. 1.4.1 Location of Nanda Devi World Heritage Biodiversity site, Uttaranchal

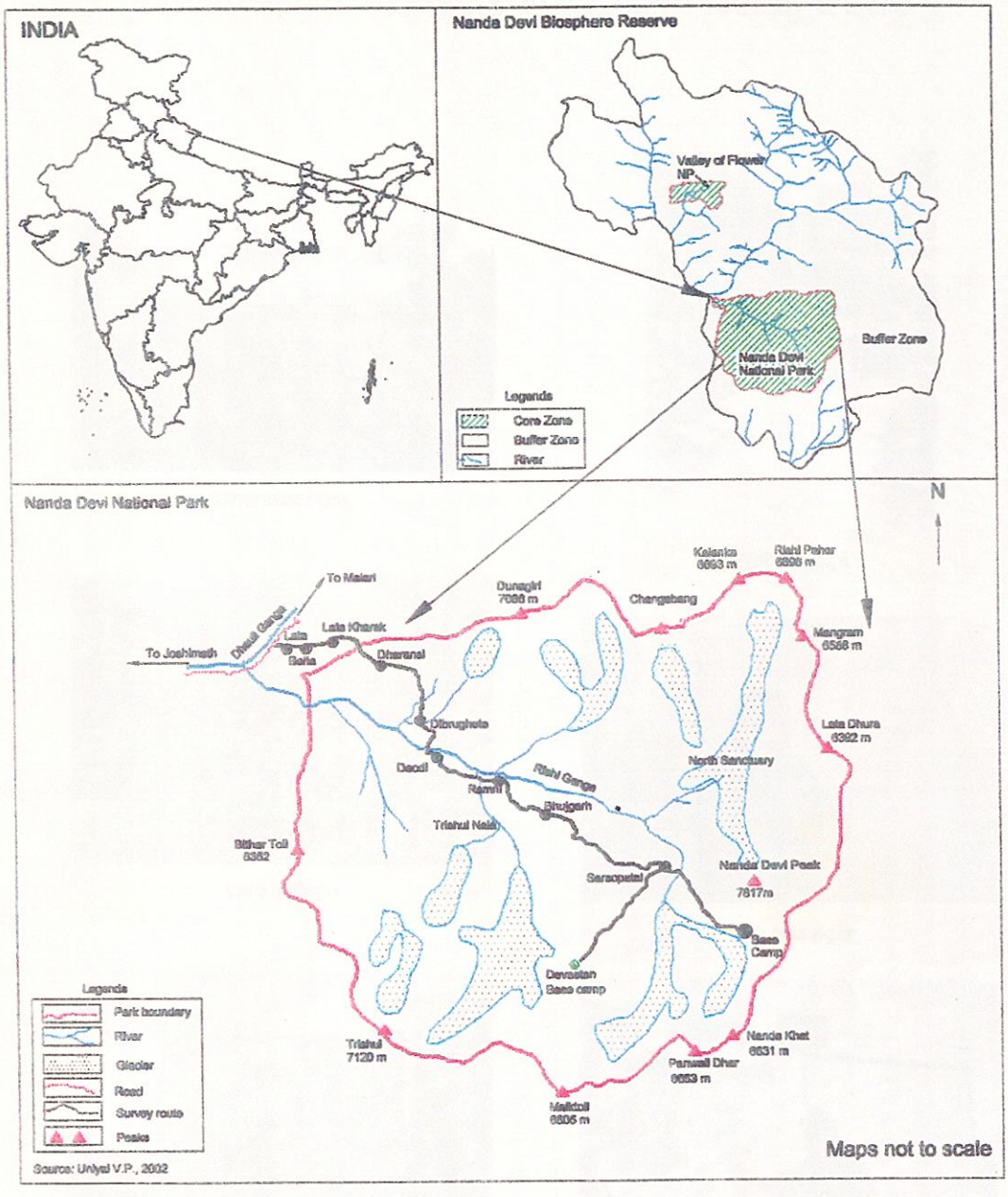
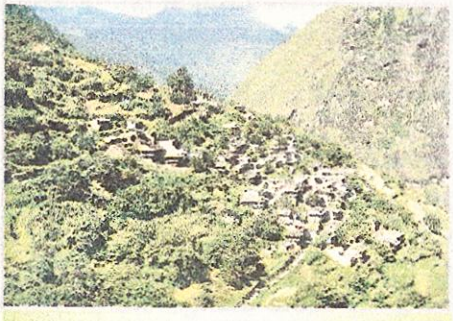


Plate 4 : Nanda Devi World Heritage Site

Dharansi Pass

Rishi Ganga



Lata Village

Park Manager

Community leader

Forest Staff

Floral and Faunal Values

Flora: The forests in the area are largely restricted to the Rishi gorge and are dominated by *Abies pindrow* (Fir), *Rhododendron campanulatum* (Rhododendron), and *Betula utilis* (Birch) up to about 3,350 m. Conditions are drier within the *'Inner Sanctuary'*, becoming almost xeric up the main Nanda Devi glacier. The reserve supports over 1000 species of plants including bryophytes, fungi and lichens (Samant, 2001).

Fauna: Various faunal surveys in the Park have reported the presence of ca. 18 mammals, seven of which are endangered. The important mammals in the area are *Uncia uncia* (Snow leopard), *Selenarctos thibetanus* (Himalayan black bear), *Ursus arctos* (Brown bear), *Moschus chrysogaster* (Musk deer), *Pseudois nyaur* (Bharal), *Hemitragus jemlahicus* (Himalayan Tahr), and *Nemorhaedus sumatraensis* (Serow). Nearly 200 species of birds are reported from NDBR.

1.4.3 Socio-cultural Values and Socio-economic Profiles

Cultural Heritage

Nanda Devi, consort of Shiva (Hindu God), is a manifestation of Parvati (Hindu Goddess) and has been revered as a natural monument since ancient times. Hindus have deified the entire basin and every 12 years devotees have approached the foot of Trisul to worship Nanda Devi, the 'Blessed Goddess'.

Local Human Populations and their Economic Profile

There are ca. 47 villages within NDBR. However, the Park proper is uninhabited apart from two small villages (Reni and Lata) on the north-western side. A majority of the locals are *Bhutias*, while those of Lata village are *Tolchas*. Before the mountaineering ban of 1983, locals used to bring their livestock (ca. 4,000 of goats and sheeps) to Dharasi and Dibrugheta areas for grazing. They were also depended on mountaineers for their income as they were employed as porters and guides. With the enforcement of the mountaineering ban, this livelihood options for the villagers ceased, leading to resentment amongst the local communities.

1.4.4 Status of Research and Monitoring

Nanda Devi is an important wilderness and hot spot of biodiversity in the Himalayan region and NDBR has been a focus of sustained research by the scientists of many research institutions including the Kumaun University, Garhwal University, G.B. Pant Institute of Himalayan Environment & Development; Almora (GBPIHED), Wildlife Institute of India (WII), Indian Institute of Remote Sensing (IIRS), High Altitude Plant Physiology Research Centre (HAPRC), Zoological Survey of India (ZSI), Botanical Survey of India (BSI) and Forest Research Institute (FRI). Wildlife Institute of India, Dehradun and the G.B. Pant Institute of Himalayan Environment and Development, Almora. Appendix 7 lists selected publications of these research projects. Faunal surveys were carried out by Dang (1961), Khachar (1978) and subsequently by ZSI and others. The flora was described by Hajra (1983), Samant (1993) and Hajra & Balodi

(1995), lichens by Upreti & Negi (1995), while the socio-economic aspects were detailed by Silori *et al.* (1999) (refer to Reference Section).

The monitoring of fauna in the Park is carried out from the month of June to September, at pre fixed sites at Dharasi, Dibrugetha, Deodi, Ramani, Sarsopatal and Pathal Khan. This consists of recording the presence/absence of flagship species, indicator species and direct counting of ungulates. Any sign of poaching or illegal collection of herbs is also noted. The last monitoring exercise was carried out in 2001 by the Park's staff and Dr.V.P. Uniyal of the Wildlife Institute of India.

1.4.5 Management Issues and Threats

The Nanda Devi National Park is being managed as a core zone of the NDBR for which a duly approved management plan is in place since 1998. Based on this management plan, an Annual Plan of Operation (APO) is prepared each year in the month of April, which is first discussed by a district level committee consisting of the district level officers and other stake holders (village heads). The same is then sent to the state level committee for approval, which then reaches the Ministry of Environment and Forest, Government of India for release of funds. Developmental works generally start from the month of June onwards each year.

In addition, the World Bank funded Eco-Development activities are also being carried out. At present, 14 of the 47 villages have been selected and funds have been released to the respective EDCs to enable them to utilise the funds on the basis of a Micro Plan prepared by them. The Park authorities have been playing the role of friend, philosopher and guide to these EDCs.

Staff

The Park is being managed by a DFO based in Joshimath at a distance of ca. 25 km from the Park and supervised by a CF. Only one Range Officer is presently sanctioned in the division and he remains hard pressed for time. At least two more Range Officers are required. As this area is very arduous and challenging, 10 more young (below 45 years of age) forest guards are required to properly man the area. There are approximately 150 personnel in various categories in NDBR.

Tourism

Visitors are not allowed to go inside the Park and hence no visitor facility currently exists inside the Park. However, for scientific expeditions and for routine monitoring, a three-room hut with attached toilet is available at the periphery of the Park at Lata Kharak. This hut is presently available to trekkers who may wish to trek up to Lata Kharak from the Lata village.

Villagers are being encouraged to develop visitor stay facilities (*Night stays*) in their own homes, especially in houses that remain under utilized during summer (April to October). These houses can be easily developed as Tourist Service Centres, run by the people needing additional sources of income. This has the potential to develop into an economic enterprise, as the Park authorities are keen on promoting ecotourism in the

buffer areas and mountaineering to the peaks situated on the periphery, the buffer and adjacent areas of the Park.

Anti-poaching measures

Strict patrolling and payment of monetary compensation to the affected people in the event of loss of human life or injury by wild animals and in the cases of cattle lifting by carnivores (to avoid retaliatory killing by the villagers) is the main anti poaching measure in place at the moment.

Annexure 1.5

Profile of Implementing Agencies

1.5.1 Wildlife Institute of India

Established in 1982 with the mandate to support nature conservation and foster the development of wildlife science in the country, the Wildlife Institute of India (WII) was made in 1986 an autonomous institution of the Ministry of Environment and Forests, Government of India. The WII's mission is to nurture the development of wildlife science and promote its application in the field, in a manner that accords with the country's economic and socio-cultural milieu. Through a wide array of capacity building programmes, the WII trains wildlife managers, researchers, conservationists and other target groups involved in wildlife conservation and carries out research on various facets of wildlife conservation and management. The WII's programmes are mainly field based, ably supported by national and international agencies. It has a team of competent, multi-disciplinary faculty and researchers along with a state-of-the-art computing facility and comprehensive library resources. In recognition of the outstanding contributions made by the WII, it was awarded the prestigious Rajiv Gandhi Wildlife Conservation Award by the Ministry of Environment and Forests, Government of India in 1999. For more details see www.wii.gov.in

1.5.2 Ashoka Trust for Research in Ecology and the Environment

In 1996, Ashoka Trust for Research in Ecology and the Environment (ATREE) was founded in an effort to address the environmental challenges facing India. ATREE is unique in that as it utilizes an interdisciplinary approach to address issues of environmental degradation and economic development. Using principles of natural and social sciences, ATREE strives to conserve biodiversity and promote sustainable development while seeking to advance the protection of the environment.

Mission Statement

- *Advancing protection of the environment,*
- *Conserving biodiversity and*
- *Promoting sustainable use of natural resources.*

ATREE is a not-for-profit organization that promotes scientific research and education, policy development, and community outreach in the following focal areas:

- Conservation and Livelihoods
- Conservation Planning
- Land-Use and Land-Cover Change
- Genetic Resources

- Restoration
- Forest Ecology and Management

ATREE's strength and success stems from the productive linkage between its diverse programs. ATREE initiates and conducts applied research to strengthen the foundation of knowledge upon which conservation decisions are made. ATREE has contributed extensively to this knowledge base through the publication of over 100 original publications and scientific presentations. ATREE's educational programs benefit significantly from these contributions: Cutting edge conservation and natural resource management strategies originated by an expert staff are disseminated through educational programs targeting university students, teachers, professionals, and the community at large.

The core objectives of this program are:

- Applying natural and social sciences to solve complex environmental problems at multiple scales
- Developing and implementing innovative educational modules for various target groups

ATREE strongly believes that good policy is guided by rigorous scientific and social research, and that the long-term effectiveness of such policy requires widespread civil support. Therefore, the policy work undertaken by ATREE focuses on three objectives:

- Carefully analyzing policies regarding land use, conservation planning, and management of forest resources
- Providing a forum, which is inclusive of historically underrepresented stakeholders, for discussion and exchange of information related to policy issues
- Advocating for an effective and meaningful change in policies

ATREE's efforts in the policy arena, particularly with regards to the management of non-timber forest products, have significantly impacted policies in India at the local and national levels.

Millions of people rely on the natural resources found within the Western Ghats and the Eastern Himalayas. ATREE is firmly committed to empowering these communities to manage changes occurring in their environments. Therefore, outreach activities are a critical aspect of ATREE's work and draw strongly upon the research and expertise of our staff. ATREE's outreach activities have three primary objectives:

- Involving community members in the research, monitoring, and decision-making process
- Creating awareness of conservation and environmental issues among community members and stakeholders
- Providing a forum for open discussion, debate, and exchange of information

Since its inception in 1996, ATREE has accomplished a great deal. ATREE is successful because of its unique and creative approach to meeting its goal of protecting biodiversity in all of its dimensions: biological, social, and economic. ATREE's interdisciplinary approach, educational and outreach programs, and community-based conservation strategies have contributed greatly toward protecting two of the world's important biodiversity hotspots. ATREE's staff continues to make important strides toward securing the future of these important regions. In addition to its continuing work in the areas of research, policy, and outreach, ATREE is launching an international journal titled *Conservation and Society*, dedicated to the advancement of the theory and practice of conservation of natural resources; and ATREE has worked with the Institute for Social and Economic Change, Bangalore to create a Center for Interdisciplinary Studies in Environment and Development (CISED), which is a forum to promote interdisciplinary research and training. For more details see www.atree.org.

Annexure 2.1

List of Participants of the WHBPI Kaziranga National Park Workshop – Stage 1

	Name & Address		Name & Address
1	S. Doley, IFS Chief Conservator of Forests (Wildlife) Office PCCF, Rehabari, Guwahati- 781 008 Assam	2	B.B. Dhar, IFS Conservator of Forests Karbi-Anglong PO: Diphu Assam
3	B. Brahma, IFS Conservator of Forests Eastern Assam Circle Jorhat, Assam.	4	N.K. Vasu, IFS Director, Kaziranga National Park PO: Bokakhat 785612 Assam
5	J.S. Bay Divisional Forest Officer Karbi-Anglong East Forest Division PO: Diphu Assam	6	A.C. Das Divisional Forest Officer (DFO) Eastern Assam Wildlife Division PO: Bokakhat 785612 Assam
7	A.K. Das DFO, Tinsukia Wildlife Division PO: Tinsukia Assam	8	S.P. Vasistha, IFS DFO Mangoldoi Wildlife Division PO: Mangoldoi Assam
9	H.P. Phukan, IFS DFO Western Assam Wildlife Division Dolabari, Tezpur Assam	10	Tapas Das, IFS Planning Officer Office of the Principal Chief Conservator of Forests Rehabari, Guwahati - 781 008 Assam
11	P.S. Das, IFS DFO Kamrup East Forest Division PO: BOKO Assam	12	Bhupen Talukdar Assistant Conservator of Forests (ACF) Office of the Chief Conservator of Forests (wildlife) Rehabari, Guwahati - 781 008 Assam
13	Aniruddha Dey ACF Eastern Assam Wildlife Division PO: Bokakhat, PIN: 785612 Assam	14	L.N. Barua ACF Eastern Assam Wildlife Division PO: Bokakhat 785612 Assam
15	Sonali Ghose, IFS ACF Directorate, Kaziranga National Park PO: Bokakhat Pin: 785612	16	D.D. Boro Range Officer Kohora Range PO: Kohora (Kaziranga) Assam

	Name & Address		Name & Address
	Assam		
17	M. Tamuli Range Officer Bagori Range, Kaziranga National Park C/O: Eastern Assam Wildlife Division Bokakhat - 785612 Assam	18	Pankaj Sarmah Range Officer Nameri National Park C/O. Western Assam Wildlife Division Dolabari, Tezpur Assam
19	Goutam Narayan Pigmy Hog Conservation Project Basistha, Guwahati - 781 029 Assam	20	Rajib Tariang AARANYAK Samanwoy Path (Survey) PO: Beltola, Guwahati - 781 028 Assam
21	Sujit Bairagi Director WWF-Assam Uzan Bazar, Guwahati - 781 001 Assam	22	Dr. Anwaruddin Choudhury Rhino Foundation for Nature in N.E. India Near Nehru Stadium, Hedaytpur Guwahati, Assam
23	Rathin Barman Wildlife Trust of India C/o "EVER GREEN" Samanwoy Path (survey) PO: Beltola, Guwahati - 781 028 Assam	24	V.B. Mathur Wildlife Institute of India Dehradun
25	Prof. K.S. Bawa ATREE	26	B.C. Choudhury Wildlife Institute of India Dehradun
27	Dr. Jagdish Krisnaswamy ATREE	28	Abi Tamim Vanak ATREE
29	Dr. Bibhab K. Talukdar ATREE-EHP	30	Jayanta Singha ATREE-EHP
31	Bakhtiar Hussain ATREE-EHP	32	Narayan Saikia Deptt. Zoology, Gauhati University
33	Apurba B Goswami Journalist C/O. Nambor Guest House Golaghat, Assam	34	Nandita Hazarika Tata Energy Research Institute – Assam

List of Participants of the WHBPI Kaziranga National Park Workshop – Stage 2

	Name & Address		Name & Address
1	Dipak Das Community and social leader of Kohora	2	Dr. Bhaskar Choudhury Veterinary Doctor stationed at the CWRC
3	Dilip Bora Local tourism entrepreneur	4	Rotikanta Das, Retired teacher
5	Apurba Ballav Goswami Journalist	6	Rubul Sarma Student leader
7	Motka Gogoi Ex poacher	8	Hari Munda Tea estate workers leader
9	D.D. Boro Range Officer Kohora	10	Parimal Bhattacharjee Local Businessman
11	Hiren Medhi Cultivator	12	Mrs. Jyostna Sonowal Teacher
13	Bibhab Kumar Talukdar ATREE	14	Raju Phukan Student leader
15	B. Kakoti Villager	16	Imran Ali School Teacher
17	Bir Singh Ingti Karbi Villager	18	Muhiram Gogoi Cultivator
19	Ms. Malati Gogoi Weaver	20	Lalit Bora Social leader
21	Ananda Barua Teacher		

Annexure 2.2

List of Participants of the WHBPI Keoladeo National Park, Bharatpur, State level consultations (3 - 5 December 2002)

Sl. No.	Name	Village/ Organizations	Status/Designations
1	Shambu Dayal Araia	Park staff	Range Officer
2	Vijay Pal Singh	Park staff	Range Officer
3	Premendra Singh	Park staff	Forester
4	Sohan Lal	Park staff	Forest Guard
5	Ramjeet Singh	Park staff	Forest Guard
6	Lal Singh	Park staff	Forester
7	Nawab Singh	Park staff	Forester
8	Chiranji	Park staff	Boat Man
9	Sreechand	Park staff	Forest Guard
10	Narpat	Park staff	Cattle Guard
11	Prem Singh	Park staff	Forest Guard
12	Rajendra Gupta	Park staff	Forester
13	Than Singh	Park staff	Cattle Guard
14	Mahendra Singh	Park staff	Forest Guard
15	Arjun Singh	Park staff	Cattle Guard
16	Basudeo Prasad	Park staff	Forester
17	Amar Singh	Park staff	Forest Guard
18	Shiv Charan	Park staff	Forest Guard
19	Vijay Singh	Park staff	Forest Guard
20	Lakshman Singh	Park staff	Forest Guard
21	Dhram Singh	Park staff	Forest Guard
22	Rambabu Gupta	Park staff	Forest Guard
23	Laxman Lal Shrama	Park staff	Office Staff
24	Ishwari Lal	Park staff	Office Staff
25	Gopal	Park staff	Cattle Guard
26	Hari Singh	Park staff	Forest Guard
27	Babu Lal	Park staff	Forest Guard
28	Dwairka Parashar	Park staff	Driver
29	Abrar Khan	Park staff	Forester
30	Barath Singh	Park staff	Range Officer
31	Ram Babu	Park staff	Office Staff
32	Madan Lal	Park staff	Chowkidar
33	Udyabhan	Park staff	Forest Guard
34	Charran	Park staff	Cattle Guard
35	Rattan	Park staff	Cattle Guard
36	Sohan Lal	Park staff	Cattle Guard
37	Mohan Singh	Park staff	Cattle Guard

Sl. No.	Name	Village/ Organizations	Status/Designations
38	Ms. Shruti Sharma	Presently with Non-Wood Forest Products Division, FRI	Former Director, KNP
39	Ms. Ritu Singh	WWF, New Delhi	Researcher
40	Shri. B. Praveen	Park staff	Director, KNP
41	Shri. R. K. Singh	Park staff	ACF, KNP
42	Naim Singh	Private Entrepreneur	Rickshaw Puller
43	Charanjeet	Private Entrepreneur	Rickshaw Puller
44	Unknown	Private Enterpreneur	Rickshaw Puller
45	Unknown	Private Entrepreneur	Rickshaw Puller
46	Hoti Singh Lamba	Private Entrepreneur	Hotel Owner
47	Ranveer Singh	Private Entrepreneur	Hotel Owner
48	Shiv Raj Singh	Private Entrepreneur	Hotel Owner
49	Sham Singh Gurjur	Jatoli	Villager
50	Jagan Singh	Ghasola	Villager
51	Parpram	Aghapur	Villager
52	Hari Singh	Darapur	Villager
53	Niranjan	Barso	Villager
54	Beem Singh Rana	Behmera	Villager
55	Gajendra Singh, Naturlist	Aghapur	Villager
56	Rattan Singh	Mallah	Villager
57	Daram Singh	Mallah	Villager
58	Brij Kishore Singh Khatana	Ghasola	Villager
59	Naim Singh	Bharathpur	Villager
60	Brijendra Singh, Naturist	Jatoli	Villager
61	Shiv Singh	Ghasola	Villager
62	Kartar Singh	Ghasola	Villager
63	Netrai Ramesh	Ghasola	Villager
64	Surjan	Ghasola	Villager
65	Vijay Singh	Ghasola	Villager
66	Govind Singh	Jatoli	Villager
67	Mohan Singh	Aghapur	Villager
68	Dhram Singh Jatav	Mallah	Villager
69	Devarilal	Mallah	Villager
70	Mahesh Kumar	Mallah	Villager
71	Ranveer Singh, Guide	Bharathpur	Villager
72	Naveen Sharma	Bharathpur	Villager
73	Mange	Ghasola	Villager
74	Puran	Ghasola	Villager
75	Parbi	Jatoli	Villager
76	Kashmira	Barpura	Villager
77	Hansiya	Barpura	Villager
78	Ramsari	Barpura	Villager
79	Ramkali	Barpura	Villager
80	Roopvati	Barpura	Villager

Sl. No.	Name	Village/ Organizations	Status/Designations
81	Chanda	Barpura	Villager
82	Bagavan Devi	Barpura	Villager
83	Meena	Barpura	Villager
84	Savithri	Barpura	Villager
85	Kirandevi	Barpura	Villager
86	Prema	Barpura	Villager
87	Chanda	Barpura	Villager
88	Kalavati	Jatoli	Villager
89	Vaijenthi	Mallah	Villager
90	Draupadi	Mallah	Villager
91	Hardaie	Mallah	Villager
92	Sampathi	Barpura	Villager
93	Lakshmi	Barpura	Villager
94	Maya	Barpura	Villager
95	Amarvati	Barpura	Villager
96	Mukta	Ghasola	Villager
97	Puran	Ghasola	Villager
98	Lachoo	Barpura	Villager
99	Kinna	Barpura	Villager
100	Unknown	Ghasola	Villager
101	Unknown	Ghasola	Villager
102	Unknown	Ghasola	Villager
103	Dr. V. B. Mathur	Wildlife institute of India, Dehradun	Professor & Head: PA Network, Wildlife Management & Conservation Education
104	Shri B. C. Choudhury	Wildlife institute of India, Dehradun	Senior Reader & Head: Endangered Species Management
105	Dr. N. M.Ishwar	Wildlife institute of India, Dehradun	Project Associate, ENVIS Cell
106	Dr. Seema Bhatt	Conservation Organisatons/NGO's	Biodiversity Consultant, Delhi
107	Shri. M. K. Mishra	Conservation Organisatons/NGO's	PEACE Institute, New Delhi

Annexure 2.3

List of Participants of the WHBPI Manas National Park Workshop – Stage 1

	Name & Address		Name & Address
1	Abhijit Rabha Field Director Manas Tiger Reserve Barpeta Road, Assam	2	Dr. Goutam Narayan Pygmy Hog Conservation Centre Basistha, Guwahati Assam
3	Srikanta Sarma Assistant Conservator of forests Silviculture Division Guwahati, Assam	4	Sujit Bairagi Director WWF – Assam
5	Bibhuti P. Lahkar Pygmy Hog Conservation Centre Basistha, Guwahati Assam	6	Pranjal Bezbaruah Botany Department Gauhati University Guwahati, Assam
7	Dr. Kamaljit. S. Bawa ATREE Bangalore	8	Dr. Jagdish Krishnswamy ATREE Bangalore
9	Abi Tamim Vanak ATREE Bangalore	10	Dr. Bibhab K. Talukdar ATREE – Eastern Himalayas
11	Jayanta Singha ATREE – Eastern Himalayas		

List of Participants of the WHBPI Manas National Park Workshop – Stage 2

	Name & Address		Name & Address
1	Sri Daranidhar Wary Teacher and President of Bodo Sahitya Sabha, Barpeta District	2	Niranjan Kalita Secretary, Green Manas
3	Siben Basumatary, Bodo student leader	4	Bibhuti Prasad Lahkar Researcher, Pygmy Hog Conservation Centre
5	Ms. R. Daimary Women's Human Right Groups, Kokrajhar	6	Gangadhar Basumatary Range Officer of Bansbari Range, Manas National Park
7	Keshab Swargairy Manas Bandhu Group	8	Advocate B. Narzary Gauhati High Court
9	Bibhab Kumar Talukdar ATREE		

Annexure 2.4

List of participants for the WHBPI Nanda Devi National Park, Project Formulation & Consultations (1-2 November, 2002) at WII

S. No.	Name	Designation	Organization
1	Shri. M. M. Harbola	PCCF, Dehradun	Uttranchal Forest Department
2	Shri. B. D. Kandpal	CWLW, Dehradun	Uttranchal Forest Department
3	Shri. A. S. Negi	MD, UAFDC, Dehradun	Uttranchal Forest Department
4	Ms. Jyotsna Sitling	CF, NDBR	Uttranchal Forest Department
5	Mr. V. K. Pangtey	DCF, IWDP, Dehradun	Uttranchal Forest Department
6	Shri. A. K. Banerjee	DFO, NDBR, Joshimath	Uttranchal Forest Department
7	Shri. Rajv Bhartari	CF, Ecotourism, Dehradun	Uttranchal Forest Department
8	Shri. S. C. Sharma	Former Additional DG (Wldlife) MoEF	Non-Governmental Institution
9	Shri. P. K. Sen	WWF-I, New Delhi	Non-Governmental Institution
10	Shri. M. K. Mishra	PEACE Institute, New Delhi	Non-Governmental Institution
11	Dr. Seema Bhatt	Biodiverty Consultant, Delhi	Non-Governmental Institution
12	Dr. Sejal Worah	Independent Consultant, (WWF-I) Mussoorie	Non-Governmental Institution
13	Dr. Alok Saxena	Forest Survey of India, Dehradun	Scientific Institution
14	Dr. Sarnam Singh	Indian Institute of Remote Sensing, Dehradun	Scientific Institution
15	Dr. D. K. Singh	Botanical Survey of India, Dehradun	Scientific Institution
16	Dr. S. S. Samant	G. B. Pant Institute, Dehradun	Scientific Institution
17	Dr. P. P. Bhojvaid	Forest Research Institute, Dehradun	Scientific Institution
18	Dr. M. P. S. Bist	Garhwal University	Scientific Institution
19	Shri. Dhananjay Mohan	Indira Gandhi National Forest Acadamy, Dehradun	Scientific Institution
20	Shri. D. M. Singh	Indira Gandhi National Forest Acadamy, Dehradun	Scientific Institution
21	Dr. J. Krishnaswamy	ATREE, Bangalore	Scientific Institution
22	Shri. A. Tamin	ATREE, Bangalore	Scientific Institution
23	Shri. Saikrishna Nautayal	Garhwal University	Scientific Institution
24	Shri. Manish Mehta	Garhwal University	Scientific Institution
25	Shri V. B. Sawarkar	Director & Dean	Wildlife Institute of India, Dehradun
26	Dr. A. J. T. Johnsingh	Professor & Head: Animal Ecology & Conservation Biology	Wildlife Institute of India, Dehradun
27	Dr. V. B. Mathur	Professor & Head: PA Network,	Wildlife Institute of India,

S. No.	Name	Designation	Organization
		Wildlife Management & Conservation Education	Dehradun
28	Dr. A. K. Gupta	Professor & Head: Population Management, Capture & Rehabilitation	Wildlife Institute of India, Dehradun
29	Dr. P. K. Mathur	Professor & Head: Landscape Level Planning & Management	Wildlife Institute of India, Dehradun
30	Dr. Bhupendra Singh Adhikari	Senior Lecturer, Habitat Ecology	Wildlife Institute of India, Dehradun
31	Dr. Yashveer Bhatnagar	Senior Lecturer, PA Network, Wildlife Management & Conservation Education	Wildlife Institute of India, Dehradun
32	Dr. Mehar Singh	Registrar	Wildlife Institute of India, Dehradun
33	Dr. G. S. Rawat	Senior Reader & Head : Habitat Ecology	Wildlife Institute of India, Dehradun
34	Dr. S. Satyakumar	Reader, Endangered Species Management	Wildlife Institute of India, Dehradun
35	Shri Sanjay Kumar Srivastava	Senior Reader, Population Management, Capture & Rehabilitation	Wildlife Institute of India, Dehradun
36	Dr. Anjali Awasthi	Research Associate	Wildlife Institute of India, Dehradun
37	Dr. Sanjay Singh	Research Associate	Wildlife Institute of India, Dehradun
38	Dr. N. M. Ishwar	Project Associate	Wildlife Institute of India, Dehradun
39	Shri. Rashid Raza	Senior Research Fellow	Wildlife Institute of India, Dehradun
40	Shri. R. S. Negi	Junior Research Fellow	Wildlife Institute of India, Dehradun
41	Shri B. C. Choudhary	Senior Reader & Head: Endangered Species Management	Wildlife Institute of India, Dehradun
42	Dr. Ravi Chellam	Reader, Endangered Species Management	Wildlife Institute of India, Dehradun
43	Dr. V. P. Uniyal	Senior Lecturer, Landscape Level Planning & Management	Wildlife Institute of India, Dehradun
44	Shri. Rajesh Pillai	ENVIS Cell	Wildlife Institute of India, Dehradun
45	Dr. Ruchi Badola	Reader, Ecodevelopment Planning & Participatory Management	Wildlife Institute of India, Dehradun

List of participants for WHBPI Nanda Devi National Park, State Level Consultations (23 - 24 November, 2002) at Joshimath

S. No.	Name	Village/Organization	Status/Designations
1	Ms. Jyotsna Sitling	Uttranchal Forest Department	CF, NDBR, Joshimath
2	Shri. A. K. Banerjee	Uttranchal Forest Department	DFO, NDBR, Joshimath
3	Smt. Nandi Rana	Paing Raini	NGO
4	Smt. Rami Devi	Paing Raini	Member
5	Shri. Manmohan Singh	Paing Raini	Motivator
6	Smt. Kalavati Devi	Faagati	NGO
7	Smt. Shuki Devi	Lata	Mahila Mangal Dal, President
8	Smt. Bali Devi	Rainee Valli	Mahila Mangal Dal, President
9	Smt. Mandodari Devi	Rainee Valli	Mahila Mangal Dal, President
10	Smt. Batti Devi	Rainee Valli	Member
11	Smt. Soni Devi	Junju	Member
12	Shri. Avatar Singh	Lata	Member
13	Shri. Muklaya Singh	Tolma	Member
14	Shri. K.S. Kunwar	Tolma	Pradhan
15	Shri. Maan Singh Rana	Nanda Devi National Park, Joshimath	Park Staff
16	Shri. Narayan Singh Negi	Nanda Devi National Park, Joshimath	Park Staff
17	Shri. Vimal Kumar Bhatt	Nanda Devi National Park, Joshimath	Park Staff
18	Miss. Sunita Rawat	NDBR, Joshimath	Social Scientist
19	Miss. Poonam Pathak	NDBR, Joshimath	Social Scientist
20	Shri. C.P. Sati	Nanda Devi National Park, Joshimath	Forester
21	Shri. Mahaveer Chauhan	Nanda Devi National Park, Joshimath	Forester
22	Shri. Mohan Singh Rana	Raini	NGO
23	Shri. K.L.Shah	NDBR, Joshimath	Vanya Jeev Rakshak
24	Shri. Gopal Dutt Joshi	NDBR, Joshimath	Vanya Jeev Rakshak
25	Shri.Trilok Singh Bisht	NDBR, Joshimath	Vanya Jeev Rakshak
26	Shri.Dheeresh Bisht	NDBR, Joshimath	Forester
27	Shri. Sangram Rawat	Raini(Jumju)	Member
28	Shri. Deewan Singh Almiya	NDBR,Tapovan	Vanya Jeev Rakshak
29	Shri. Narandra Lal Shah	NDBR,Tapovan	Vanya Jeev Rakshak
30	Shri. Satyendra Singh	NDBR,Tapovan	Vanya Jeev Rakshak
31	Shri. Avatar Singh Pawar	NDBR,Tapovan	Vanya Jeev Rakshak
32	Shri. Dayal Singh Rana	Paing Murunda	President
33	Shri. Prakash Chand	NDBR, Joshimath	Park Staff
34	Shri. Madan Lal Sharma	Raini	Vanya Jeev Rakshak
35	Shri. N.S.Negi	Suraithota	Vanya Jeev Rakshak

S. No.	Name	Village/Organization	Status/Designations
36	Shri. Mahaveer Singh	Urgam	Vanya Jeev Rakshak
37	Shri. Gabar Singh	Gahar,Tapovan	Sarpanch
38	Shri. Jayatpal	NDBR, Joshimath,HQ	Park Staff
39	Shri. S.C.Dimri	NDBR, Joshimath,HQ	Park Staff
40	Shri. Kundan Giri Goswami	NDBR, Joshimath,HQ	Park Staff
41	Shri. Umed Singh Gusain	NDBR, Joshimath,HQ	Park Staff
42	Shri. J.P. Kothiyal	NDBR, Joshimath,HQ	Park Staff
43	Shri. Digpal Singh	NDBR, Joshimath,HQ	Park Staff
44	Shri. Jeetpal Singh	NDBR, Joshimath,HQ	Park Staff
45	Shri. Bharat Singh	NDBR, Joshimath,HQ	Park Staff
46	Shri. Shantilal Singh	NDBR, Joshimath,HQ	Park Staff
47	Shri. Ranjeet Singh	NDBR, Joshimath,HQ	Park Staff
48	Dr. V.B. Mathur	Wildlife Institute of India, Dehradun	Professor & Head: PA Network, Wildlife Management & Conservation Education
49	Dr. S.Satyakumar	Wildlife Institute of India, Dehradun	Reader, Endangered Species Management
50	Dr. S.S. Samant	Scientist, GBPHIED, Almora	Non-Governmental Institution
51	Shri. Manoj K Mishra	Consultant, PEACE Institute, New Delhi	Non-Governmental Institution
52	Dr. Sejal Worah	Independent Consultant (WWF-I), Mussorie	Non-Governmental Institution

Annexure 3.1

Development of WHBPI for Kaziranga

A two stage consultation process was followed during the planning phase of the programme. The objective of the first stage was to determine critical training and infrastructure needs of the Park and for this purpose a workshop was held at the Interpretation centre at Kohora, Kaziranga NP, from 21-22 of September 2002. The participants of this workshop included high ranking officers of the Assam State Forest Department, past and present managers of Kaziranga, NGOs and scientists.

The workshop was inaugurated by the Chief Wildlife Warden of Assam Mr. S. Doley IFS, and chaired by Dr. Kamaljit Bawa, Founder trustee of ATREE and Distinguished Professor, University of Massachusetts, USA. An introduction to Kaziranga was presented by the Director of KNP Mr. N.K. Vasu, and was followed by an introduction to ATREE and the WBH programme by Dr. Jagdish Krishnaswamy of ATREE. Dr. V.B. Mathur of WII, explained the concept of the Logical Framework for developing ideas in the workshop. The first session concluded with a visit to the National Park.

On the Second day, the participants were divided into working groups, under the following four discussion topics, and after the brain storming session, the suggestions from each group were presented to all the participants, and suggestions and comments were elicited.

- Infrastructure and Management
- Research and monitoring
- Community and stakeholder interface
- Policy and Governance

The second stage of the consultations involved meetings with stake holder groups and local communities and was held at two sites in Kaziranga from 7^{th}-8^{th} November 2002. The first meeting was held at the Kohora High School and the second at the Baguri public works department Inspection Bungalow. The objective of these consultations was to determine the needs of the local communities and discuss ways and means to increase their participation in conservation.

The existing KNP (including the original WHB site area of ca 430 km^2) is relatively well protected and the morale of the Park staff is reasonably high. However, the future of Kaziranga and the continued existence of its key attributes will be determined by the success attained in securing the new extension areas which include the riverine islands in the Brahmaputra as well as corridors to the Mikir hills in Karbi Anglong. This WHB program envisages investments in existing and proposed PAs in both the Brahmaputra flood plain ecosystems and the Karbi-Anglong hill forests. Though Kaziranga has not lost any attributes there are still issues of concern such as weed infestation, protection and restoration of aquatic biodiversity, and improving relations with local communities. Continued efforts to maintain the protection machinery were therefore high on the priority. A set of activities were agreed upon after consensus among the various groups with indicators of success and means of assessment is given in the Table below.

WHBPI for Kaziranga National Park: Activity, Success Indicators & Means of Assessment

S. No.	Activity	Indicator of success	Means of Assessment
1	**STRENGTHEN CAPACITY FOR EFFECTIVE MANAGEMENT**		
1.1	*Enhance key infrastructural requirements*		
1.1.1	Building of roads and bridges in extension areas (25 km)	Good accessibility into the park and efficient patrolling. Response time is reduced for dealing with emergencies	Number of bridges built and length of roads built.
1.1.2	Repair and maintenance of roads in extension areas	Good accessibility into the park and Efficient patrolling. Response time is reduced for dealing with emergencies	Condition of roads. Inspection of vehicle log books
1.1.3	Upgradation and modernization of existing elephant camps for park elephants	Increased care of elephants Efficient Patrolling	Inspection of facilities and interviews with mahouts
1.1.4	Upkeep and maintenance of park elephants	Increased care of elephants Better health condition	Supervision by external veterinary doctor
1.1.5	Boundary demarcation on northern side	Better management of park. Boundaries clearly established	External Inspection of boundary pillars.
1.2	*Provide Adequate Communication & Transport Infrastructure*		
1.2.1	Purchase of modern communication equipment and upgradation of existing ones	Better communication, Efficient Patrolling. Response time is reduced for dealing with emergencies	Numbers of equipment purchased. Inspection of log books
1.2.2	Purchase of vehicles (4WD, Motorcycles, cycles) for extension areas	Better mobility Efficient Patrolling. Response time is reduced for dealing with emergencies	Number of vehicles purchased. Inspection of log book for deployment of vehicles for park use.
1.2.3	Transportation of unused boats from Manas to Kaziranga	Effective use of existing infrastructure	External inspection of subsequent use of boats in KNP
1.2.4	Running costs and Maintenance of vehicles and equipment	Effective use of vehicles and equipment. Reduction in time under repairs	Number of breakdowns and expenditure on repairs
1.3	*Improve skills for staff in key areas*		
1.3.1	Workshops to orient staff towards interactions with local communities, and to sensitize them to people's issues.	Better Park-People relations	Number of workshops conducted. Interviews with staff and local people
1.3.2	Workshop to train staff in basic data collection for monitoring populations of target species	Robust population status information	Number of workshops conducted. Number of staff trained. Assessment of ability to use training in the field.

S. No.	Activity	Indicator of success	Means of Assessment
1.3.3	Study tours – National	Exposure of staff to various environments and methods of management in other parts of the country	Review of reports on study tours
1.3.4	Study tours - International	Exposure of staff to international environments and methods of management	Review of reports on study tours
1.4	*Improve motivation and commitment of staff*		
1.4.1	Payment of a WHB site allowance to all staff	Better motivation of staff and pride in their work	
1.4.2	Construction of two family housing colonies	Better living conditions for staff. Reduced absenteeism by staff	Number of staff allocated housing. Inspection of leave register
1.4.3	Purchase and distribution of field kits for forest staff	Increased efficiency of staff Higher staff morale	Number of field kits distributed. Interviews with staff
1.4.4	UNESCO WHB awards for outstanding staff	Healthy competition among staff for better performance of duty	Number of staff nominated for awards and interviews with staff
2	**Enhance the Role of Local Communities in Conservation of Biodiversity**		
2.1	*Provide health care and veterinary benefits*		
2.1.1	Mobile medical clinic		
2.1.2	Free medical camp 4 times a year/range	Improved medical benefits for local communities	Number of camps conducted and number of people treated
2.1.3	Free veterinary camp 2 times a year/range	Improved veterinary care for cattle. Lowered risk of disease transmission to wild herbivores	Number of camps conducted and number of livestock immunised/treated
2.2	*Resolve people-park conflicts*		
2.2.1	Compensation for crop damage	Lowered animosity towards wildlife and park management	Spot checks on claims and time taken for compensation payment
2.2.2	Compensation for livestock loss and human casualties to predators and elephants	Lowered animosity towards wildlife and park management	Spot checks on claims and time taken for compensation payment
2.2.3	Livestock improvement measures	Stall feeding, lower incidence of cattle straying into park	Number of improved livestock procured, number of families stall feeding.
2.3	*Develop Viable & Acceptable Alternative Livelihoods*		
2.3.1	Vocational Training for 4 youths (two women) per village/year for 10 villages/year	Reduced dependence on forest based livelihood. Reduced removal of biomass.	Impact studies

S. No.	Activity	Indicator of success	Means of Assessment
2.3.2	Ecotourism Development training	Reduced dependence on forest based livelihood	Assessment of utilisation of the training for livelihood means. Interviews with local people.
2.3.3	Help local people in eco-tourism entrepreneurships in their own private lands - Seed money for setting up eco-tourism ventures (2 per year)	Eco-tourism ventures successfully set up	Assessment of financial and technical viability of the project.
2.4	*Building community assets*		
2.4.1	Community Centre	Closer social interaction between park staff and local communities	Interviews with staff and local people
2.4.2	Construction of a Primary school and health centre for forest staff and local communities*	Health and education benefits for staff and local communities	Number of staff and village children attending the schools. Number of people treated at health centre
2.4.3	Running costs of primary school for forest staff and village children*	Smooth functioning of school	External inspection of school
2.4.4	Running costs of a primary health care centre for forest staff and nearby villages*	Smooth functioning of medical facility	External inspection of medical facility
3	**ENHANCING HABITAT CONNECTIVITY AND IMPROVING ANIMAL MOVEMENT CORRIDORS**		
3.1	Construction and maintenance of rumble strips on highway near corridors	Reduced vehicular speed, reduced incidence of road kills	Number of road kills. Spot checking of vehicular speed with speed gun
3.2	Put up signboards and signages along strategic locations to educate road users and warn them of potential animal crossing zones	Reduced vehicular speed, reduced incidence of road kills	Number of road kills. Spot checking of vehicular speed with speed gun
3.3	Put up forest check posts at sensitive zones to slow down night time traffic	Reduced vehicular speed, reduced incidence of road kills	Number of road kills. Spot checking of vehicular speed with speed gun
3.4	Launch an awareness campaign among long distance heavy vehicle owners and drivers about the importance of this area and the need to slow down traffic for one month of the year along a narrow stretch	Reduced vehicular speed, reduced incidence of road kills	Number of road kills. Spot checking of vehicular speed with speed gun. Interviews with drivers.
4	**IMPROVING PROTECTION MEASURES**		
4.1	*Improve patrolling*		
4.1.1	Establishment of new beat camps in extension areas and KAHC (25 camps)	Initial increase in no. of offences registered at new sites	Physical verification through Spot checks

S. No.	Activity	Indicator of success	Means of Assessment
4.1.2	Running and Maintenance of beat camps (75 camps)	Smooth functioning of patrol camps and efficient Patrolling	Checks by external agency and reports from staff
4.1.3	Orientation of staff in legal procedures and appropriate clauses of the various legal acts pertaining to WHB sites	More numbers of successful prosecutions	Evaluation of staff skills.
4.1.4	Purchase of arms and ammunitions and repair and maintenance of existing arms	Increased deterrent to offenders Better patrolling	Number of arms procured. Staff to Arms ratio
4.2	*Incentives for field staff in patrol camps*		
4.2.1	Purchase of provisions for patrol camps	Less time spent by staff on non-patrolling matters. Continuous presence of staff at beat camps	Time spent by staff at patrol camps
4.2.2	Solar Lanterns, Transistor radios, magazines	Increased staff presence at patrol camps, better staff morale	Amenities available at patrol camps. Spot checks of personnel at patrol camps.
4.3	*Improve intelligence & information on poaching*		
4.3.1	Training of staff in intelligence gathering, and setting up informer network	Increased and more effective patrolling	Number of offenders apprehended
4.4	*Improve ability to apprehend & prosecute*		
4.4.1	Training workshop on ability to apprehend and prosecute offenders	More numbers of successful prosecutions	Number of workshops held, and number of staff trained. Tests for staff.
4.4.2	Orientation of staff in legal procedures and appropriate clauses of the various legal acts pertaining to WHB sites	More numbers of successful prosecutions	Number of workshops held, and number of staff trained. Tests for staff.
5	**RESEARCH AND MONITORING**		
5.1	*Research infrastructure*		
5.1.1	Setting up of a fully equipped field research station with a basic lab and library to be jointly run by PA and participating academic institutions	Good research facilities available	Time frame for construction of field station. Independent Inspection of facilities available at field station and use by researchers.
5.1.2	Dedicated research vehicle (one 4WD)	Research work is not hampered due to limitation of mobility	Log books of vehicle use. Interview with researchers
5.1.3	Field station manager	Efficient management of field station and proper allocation of facilities to	Interviews with researchers. Inspection of field

S. No.	Activity	Indicator of success	Means of Assessment
		researchers.	station.
5.1.4	Maintenance and upkeep of field station and vehicles	Effective use of vehicles. Smooth functioning of field station. Reduction in time under repairs	External inspection of field station. Number of breakdowns and expenditure on repairs
5.2	*Research and monitoring*		
5.2.1	Long term Research project on: Effect of management practices (Burning of Grasslands and associated ecosystems	Scientific information on management practices is available	Review of annual reports. Number of publications in reputed scientific journals
5.2.2	Estimation of large mammal densities every two years based on scientific methods	Scientific information on mammal densities available	External review of scientific merit of data and results obtained
5.2.3	Monitoring and research on invasive species and their spread	Information on spread and possible control of invasive species is available	External review of report and merit of control measures
5.2.4	Long term research project to study hydrology and sedimentation processes of the floodplain ecosystem, including annual flooding cycles	A better understanding of the hydrological dynamics of the floodplain ecosystem	Review of Annual reports, and number of publications in reputed scientific journals
5.2.5	Detailed habitat mapping using RS/GIS and multidate satellite imagery	Habitat map of KNP is made available. Widespread use of map for future research and planning	Review of Annual reports. Number of references to maps in publications
5.2.6	Assess other components of biodiversity, and woodland and riverine habitats	Biodiversity inventory of KNP is made available	Review of Annual reports, and number of publications in reputed scientific journals
5.2.7	Long term research on movement patterns of Elephants and tigers between Kaziranga floodplains and Karbi-Anglong hills	Important elephant and tiger movement routes and corridors are identified	Review of Annual reports, and number of publications in reputed scientific journals
5.2.8	Long term research on movement of rhinos between Kaziranga and neighbouring areas, including river islands	Movement and dispersal of rhinos to adjoining areas.	Review of Annual reports, and number of publications in reputed scientific journals
5.2.9	Identification of crucial animal corridors during the flood season	Information on animal movement patterns is available	Camera trap surveys of corridors

S. No.	Activity	Indicator of success	Means of Assessment
5.2.10	Research on the metapopulation dynamics of rhinos with respect to Kaziranga and satellite PAs	Scientific information for long term management of metapopulations is available	Review of Annual reports, and number of publications in reputed scientific journals
5.2.11	Assisted genetic exchange within the rhino metapopulation by translocation	A program to ensure a viable population of Rhinos is put into place. Survival and reproduction of translocated rhinos	External review of translocation plan. Number of rhinos translocated. Study on demographics of metapopulation
5.2.12	Set up a database at the Park HQ to help in the collection and analysis of data pertaining to the biodiversity of the park	Information on various aspects of KNP is centralised and easily accessible	External review of database and validity of data available.
5.2.13	Documentation and dissemination	Information on the park and its research and management is readily and easily available.	Review of literature, brochures, websites and other media provided by park.
6	**POLICY AND GOVERNANCE**		
6.1	*Site Management Committee*		
6.1.1	Setting up of supervisory and advisory committee for park management consisting of FD, Civic administrators, Community representatives, NGOs, Academic institutions, Scientists and representatives from UNESCO and MoEF	Involvement of multiple agencies and civil society partners in Park administration is facilitated. Park administration has maximum professional input.	Number of representatives from different agencies and organizations.
6.1.2	Administration and coordination of activities of the committee	Smooth functioning of the committee	Review of functioning of committee by PCC.

*To be shared by forest staff and local communities

Annexure 3.2

Development of WHBPI for Keoladeo NP

Site-level consultations were held as informal discussion sessions where members from each stakeholder groups, namely; representatives from local communities, Forest Department staff, local Hoteliers, Rickshaw pullers interacted with the project team. Also present, as part of these interactions, were the former and present Park Directors. Each stakeholder group was explained the purpose of the team's visit and then encouraged to share their views about the Park and its management with the team. Individual views were written on cards (in Hindi) and put up on a board for viewing as discussions continued. At the end of each discussion session these cards were viewed with the group to ensure that all the issues raised and discussed had been covered.

An interesting discussion point with the Forest Staff was the question posed by the team, as to what each individual staff member would do if made the Park Director for a day? The question was posed particularly to the older staff members who had spent considerable number of years in the Park and were familiar with its history. It was also posed to the new recruits. These stakeholders meetings were held at KGNP between the 3rd and 4th of December 2002.

It is to be stated that this Park has been a subject of intensive study in the past and several exercises involving community response to Park management have been carried out. In 1996, The World Wide Fund for Nature-India (WWF-I) carried out a Participatory Rural Appraisal in the villages surrounding the Park and brought out a publication on Participatory Management Planning for the Park.

Objective

To bring together the different stakeholders and to understand, appreciate and develop probable solutions to the problems faced by the KGNP World Heritage Site in a systematic manner.

Activities and conclusions

The meeting was facilitated by a team of expert facilitators adopting a modified log frame planning approach. The participants deliberated and arrived at following conclusions:

The Current Situation

The potential and existing threats to the effective management of KGNP can be stated as follows:

- *The alienation of local communities from conservation*

Centuries of interaction with the *Ghana* and its resources have resulted in the dependency of villagers on buffaloes and other livestock. Some of them still retain their pastoral lifestyle making them more dependent on wetland resources than others. *Ghana* was a major source of livelihood until 1982. After the declaration of the area as a NP, the rights of the locals on this area has been curtailed and led to a situation of confrontations.

- *People - Park Conflicts*

A 32 km long and six foot high boundary wall around the Park, constructed in 1981, is largely ment to prevent the illegal entry of cattle and people into the Park and to restrict the movement of ungulates from within the Park to the surrounding agricultural fields. However, the wall at present is broken in many places and the surrounding villages push in their useless cattle into the Park. This has lead to an alarming increase of feral cattle in the Park competing for the limited resources with ungulates. It is also claimed by the locals that ungulates like Nilgai jump the wall and damage crop fields. The community has thus requested wall to be repaired and the wall height to be increased by another two feet. There was also some discussion about the possibility of providing crop insurance and/or compensation against crop damage.

- *Inadequate capacity for management*

Park managers highlighted the need for capacity building of the frontline staff for ensuring better management. The need for better training on legal issues also came up. The Park staff also suggested an independent magistrate to look at specific Park related legal matters. Others expressed the need for a legal advisor or even a legal post in the Park.

- *Tourism*

The forest staff felt that their communication with tourists was handicapped due to the language barrier. It was requested that the capacity of the staff be built to overcome the language barrier. There was also a suggestion that information about other places of tourist interest be made available with the Park staff to facilitate dialogue with tourists who often ask for such information. The Park has 108 rickshaw wallahs who take tourists inside the Park. These are trained in the art of bird watching and they are also good tourists guides. At present they are the worst affected by the drought since there has been a drastic decline in the tourists and hence are without employment. Ironically, these people are now so habituated to working in the Park that they refuse to seek employment in Bharatpur town. They expressed their interest in being employed in Park management related activities. A specific request from them was to provide each of them a pair of binoculars. They said that often they lost a client because some of them did not have binoculars.

- *Water Resource Management*

With the drought over the last few years, and the complete drying up of the Park, there was considerable concern and discussion on the issue of water at this meeting. Suggestions at the meeting ranged from digging larger water bodies to treating the catchment area of the region. However, there is also the view that since the area is a wetland, cycles of dry and wet periods are natural and necessary for the maintenance of the wetland. If this is taken into consideration, then perhaps there may not be cause for alarm over the recent drought conditions. It was felt that under this project UNESCO-UNF and other developmental agencies should assist the Rajasthan State Government in augmenting water availability for KGNP through various means including bringing water *via* pipeline from Chambal/Yamuna Rivers.

The Future Vision

The effective and participatory management of the Park can be arrived at by ensuring:

- *Develop Viable and Acceptable Alternative Livelihoods*

Livelihood issues seemed to be a major concern for the local community. There was a concern about providing employment opportunities to the younger generation. One specific suggestion was to encourage the hoteliers to employ more local people. There was also discussion on having orientation visits relevant to livelihood options for local communities. Some very specific alternate livelihood options discussed were: dairying; honey production and fish rearing. Villagers also used to collect the roots of *Veteveria* grass for extraction of *Khus* oil until 1981. This could be looked into provided the cultivation of *Vetiveria* grass outside the Park is viable.

- *Tourism*

It was felt that *satellite wetlands* in the surrounding areas needs to be developed as tourist's spots, as there are many village wetlands that did have water and have now become a refuge for birds. It was discussed that if the villagers were interested, they could develop these into tourist's spots and also benefit from tourism revenues. The possibility of developing *'home-stays'*, which could provide tourists with a village experience and also earn some revenue for local communities, was discussed and local community members seemed amenable to these enterprises.

- *Develop Community Assets*

Requests to provide schools in particular villages and even provide for a new cremation ground did come up, but were not pursued further as they feel outside the mandate of this project. There was however considerable discussion on strengthening some of the roads within villages. Several community members, particularly women raised the issue of better toilet facilities in the villages and the need to have solar lights.

➢ *Address Community Resource Needs*

As cutting of wood to meet fuel-wood requirements of the local people is not allowed, the issue of fuel-wood/alternate sources of fuel was discussed. The Park authorities have addressed this by setting up biogas plants and providing LPG connections at subsidized prices. The people in this meeting requested that LPG subsidies be provided even for refills. As grazing is banned in the Park, the authorities have been issuing permits to cut fodder grass from inside the Park, to meet the fodder requirements of the locals. Each family on request used to get a permit on nominal payment. Two people can go inside the Park to cut grass and bring it back for the cattle. This practice however, has been recently discontinued due to severe drought conditions. The community members wanted this to be addressed.

The success indicators and means of supervision for each of the proposed activities are presented in the table below.

WHBPI for Keoladeo National Park: Activity Success Indicators and Means of Assessment.

S.No	Activity	Success Indicators	Means of Assessment
1 Strengthen Capacity (Staff & Infrastructure) for Effective Management			
1.1 Enhance Key Infrastructural Requirements			
1.1.1	Improvement and maintenance of check posts (13 sites)	Improved Park protection Decrease in illegal activities in the Park	Records of illegal activities maintained by the Park
1.1.2	Maintenance of Park boundary rubble wall	Decrease in illegal activities in the Park	Records of illegal activities maintained by the Park
1.1.3	Up gradation and maintenance of forest trails	Easy and fast access to Park interiors	
1.2 Provide Adequate Communication & Transport Infrastructure (Infrastructure)			
1.2.1	Wireless System	Well connected staff	Distribution records Reports of their effectiveness in realizing the objective
1.2.2	Vehicles	Improving accessibility and mobility within the Park, thus ensuring better Park management	Distribution records Reports of their effectiveness in realizing the objective
1.2.3	Motor Bikes	Improving accessibility within the Park, improving communication and thus ensuring better Park management	Distribution records Reports of their effectiveness in realizing the objective
1.2.4	Computers & accessories	Well informed staff	Distribution records Reports of their effectiveness in realizing the objective
1.3 Improved Skills of Staff in Key Areas (Capacity building)			
1.3.1	Training on: - Communication skills - Animal population estimation techniques - Bird-watching skills - Study tours National - Study tours International	Improved Park management based on experiences learnt from other sites	Documents regarding better management and means of implementation Periodic reports
1.4 Improved Coordination between Local Communities, PA Management & Other Stakeholders			
1.4.1	Training & sensitization for staff on community relations and extension	Increase in the number of trained and sensitized PA staff Increase in number of meetings between the PA staff and local community	Minutes of the meetings held Decrease in conflict situations between Park authorities & local communities
1.4.2	Translation, simplification, dissemination & discussion of management plan with local communities and other stakeholders	Well informed local communities & stakeholders Increase in number of meetings between the PA staff and local community	Increase in voluntary actions by the local communities towards conservation
1.4.3	Design & conduct mass/Public Awareness campaigns	Harmonious Park-people relationship Greater awareness of the Park,	Decrease in conflict situations between Park authorities &

S.No	Activity	Success Indicators	Means of Assessment
		at both the National and International levels	local communities
1.4.4	Strengthen EDC's for regular dialogue, roles & responsibilities	Harmonious Park-people relationship Better communication between Park authorities & local communities Stake of local communities in Park conservation is greater	Increase in voluntary actions by the local communities towards conservation
1.5 Improved Motivation & Commitment of Staff (Staff Welfare and Incentives)			
1.5.1	Purchase and distribution of Field Equipment - Personal - Patrolling/monitoring equipment	Well provided staff	Distribution records Reports of their effectiveness in realizing the objective
1.5.2	Staff Welfare - Housing - Insurance*	Happy and contended staff	Distribution records Reports of their effectiveness in realizing the objective
1.5.3	UNESCO WHBPI awards for outstanding staff	Motivated staff	Distribution records Reports of their effectiveness in realizing the objective
1.5.4	Special WHBPI allowance for 150 staff @ Rs. 400/month	Well provided and motivated staff	Distribution records Reports of their effectiveness in realizing the objective
2 Enhancing the Role of Local Communities in Conservation of Biodiversity **2.1 Develop Viable & Acceptable Alternative Livelihoods**			
2.1.1	Review past attempts & assess/draw lessons	Help in future management	Report on review of past attempts and how lessons were used for better Park management
2.1.2	Feasibility assessment of selected livelihood options and other activities	The likelihood that these will be used to promote alternate livelihood options in the area	Feasibility report of selected livelihood options & records of success of those initiated
2.1.3	To promote the involvement of existing NGOs/CBOs and EDCs to assist in livelihood development	The increased involvement of NGOs/CBOs and EDCs in developing and promoting alternate livelihood options for local communities	Record of NGOs/CBOs sought to help in this initiative. Report of how many and how NGOs/CBOs and EDCs are helping towards promotion of alternate livelihoods
2.1.4	Strengthen capacity of EDCs	Active EDCs	Record of the number of EDCs trained in various aspects and their present status

* Although, the present project has listed this as an activity, there are no budgetary provisions for the same as WTI is already involved in a nation-wide Insurance programme for field staff in all PAs.

S.No	Activity	Success Indicators	Means of Assessment
2.1.5	Provide support for strengthening/adding value to ongoing livelihood initiatives	Support to and enhancement of community livelihoods leading to better community support to the Park	
2.1.6	Provide livelihood tools (binoculars) to nature guides/rickshaw pullers	Empowerment of rickshaw pullers. More support to the Park	Records of distribution Reports of its effectiveness
2.1.7	Design and conduct camps on bird identification and communication skills for the nature guides/rickshaw pullers	Improve the skills of these guides Improved communication between the guides and tourists	Records of attendance Report on its effectiveness
2.1.8	Design and conduct camps for locals on hospitality management	Greater and improved employment for the locals Request for more training camps Improve goodwill with the park authorities	Report on its effectiveness
2.2 Resolve People-Park Conflict			
2.2.1	To construct, repair & maintain the boundary wall of the Park	Protect the Park Decrease in the number of feral cattle in the Park.	Record of crop damage by wild animals after the boundary wall has been repaired Record of the number of cattle introduced in the Park after the boundary wall has been repaired
2.3 Develop community Assets			
2.3.1	Improve/provide access roads to select villages	Maintain the goodwill of local communities & provide them basic amenities	Better access to villages
2.3.2	Feasibility of establishing Sulabh toilets	Providing basic amenities to locals Improve Park surroundings Maintaining the goodwill of locals	Feasibility report of establishing Sulabh toilets
2.3.3	Construction of two Sulabh toilets		Records of its use
2.3.4	Techno feasibility assessment for the development of community ponds	Providing basic amenities to locals Improve Park surroundings Maintaining the goodwill of locals	Techno-feasibility report
2.3.5	Development of community ponds		Records of its use
2.4 Address Community Resource Needs			
2.4.1	Provision of LPG connections	Providing basic amenities to locals Reduce in the illegal felling of wood from the Park	Records of installation Report on its effectiveness
2.4.2	Provision of Biogas connections	Providing basic amenities to locals Reduce in the illegal felling of wood from the Park	Records of installation Report on its effectiveness

S.No	Activity	Success Indicators	Means of Assessment
2.4.3	Provision of solar lanterns	Providing basic amenities to locals Reduce in the illegal felling of wood from the Park	Records of installation Report on its effectiveness
3 Water Resource Management **3.1 Enhancing Catchment Capability**			
3.1.1	Conduct techno-feasibility surveys in the zone of influence		Techno-feasibility report
3.1.2	Implement afforestation and soil-moisture conservation measures	Ensuring a sustained supply of water for local communities as well as the Park	A report on its effectiveness
3.2 Tapping of River Water *via* Pipe Line			
3.2.1	Conduct techno-feasibility surveys for water tapping	Ensuring a sustained supply of water for local communities as well as the Park	Techno-feasibility report
4 Protected Area Management			
4.1	Management of Invasive species (terrestrial and aquatic)	To ensure improved Park ecosystem	Records of invasive species
4.2	Management of feral cattle	To ensure better Park ecosystem	Records of the number of feral cattle inside the Park
4.3	Immunization of feral cattle	To ensure the health of wild ungulates	Health records of the ungulates in the Park
4.4	Creation & maintenance of water bodies	Improved habitat and health of wildlife	Health records of the ungulates in the Park
5 Improve Protection Measures **5.1 Improved Intelligence & Information on Poaching**			
5.1.1	Training of staff on intelligence gathering etc	Trained staff	
5.1.2	System of regular information exchange with other departments	Improved Park protection Prevention of poaching	
5.2 Improve Ability to Apprehend and Prosecute			
5.2.1	Develop network of informants and provide incentives for intelligence gathering	Good intelligence on criminals	Number of poachers / criminals caught
5.2.2	Training on judicial/legal processes/law enforcement and engagement of legal services	Empowerment of Park staff & building of capacity for better enforcement	Record of training programmes
6 Research & Monitoring **6.1 Research Infrastructure (Personal & Equipment)**			
6.1.1	Equipment for Research Lab.	Ensure research & monitoring Improve Park management	Report
6.1.2	Establishment of Research Lab.	Ensure research & monitoring Improve Park management	A report
6.1.3	Specialized wetland equipment gear	Ensure research & monitoring Improve Park management	Report
6.1.4	Research Boat & accessories	Ensure research & monitoring Improve Park management	
6.1.5	Contractual engagement of field station manager and social scientist	Better coordination between research organizations & the PA	Periodic report

S.No	Activity	Success Indicators	Means of Assessment
6.2 Research Projects & Dissemination			
6.2.1	Project on biodiversity mapping and monitoring	Biological values are mapped	Periodic report
6.2.2	Annual research seminar	Improved stakeholder involvement in research activities	
6.2.3	Documentation and dissemination	Park values are widely known	A report
7	**POLICY AND GOVERNANCE**		
7.1	*Site Management Committee*		
7.1.1	Setting up of supervisory and advisory committee for park management consisting of FD, Civic administrators, Community representatives, NGOs, Academic institutions, Scientists and representatives from UNESCO and MoEF	Involvement of multiple agencies and civil society partners in Park administration is facilitated. Park administration has maximum professional input.	Number of representatives from different agencies and organisations.
7.1.2	Administration and coordination of activities of the committee	Smooth functioning of the committee	Review of functioning of committee by PCC

Annexure 3.3

Development of WHBPI for Manas

A two-stage consultation process was followed during the planning phase of the programme. The objective of the first stage was to determine critical training and infrastructure needs of the Park and for this purpose a workshop was held at the picturesque Mathanguri Forest Rest House in Manas NP from 17 to 19 of September 2002. This was a gathering of people who have either been closely associated with this Park in the past or continue their association in the present.

The workshop was inaugurated by the Field Director Mr. Abhijit Rabha IFS, and chaired by Dr. Kamaljit Bawa, Founder trustee of ATREE and Distinguished professor, University of Massachusetts, USA. After the participants introduced themselves, the workshop proceedings started in earnest. The Field Director gave a detailed introduction to the Park, its history and current threats and issues that set the tone for further discussions.

The second stage of consultations was carried out with community representatives of Bodo and non-Bodo tribals around Manas National Park from 29th October till 3rd November 2002 in various villages, and one at the Forest Guest House at Mathanguri, MNP. The objective of these consultations was to assess the needs of the local communities and ways and means of increasing their support for conservation.

The issues that emerged from the consultations could be broadly divided into the following categories.

- Strengthen capacity for effective management
- Restoration of lost attributes
- Research and monitoring
- Policy and governance
- Increasing the participation of local communities in conservation

The activities under these categories are listed below, with indicators of success and means of assessment.

WHBPI for Manas National Park; Activity, Success Indicators and Means of Assessment

S. No.	Activity	Indicator of Success	Means of Assessment
1	**STRENGTHEN CAPACITY FOR EFFECTIVE MANAGEMENT**		
1.1	*Enhance key infrastructural requirements*		
1.1.1	Rebuilding of bridges (15 nos.)	Improved access to various parts of the Park	Number of bridges built
1.1.2	Maintenance of bridges	Good accessibility into the Park and efficient patrolling. Response time is reduced for dealing with emergencies	Inspection of infrastructure
1.1.3	Rebuilding of road network	Good accessibility into the Park and efficient patrolling. Response time is reduced for dealing with emergencies	Length of roads built. Inspection of infrastructure. Inspection of vehicle log books
1.1.4	Repair/Maintenance of road network	Good accessibility into the Park and efficient patrolling. Response time is reduced for dealing with emergencies	Inspection of road condition. Inspection of vehicle log books
1.1.7	Construction of a modern and well equipped elephant camp for Park elephants	Increased care of elephants Efficient Patrolling	Inspection of facilities and interviews with mahouts
1.1.8	Upkeep and maintenance of Park elephants	Increased care of elephants Better health condition	Examination by independent veterinary doctors
1.2	*Provide Adequate Communication & Transport Infrastructure*		
1.2	Purchase of modern communication equipment and upgradation of existing ones	Better communication, Efficient Patrolling. Response time is reduced for dealing with emergencies	Inspection of log books
1.2.1	Purchase of one 4WD vehicle	Better mobility. Efficient Patrolling. Response time is reduced for dealing with emergencies	Inspection of logbook for deployment of vehicles for Park use.
1.2.3	Purchase of one flat bottom boats	Effective patrolling of river. Initial Increase in number of illegal fisherman caught	Inspection of logbook of boat. Inspection of charge sheets for offenders.
1.2.4	Purchase of five Motorcycles	Better mobility. Efficient Patrolling. Response time is reduced for dealing with emergencies	Inspection of logbook for deployment of vehicles for Park use.
1.2.5	Running costs and Maintenance of vehicles and equipment	Effective use of vehicles and equipment. Reduction in time under repairs	Number of breakdowns and expenditure on repairs
1.3	*Improve skills for staff in key areas*		
1.3.1	Training of staff in basic vehicle and equipment maintenance and repair and effective wireless communication	Quick response time in dealing with breakdown of equipment and vehicles. Efficient wireless communication	Number of times vehicles and equipment are sent outside for minor repairs

S. No.	Activity	Indicator of Success	Means of Assessment
1.3.2	Workshops to orient staff towards interactions with local communities, and to sensitize them to people's issues.	Better Park-People relations	Interviews with staff and local people
1.3.3	Workshop to train staff in basic data collection for monitoring populations of target species	Robust population status information	Number of staff trained. Assessment of ability to use training in the field.
1.3.4	Study tours – National	Exposure of staff to various environments and methods of management in other parts of the country	Interviews with staff. Review of reports on study tours
1.3.5	Study tours - International	Exposure of staff to international environments and methods of management	Interviews with staff. Review of reports on study tours
1.4	*Improve motivation and commitment of staff*		
1.4.1	Payment of a WHB site allowance to all staff	Better motivation of staff and pride in their work	Interviews with staff
1.4.2	Construction of family housing colony at Bansbari	Better living conditions for staff. Reduced absenteeism by staff	Number of staff allocated housing. Inspection of leave register
1.4.3	Purchase and distribution of field kits for forest staff	Increased efficiency of staff Higher staff morale	Interviews with staff
1.4.4	UNESCO WHB awards for outstanding staff	Healthy competition among staff for better performance of duty	Number of staff nominated for awards and interviews with staff
2	**ENHANCE THE ROLE OF LOCAL COMMUNITIES IN CONSERVATION OF BIODIVERSITY**		
2.1	*Provide health care and veterinary benefits*		
2.1.1	Mobile Medical Clinic	Improved medical benefits for local communities	Nnumber of beneficiaries
2.1.2	Free medical camp 4 times a year/range	Improved medical benefits for local communities	Number of beneficiaries
2.1.3	Free veterinary camp 2 times a year/range	Improved veterinary care for cattle. Lowered risk of disease transmission to wild herbivores	Number of livestock immunized/ treated
2.2	*Improve educational facilities*		
2.2.1	Salaries for teachers of venture schools (@ Rs. 1000 x 25 for 12 months)	Regular functioning of venture schools	Number of venture schools running and attendance
2.2.2	WHB Scholarships to 50 students of Grade 10 @ Rs. 500/Month	Incentive and encouragement for school students to continue education	Performance of these students in their class and attendance in Park activities
2.2.3	WHB Scholarships to 50 students of Grade 11 @ Rs.625/Month	Incentive and encouragement for school students to continue education	Performance of these students in their class and attendance in Park activities
2.2.4	WHB Scholarships to 50 students of Grade 12 @ Rs.750/Month	Incentive and encouragement for school students to continue education	Performance of these students in their class and attendance in Park activities
2.3	*Resolve people-Park conflicts*		

S. No.	Activity	Indicator of Success	Means of Assessment
2.3.1	Compensation for crop damage	Lowered animosity towards wildlife and Park management	Spot checks on claims and time taken for compensation payment
2.3.2	Compensation for livestock loss and human casualties to predators and elephants	Lowered animosity towards wildlife and Park management	Spot checks on claims and time taken for compensation payment
2.4	*Develop Viable & Acceptable Alternative Livelihoods*		
2.4.1	Vocational Training for 4 youths per village/year for 3 villages/year	Reduced dependence on forest based livelihood	Impact studies
2.4.2	Ecotourism Development training	Reduced dependence on forest based livelihood	Assessment of utilization of the training for livelihood means. Interviews with local people
2.4.3	Help local people in eco-tourism entrepreneurships in their own private lands - Seed money for setting up eco-tourism ventures (2 per year)	Eco-tourism ventures successfully set up	Assessment of financial and technical viability of the project
2.5	*Building community assets*		
2.5.1	Community Centre	Closer social interaction between Park staff and local communities	Interviews with staff and local people
2.5.2	Construction of a Primary school and health centre for forest staff and local communities	Health and education benefits for staff and local communities	Number of staff and village children attending the schools. Number of people treated at health centre
2.5.3	Running costs of primary school for forest staff and village children	Smooth functioning of school	External inspection of school
2.5.4	Running costs of a primary health care centre for forest staff and nearby villages	Smooth functioning of medical facility	External inspection of medical facility
3	**RESTORING LOST ATTRIBUTES**		
3.1	*Restoring lost habitats*		
3.1.1	Assessment of lost habitats using RS/GIS	Comprehensive map of lost habitats. Utilization of maps for future restoration plans	External review of report with maps.
3.1.2	Formulate an action plan for habitat restoration	Practical and implementable action plan formulated	External review of report
3.1.3	Habitat Restoration	Tangible signs of recovery of lost habitats	Habitat assessment and monitoring of recovery
3.1.4	Research and Monitoring	Proper documentation of restoration activities	External review of reports
3.2	*Restoring lost species*		
3.2.1	Assessment of populations of critically endangered species such as rhino, Swamp deer and gharial	Rigorous assessment of current status of target species	External review methodology and results
3.2.2	Pilot phase of reintroduction of rhino/swamp deer/gharial	Survival of reintroduced species	External review of reintroduction plan. Supervision of animals

S. No.	Activity	Indicator of Success	Means of Assessment
			introduced.
3.2.3	Monitoring of reintroduced population	Information on status of reintroduced species	External review of report
4	**IMPROVE PROTECTION MEASURES**		
4.1	Improve patrolling		
4.1.1	Building of fully functional beat camps (11 Nos)	Initial increase in number of offences registered Increased patrolling	Physical Verification through Spot checks
4.1.2	Running and Maintenance of beat camps	Smooth functioning of patrol camps and Efficient Patrolling	Checks by external agency and reports from staff on working and living conditions
4.1.3	Purchase of arms and ammunitions and repair and maintenance of existing arms	Increased deterrent to offenders Better patrolling	Number of arms procured. Staff to Arms ratio
4.2	*Provide Incentives for field staff in patrol camps*		
4.2.1	Purchase of provisions for patrol camps	Less time spent by staff on non-patrolling matters. Continuous presence of staff at beat camps	Time spent by staff at patrol camps
4.2.2	Solar Lanterns, Transistor radios, magazines etc	Increased staff presence at patrol camps, better staff morale	Amenities available at patrol camps. Spot checks of personnel at patrol camps.
4.3	*Improve ability to Apprehend & Prosecute*		
4.3.1	Creation and training of Antipoaching squads	Initial increase in no. of offences registered Increased and more effective patrolling	Number of offenders apprehended
4.3.2	Orientation of staff in legal procedures and appropriate clauses of the various legal acts pertaining to WHB sites	More numbers of successful prosecutions	Number of staff trained. Tests for staff.
5	**RESEARCH AND MONITORING**		
5.1	*Research infrastructure*		
5.1.1	Setting up of a fully equipped field research station with a basic lab and library to be jointly run by PA and participating academic institutions	Good research facilities available	Time frame for construction of field station. Independent Inspection of facilities available at field station and use by researchers.
5.1.2	Dedicated research vehicles	Research work is not hampered due to limitation of mobility	Log books of vehicle use. Interview with researchers
5.1.3	Field station manager	Efficient management of field station and proper allocation of facilities to researchers.	Interviews with researchers. Inspection of field station.
5.1.4	Maintenance and upkeep of field station and vehicles	Effective use of vehicles. Smooth functioning of field station. Reduction in time under repairs	External inspection of field station. Number of breakdowns and expenditure on repairs
5.2	*Research Projects*		
5.2.1	Long term Research projects on		
5.2.1.1	Habitats (Grasslands, riverine forests, savannah woodlands)	Information on critical habitats is available	Review of annual reports. Number of publications in

S. No.	Activity	Indicator of Success	Means of Assessment
			reputed scientific journals
5.2.1.2	Indicator species (Pygmy hog, hispid hare, Bengal florican etc)	Information on ecology of indicator species is available	Review of annual reports. Number of publications in reputed scientific journals
5.2.2	Socio-economic aspects		
5.2.2.1	Resource use by local communities	Information on use of resources. Feedback into community programs	External review of report.
5.2.2.2	Effectiveness of outreach programs	Information on effectiveness of outreach programs. Feedback into ongoing outreach programs	External review of report
5.2.2.3	Effectiveness of welfare programs	Report on effectiveness of welfare programs. Feedback into ongoing welfare programs	External review of report
5.2.2.4	Profiling of wildlife offenders	Socio-economic profile of offenders prepared	External review of report
5.2.3	Annual Research Seminar (combined for Manas and Kaziranga)	Dissemination of information on various projects	Quality of presentations
5.2.4	Documentation and dissemination		
6	**POLICY AND GOVERNANCE**		
6.1	*Interstate Heritage committee and Site Management Committee*		
6.1.1	Setting up of supervisory and advisory committees for Park management consisting of FD, Civic administrators, Community representatives, NGOs, Academic institutions, Scientists and representatives from UNESCO and MoEF	Involvement of multiple agencies and civil society partners in Park administration is facilitated. Park administration has maximum professional input.	Number of representatives from different agencies and organisations
6.1.2	Administration and coordination of activities of the committees	Smooth functioning of the committees	Review of functioning of committee by PCC.
6.2	*Trans-boundary cooperation in Park management*		
6.2.1	Joint patrolling by Bhutan and Indian Forest Dept.	Increased vigilance along the border areas	Number of joint patrols conducted
6.2.2	Regular meetings between heads of two Parks to strengthen protection	Better cooperation in cross border patrolling	Number of meetings between the two Park managers
6.2.3	*Restoration of enclosures within the Park*		
6.3.1	Restoration of 2000 acres of Central Seed Farm inside Manas to the National Park	Seed farm is returned to the Park management	Review of steps taken by central and state government towards this goal

Manas is a WHB site in danger because of past insurgency, poor relations with surrounding communities, breakdown of government authority, damage to infrastructure and low morale of Park management. The main goals for Manas under the WHBPI will be to secure the existing Manas National Park area (which includes the 390 km^2 Manas Wildlife Sanctuary which was designated as a WHB site), rebuild basic infrastructure, develop positive interactions with the surrounding communities and enhance its profile amongst political and cultural institutions such as the Bodo Territorial Council, the Bodo Sahitya Sabha and finally to restore its lost attributes without which it can longer be considered of WHB site stature. These lost attributes are basically species such as the rhino, swamp deer and gharial as well as habitats such as managed grasslands. Manas should be de-listed as a WHB site if faunal attributes continue to be lost and its unique grassland habitats allowed to deteriorate. The WHB activities and budgetary allocations after the first year will be conditional on progress made on securing the Park attributes as well demonstrated commitment of the state government to restoring Manas.

Annexure 3.4

Development of WHBPI for Nanda Devi

A two-stage consultation process was followed during the planning phase of the program, beginning with a one-day meeting held at WII, between the 1-2, November 2002. This meeting brought together 25 experts including the Park managers and field researchers to assess and analyse the current situation regarding the potential and existing threats to the effective management of the Park and to provide a future vision for an effective and participatory management of the Park. This was followed by the second stage, which consisted of a two day 'on site' meeting with key stakeholders (local villagers and the frontline staff of the Park) at Joshimath between the 23-24, November 2002. This helped in understanding not only the perceptions of the stakeholders about the Park and its past, current and future management but to also validate the results of the one-day meet at WII.

The consultation process

Workshop at WII (November, 2002)

Objective

To bring together experts and knowledgeable individuals to understand and appreciate the problems faced by the Nanda Devi World Heritage Site in a systematic manner.

Activities and conclusions

The meeting was facilitated by an expert facilitator using a log frame approach, and the participants deliberated and arrived at following conclusions:

The Current Situation

The potential and existing threats to the effective management of NDNP can be stated as follows:

- *The alienation of local communities from conservation*

  Nanda Devi peak has been one of the most popular peaks with mountaineers, largely due to the challenges posed by this magnificent peak. As a result, mountaineering expeditions to the Nanda Devi peak were a regular feature before a ban was imposed following the declaration of the National Park in 1982. Although there is no human habitation inside the Park, few villages on the Park periphery used to earn a modest income by assisting the mountaineering groups. The cessation of mountaineering activities and the formation of the NP resulted in the direct loss of income to these villagers. Some of the participants were of the opinion that this fact had alienated the local people from conservation and deserved a serious look as part of the current initiative. Another observation was that some of *Van Panchayat* land was also been included within the NP notified area, leading to further alienation of the locals from the Park authorities.

- *Poaching of key wildlife species by locals and outsiders*

  The current Park managers, as well as other knowledgeable participants considered poaching of animals like the Himalayan musk deer, Himalayan black bear, and Bharal by poachers (non-locals, may be migrants from Nepal) often in collaboration with the locals as a serious problem confronting the Park.

- *Inadequate capacity for management*

  Park managers highlighted the non-availability of essential equipments like vehicles, communication equipment, high altitude gear and camping facilities inside the Park for efficient and effective management. The need for capacity building among the staff was also emphasized.

- *Absence of a rational tourism policy*

  An intense discussion amongst the participants resulted in the identification of the absence of a rational tourism policy for the Park as a serious problem deserving focus under the current initiative.

The Future Vision

The effective and participatory management of the Park can be arrived at by ensuring:

- *Supportive role of local communities in conservation*

  Since the participation and active support of local people in Park's management is essential for its effective management, it was suggested that strategies be devised to elicit short as well long-term support of locals in all conservation activities in and around the Park.

- *Control of poaching of key wildlife species*

  It was suggested that the Park management specially the front line staff, be enabled materially and through relevant training programs to effectively control poaching of key wildlife species.

- *Effective research and monitoring systems*

  The need of a well planned and fully funded research and monitoring program at the Park to not only document the current biological values but also monitor changes if any was also recommended.

- *Strengthened capacity and systems for effective management*

  In view of the extreme climatic and logistical challenges that the Park provides to its managers and frontline staff, it was recommended that the capacity of the Park staff for effective patrolling and communication needed immediate provisioning. It was

also suggested that motivational programmes like family welfare programs would go a long way in ensuring the effective management of the Park.

- *Rational ecotourism policy in place*

  It was recommended that the development of a rational ecotourism policy and practices for the Park would go a long way in not only generating the necessary goodwill amongst various stakeholders for the Park, but also provides the locals with much needed income generating mechanism.

NOTE: Finally, it was recommended that these observations and suggestions may be validated and amended as necessary through an on site visit and focused interaction with the local villagers and the Park's frontline staff, by the planning team.

The stakeholders meeting at Joshimath (23- 24, November, 2002)

Objective

To ground truth the findings of the meeting held at WII and to assess the perceptions of the locals and the requirements/aspirations of the frontline staff of the Park.

Activities and results

The meeting of the people from the local villages (Reni and Lata) was facilitated in a participatory mode, and they (with a fair number of women representatives) were encouraged to freely voice their opinion on the formation of the Park and the resultant problems they face. They were also encouraged to comment about their current and potential source of livelihood, their relations with the Park management, about poaching problems in the Park and their suggestions about the ways a participatory management program could be developed for the effective management of the Park. It was a very productive meeting with women taking lead on most issues.

The meeting with the frontline staff of the Park including the Forest Range Officers, Deputy Rangers and the Forest Guards resulted in a realistic assessment of the management capacity building requirements including those of training and special gear for high altitude travel and stay.

The success indicators and means of supervision for each of the proposed activities are given in table below.

WHBPI for Nanda Devi National Park : Activity, Success Indicators & Means of Assessment

S.No	Activity	Success Indicators	Means of Assessment
1 Strengthen Capacity (Staff & Infrastructure) for Effective Management			
1.1 Effective systems & infrastructure at key entry points			
1.1.1	Establish permanent patrolling camps (3 sites)	Improved Park protection. Decrease in illegal activities in the Park	Records of illegal activities maintained by the Park
1.1.2	Running & maintenance of permanent all year patrolling camps	Improved Park protection. Decrease in illegal activities in the Park	Records of illegal activities maintained by the Park
1.1.3	Incentive to staff manning permanent patrolling camps	Satisfied and motivated staff at patrolling camps	
1.2 Provide adequate communication & transport Infrastructure			
1.2.1	Wireless System	Well connected staff	Distribution records Reports of their effectiveness in realizing the objective
1.2.2	Vehicles (4WD)	Improving accessibility and mobility within the Park, thus ensuring better Park management	Distribution records Reports of their effectiveness in realizing the objective
1.2.3	Computers & accessories	Well informed staff	Distribution records Reports of their effectiveness in realizing the objective
1.3 Improved skills of staff in key areas (capacity building)			
1.3.1	Training on: - High altitude population estimation of animals - Equipment use/maintenance - Forensic skills/diagnosis - Mountaineering skills - Study Tour National - Study Tour International	Improved Park management based on experiences learnt from other sites	Documents regarding better management and means of implementation Periodic reports
1.4 Improved coordination between local communities, PA management & other stakeholders			
1.4.1	Training & sensitization for staff on community relations & extension (ca. 30 staff)	Increase in the number of trained and sensitised PA staff Increase in number of meetings between the PA staff and local community	Minutes of the meetings held. Decrease in conflict situations between Park authorities & local communities
1.4.2	Translation, simplification, dissemination & discussion of Management Plan with local communities & other stakeholders	Well informed local communities & stakeholders Increase in number of meetings between the	Increase in voluntary actions by the local communities towards conservation

S.No	Activity	Success Indicators	Means of Assessment
		PA staff and local community	
1.4.3	Design & conduct Mass/Public Awareness campaigns (awards for CBOs, EDCs, Celebration of Nanda Devi Day)	Well-informed public including CBOs, EDCs and other key stakeholders Harmonious Park-people relationship Greater awareness of the Park, at both the National and International levels	Decrease in conflict situations between Park authorities & local communities
1.4.4	Establish Park-People Management. Committee for regular dialogue, roles, responsibilities, etc.	Harmonious Park-people relationship Increase in number of meetings between the PA staff and local community	Increase in voluntary actions by the local communities towards conservation
1.4.5	Engage "*Social motivators*" to work on developing/ maintaining community relations	Harmonious Park-people relationship	Increase in voluntary actions by the local communities towards conservation
1.5 Improved motivation & commitment of staff (staff welfare & incentives)			
1.5.1	Purchase and distribution of Field Equipment - Personal (25 Nos.) - High altitude gear (25 Nos.) - Patrolling/monitoring equipment	Well provided staff	Distribution records Reports of their effectiveness in realizing the objective
1.5.2	Staff Welfare - Housing - Insurance*	Happy and contended staff	Distribution records Reports of their effectiveness in realizing the objective
1.5.3	UNESCO WHBPI awards for outstanding staff	Motivated staff	Distribution records Reports of their effectiveness in realizing the objective
1.5.4	Special WHBPI allowance for 150 staff @ Rs. 400/month	Well provided and motivated staff	Distribution records Reports of their effectiveness in realizing the objective
2 Enhance the Role of Local Communities in Conservation of Biodiversity ***2.1 Develop viable & acceptable alternative livelihoods***			
2.1.1	Review past attempts & assess/draw lessons	Help in future management	Report on review of past attempts and how lessons were used for better Park management
2.1.2	Feasibility assessment of selected livelihoods options & other activities (capacity	The likelihood that these will be used to promote alternate	Feasibility report of selected livelihood options & records of success of

* Although, the present project has listed this as an activity, there are no budgetary provisions for the same as WTI is already involved in a nation-wide Insurance programme for field staff in all PAs.

S.No	Activity	Success Indicators	Means of Assessment
	needs, markets, benefits, targets, sustainability)	livelihood options in the area	those initiated
2.1.3	Strengthen capacity of existing CBOs to assist in Livelihood Development	Active CBOs	CBOs enter into partnership (MoUs) with Park management
2.1.4	Strengthen capacity of EDCs (Management, Finance) - training & exposure visits	Improve Park management and local community relations and facilitate alternate livelihood options. Active EDCs	Record of the number of EDCs trained in various aspects and their present status
2.1.5	Provide support for strengthening/adding value to ongoing livelihood initiatives (e.g. weaving) 10 Nos. – Jacard Machines 1 Nos. – Finishing Machines 1 Nos. – Ball Making Machines	Forest dependence is reduced	Record of distribution Reports on its effectiveness
2.2 Resolve people-park conflict			
2.2.1	Research on extent of damage, key species, locations, impacts & development of mitigation strategies		Report
2.2.2	Build awareness on simple measures to reduce livestock damage *e.g.* controlling free grazing	Aware public and decrease in loss of livestock to wild animals	Records of loss of livestock Reduced spending by Park on compensation
2.2.3	Implement mitigation/management measures for reducing man wildlife conflict	Decrease in man animal conflict	Records of loss of livestock Reduced spending by Park on compensation
2.2.4	Introduce and assess the effectiveness of '*Gandhi Guns'* in selected villages. (14 villages, two guns per village)	Decrease in man animal conflict	Records of loss of livestock Reduced spending by Park on compensation
3 Protected Area Management (Develop a Rational Eco tourism Policy) 3.1 Acceptance of mountaineering ban inside core by pressure groups (tourists, mountaineers, locals)			
3.1.1	Research on impacts of ban over 20 yrs		Report
3.1.2	Awareness raising among different groups on impacts of mountaineering	Aware stakeholders	Decrease in the negative impacts of mountaineering
3.2 Effective & well-managed eco tourism operating in buffer zone (& parts of core)			
3.2.1	Feasibility assessment of eco tourism (circuits, markets, carrying capacity, income/fees, guidelines, rules, monitoring,		Feasibility report

S.No	Activity	Success Indicators	Means of Assessment
	infrastructure)		
3.2.2	Capacity building for staff & communities on eco tourism (training, study tours)	Trained and aware staff	
3.2.3	Infrastructure for eco tourism - Interpretation cum Research Centre - Trekking cum Monitoring trails (2 Nos., 30 km) - Homestays (5 villages, 2 houses per village	The effective use of the Infrastructure	Report of its effectiveness
4 Improve Protection Measures ***4.1 Address the international market demand for important wildlife species (Musk deer, Snow leopard, Black bear)***			
4.1.1	Conduct research on key species, demands, trade routes, market, & income		Report
4.1.2	Work with other agencies (TRAFFIC) to develop campaign on poaching	Greater awareness on wildlife products & poaching	Report
4.2 Improved intelligence & information on poaching			
4.2.1	Training of staff on intelligence gathering	Trained staff	
4.2.2	System of regular information exchange with other departments	Improved Park protection Prevention of poaching	
4.2.3	Training of other agencies (Customs, Police)	Trained staff of partner Organisations	
4.3 Improve ability to apprehend & prosecute			
4.3.1	Develop network of informants & provide incentives for intelligence gathering	Good intelligence on criminals	Number of poachers / criminals caught
4.3.2	Training on judicial/legal process/law enforcement	Empowerment of Park staff and building of capacity for better enforcement	Record of training programmes
5 Research & Monitoring ***5.1 Research infrastructure (Personal & equipment)***			
5.1.1	Equipment for Research Lab	Ensure research & monitoring Improve Park management	Report
5.1.2	Establishment of research Lab	Ensure research & monitoring Improve Park management	Report
5.1.3	Contractual Engagement of Field Station Manager	Ensure research & monitoring Improve Park management	Periodic reports

S.No	Activity	Success Indicators	Means of Assessment
5.2 Research projects & dissemination			
5.2.1	Project on Biodiversity Mapping and Monitoring	Biological values are mapped	Periodic reports
5.2.2	Project on NTFP Assessment, Cultivation & Marketing	Biological values are mapped	Report
5.2.3	Annual Research Seminar	Improved stakeholder involvement in research activities	
5.2.4	Documentation & Dissemination	Park values are widely known	Report
6 Policy and Governance			
6.1 Interstate Heritage committee and Site Management Committee			
6.1.1	Setting up of supervisory and advisory committees for Park management consisting of FD, Civic administrators, Community representatives, NGOs, Academic institutions, Scientists and representatives from UNESCO and MoEF	Involvement of multiple agencies and civil society partners in Park administration is facilitated. Park administration has maximum professional input.	Number of representatives from different agencies and organisations
6.1.2	Administration and coordination of activities of the committees	Smooth functioning of the committees	Review of functioning of committee by PCC.

Annexure 8.1

Details of the Valley of Flowers[1] site Nomination

S No.	Item	Description
1	Identification of property	
	a. Country	India
	b. State	Uttaranchal
	c. Name of Property	The Valley of Flowers National Park
	d. Exact location on map & geographical coordinates	The property is located within the Nanda Devi Biosphere Reserve. 30°41' - 30°48' N 79°33' - 79°46' E Bio-Geographic Zone/Province: 2B Himalaya/West Himalaya
	e. Maps/plans showing boundary of area proposed for inscription	Will be provided by the Forest Department
	f. Area of the proposed inscription & proposed buffer zone	87.5 km^2 Buffer zone not yet identified.
2	Justification for inscription	
	a. Statement of Significance	The proposed site supports a wealth of exquisite floral (over 300 species of wild flowers) and faunal (Himalayan thar, Himalayan musk deer, Himalyan black bear) diversity. The site is a unique example of superlative natural phenomena where in for a period of three months, the valley is of exceptional natural beauty with the blooming of flowers. The site is also significant for in-situ conservation of many of these endangered plants, including threatened species of outstanding universal value.
	b. Possible comparative analysis	Refer to report prepared by the Uttaranchal Forest Department
	c. Authenticity/Integrity	Refer to report prepared by the Uttaranchal Forest Department
	d. Criteria under which inscription is proposed	Natural Criteria (iii) & (iv)
3	Description	
	a. Description of Property	The NP is surrounded by Gauri Parvat (6590 m) & Ratban (6126 m) in the east, Kuntkhal (4430 m) on the west, Saptsring (5038 m) in the south and Nilgiri Parwat (6479 m) in the north. The River Pushpawati flows down the

[1] The Chief Wildlife Warden, Uttaranchal Forest Department has prepared a comprehensive proposal for the nomination of the Valley of Flowers. We have relied on this document in preparation of the present write-up.

S No.	Item	Description
		valley and joins the Lakshman Ganga. The central valley is ca. 10 km^2 in area, and towards the north & south the slopes that are gentle at the base rise to join the snow clad mountains. The elevation of the central meadows is 3000 m and the area is heterogeneous; ranging from low and flat/gentle areas to steep slopes, unstable glaciers, moraines, streams, forest meadows and snow bound areas. Details of the site are provided by the Uttaranchal Forest Department.
	b. History & Development	The credit for the discovery of the site goes to the British mountaineers Frank S. Smythe and R. L. Holdsworth, who accidentally reached the valley after a successful expedition to Mount Kamet in 1931. Prior to 1982 the entire Bhyundar valley used to be the summer grazing ground for migratory pastoralists. Following the widespread publicity and awareness of the Park and the concern raised by conservationists, the area was declared as a National Park in 1982 after which there has been no grazing in the site. In 2000, the area came under the Nanda Devi Biosphere Reserve and was reorganized as the second core zone of NDBR. Details of the site are provided by the Uttaranchal Forest Department.
	c. Form & date of most recent records of the property	Refer to report prepared by the Uttaranchal Forest Department
	d. Present status of Conservation	Refer to report prepared by the Uttaranchal Forest Department
	e. Policies & programmes related to the preservation & promotion of the property	Refer to report prepared by the Uttaranchal Forest Department
4	Management	
	a. Ownership	Uttaranchal Forest Department
	b. Legal status	National Park
	c. Protective measures & means of implementing them	Biotic interference and collection of any product is banned under the provisions of the law
	d. Agency/agencies with management authority	Forest Department, Uttaranchal State.
	e. Level at which management exercised	Director, Nanda Devi Biosphere Reserve, Gopeshwar, Dist - Chamoli, Uttaranchal , India & Field Manager, Nanda Devi National Park, Forest Complex , Joshimath, Dist - Chamoli, Uttaranchal , India
	f. Agreed plans related to property	Refer to report prepared by the Uttaranchal Forest Department

S No.	Item	Description
	g. Source & level of finance	Refer to report prepared by the Uttaranchal Forest Department
	h. Source of expertise training in conservation & management techniques	Refer to report prepared by the Uttaranchal Forest Department
	i. Visitor facilities & statistics	Refer to report prepared by the Uttaranchal Forest Department
	j. Property management plan & statement of objectives	Refer to report prepared by the Uttaranchal Forest Department
	k. Staffing level	Refer to report prepared by the Uttaranchal Forest Department
5	Factors affecting Property	
	a. Development pressures	There are no developmental pressures on the site, however, Ghangaria (ca. 3 km from the site), is under pressure due to religious tourism.
	b. Environmental pressures	Refer to report prepared by Uttaranchal Forest Department
	c. Natural disaster & preparedness	Nil
	d. Visitor & tourism pressures	Ca. 3000 – 4000/year
	e. Number of inhabitants within the property, buffer zone	No village inside the property. In the buffer zone, there is village – Bhundyar with ca. 125 families.
6	Monitoring	Refer to report prepared by the Uttaranchal Forest Department
	a. Key indicators for measuring state of conservation	
	b. Administrative arrangement for monitoring property	
	c. Result of previous exercise	
7	Documentation	Refer to report prepared by the Uttaranchal Forest Department
	a. Photographs, slides & where available film/video	

S No.	Item	Description
	b. Copies of property management plan	
	c. Bibliography	Refer to report prepared by the Uttaranchal Forest Department, Uniyal, 2002 & Valley of Flowers Management Plan, 1999
	d. Address where inventories, records & archives are held	

Annexur 8.2

(a) Nomination for Kudremukh-Someshwara Sub-cluster

S No.	Item	Description
1	**Identification of property**	
	a. Country	India
	b. State	Karnataka
	c. Name of Property	Kudremukh -Someshwara Cluster
	d. Exact location on map & geographical coordinates	The entire area under Kudremukh NP, Someshwara WLS, Someshwara RF, Agumbe RF and Balahalli RF Approximate coordinates: 13°00' to 13°30'N; 75°00' to 75° 25' E — Kudremukh NP 13° 22' to 13° 30'N; 75° 04' to 75° 10' E — Someshwara RF 13° 30' to 13° 37' N; 74°55' to 75° 05' E — Someshwara WLS 13°30' to 13°38' N; 75°02' to 75°07' E — Agumbe RF 13°27' to 13°30' N; 75°05' to 75°10' E — Balahalli RF
	e. Maps/plans showing boundary of area proposed for inscription	Figure 8.4
	f. Area of the proposed inscription & proposed buffer zone	Kudremukh NP 771.41 km^2 Someshwara WLS 81.66 km^2 Someshwara RF 112.92 km^2 Agumbe RF 57.09 km^2 Balahalli RF 22.63 km^2 Total 1045.71 km^2
2	**Justification for inscription**	
	a. Statement of Significance	Kudremukh NP contains a diversity of physical and vegetational formations. It has the widest and the largest block of wildlife habitat in the central and northern Western Ghats, with vast evergreen forests and shola-grassland habitats. The largest stretch of the Shola-Grassland. The park has one the largest breeding lion-tailed macaque population in the Western Ghats (Singh et al. 2000) besides resident and transient populations of other large mammals like the Tiger and Gaur. The exceptionally high rainfall in combination with the characteristic hydrology of the Shola-Grassland ecosystems has led to the formation of hundreds of perennial streams, making it one of the most important watersheds in the region. Three major rivers- the Tunga, the Bhadra and the Nethravathi flow out of this area (Sukumar et al. 2001). These rivers and their associated reservoirs are crucial to the livelihoods of millions in the states of Karnataka and Andhra Pradesh.
	b. Possible comparative analysis	Table 8.1

S No.	Item	Description
	c. Authenticity/Integrity	Will be provided by the Forest Department
	d. Criteria under which inscription is proposed	Natural Criteria (ii), (iii) and (iv)
3	**Description**	
	a. Description of Property	The elevation in this region varies from about 100masl to 1892masl. The steep western slopes give way to undulating hills at about a 1,000masl on the plateau. This area receives about 6,500mm of average annual rainfall- among the highest in India (Sukumar et al. 2001). The rainfall at Agumbe is the highest in the Western Ghats at 7,460 mm per annum (Ramesh et al 1997). This area forms the watershed of the Tunga, Bhadra, Sitanadi and Netravathi rivers as well as several other perennial streams. The main vegetation types in the area are evergreen or semi-evergreen forests and shola grasslands at higher elevations. The lower elevation forest types consist of *Poeciloneuron indicum* of the *Dipterocarpus indicus-Kingiodendron pinnatum-Humboldtia brunonis* series. The medium elevation forests are characterized by the *Palaquium ellipticum-Poeciloneuron indicum- Hopea ponga* series. The high elevation forest type, which is found only in this area north of the Palghat Gap, is the *Scefflera spp.-Gordonia obtusa-Meliosma arnottiana* series (Pascal et al. 1982). The mean vegetation species richness found in the mid-elevation forests of Kudremukh NP is amongst the highest recorded in the literature for evergreen forests at comparable elevation in the Western Ghats (Sukumar et al 2001). Several threatened or endangered mammals such as the tiger, rusty spotted cat, fishing cat, lion-tailed macaque, wild dog, Malabar civet, brown palm civet, Malabar giant squirrel, slender Loris, small Travancore flying squirrel and the Asian elephant are found in these forests. Of these, the Malabar civet, the brown palm civet, the small Travancore flying squirrel and the lion-tailed macaque are endemic to the Western Ghats. Based on preliminary surveys, 42 species of mammals are known to occur in Kudremukh NP (Sukumar et al. 2001). A global assessment of tiger habitats done by WWF-US and WCS has identified the National Park as a global priority Tiger Conservation Unit based on high prey densities and availability of breeding habitat (Wikramanayake et al. 1999). The park also contains 169 bird species, 8 of which are endemic. A survey conducted in 2000 revealed that the park held 34 species of amphibians and 54 species of reptiles (Sukumar et al 2001). The natural forest areas provide excellent habitat for various habitat specialist and endemic species of herpetofauna such as *Nyctibatrachus sp* and *Ansonia ornata*, and especially the endangered *Ophiophagus hannah* (king cobra). The flying lizard is another highly endangered and specialized reptilian species that is found here. Surveys have also found that the aquatic insect species richness in Kudremukh NP is the highest ever known from any site in the Western Ghats (Sukumar et al 2001).

S No.	Item	Description
		Based on a field visit, it was observed that the Reserve Forests (RFs) of Someshwara, Agumbe and Balahalli contain good mid-low elevation evergreen forests, which form a continuous belt of habitat for threatened and endemic species between the two protected areas; Someshwara WLS and Kudremukh NP. The remarkable scenic beauty of this landscape and the numerous waterfalls within the forests make this area a popular tourist destination. Tourists visit both the National Park and surrounding RFs in large numbers, especially during the summer months.
	b. History & Development	Will be provided by the Forest Department
	c. Form & date of most recent records of the property	Will be provided by the Forest Department
	d. Present status of Conservation	Will be provided by the Forest Department
	e. Policies & programmes related to the preservation & promotion of the property	Will be provided by the Forest Department
4	**Management**	
	a. Ownership	Karnataka Forest Department
	b. Legal status	National Park, Wildlife Sanctuary, Reserved Forests
	c. Protective measures & means of implementing them	Will be provided by the Forest Department
	d. Agency/agencies with management authority	Karnataka Forest Department.
	e. Level at which management exercised	Field Director, Wildlife Warden and DFO
	f. Agreed plans related to property	Will be provided by the Forest Department
	g. Source & level of finance	Will be provided by the Forest Department
	h. Source of expertise training in conservation & management techniques	Will be provided by the Forest Department
	i. Visitor facilities & statistics	Will be provided by the Forest Department
	j. Property management	Will be provided by the Forest Department

S No.	Item	Description
	plan & statement of objectives	
	k. Staffing level	Will be provided by the Forest Department
5	**Factors affecting Property**	
	a. Development pressures	There are several enclosures in these forests. KIOCL open cast iron ore mining has been taking place over 480 ha within the National Park over the last 23 years (Sukumar et al. 2001). A township has been established within the park because of the mine. Establishment of Lakya dam to hold mine tailings has led to further fragmentation of available habitat and a concentration of contaminated sediments in one place, which poses a constant threat to habitat quality. Roads have been constructed through the Kudremukh area after the opening of the dam, further fragmenting habitats and allowing increased access for local people and tourists to the forested areas. The total direct loss of wildlife habitat due to the KIOCL project – including the mine, dams, roads, electric lines and pipelines is around 2000 ha (Sukumar et al. 2001). A Supreme Court order has now commanded that the mining operations be ended by 2005, opening up the possibility of restoration and reclamation of natural habitats. However, there is a proposal by KIOCL to open up new mining areas within the park, which would be almost 3 times the size of the current mined area. Widening of roads into the RFs to the enclosures under the *Pradhan Mantri Grama Sadak Yojana* also poses a threat to these areas.
	b. Environmental pressures	Invasion of exotic species especially for plants and birds due to the disturbance caused by mining and plantations. Species such as *Acacia auriculiformis* and Eucalyptus have been planted extensively in the grassland areas (Sukumar et al. 2001).
	c. Natural disaster & preparedness	Will be provided by the Forest Department
	d. Visitor & tourism pressures	Will be provided by the Forest Department
	e. Number of inhabitants within the property, buffer zone	Will be provided by the Forest Department
6	**Monitoring**	
	a. Key indicators for measuring state of conservation	Will be provided by the Forest Department
	b. Administrative arrangement for monitoring property	Will be provided by the Forest Department
	c. Result of previous exercise	Will be provided by the Forest Department

S No.	Item	Description
7	**Documentation**	
	a. Photographs, slides & where available film/video	Will be provided by the Forest Department
	b. Copies of property management plan	Will be provided by the Forest Department
	c. Bibliography	Pascal et al. 1982; Ramesh et al. 1997; Sukumar, et al. 2001; Wikramanayake et al. 1998
	d. Address where inventories, records & archives are held	Will be provided by the Forest Department

(b) Nomination for Brahmagiri- Pushpagiri-Talakaveri Sub-cluster

S No.	Item	Description
1	**Identification of property**	
	a. Country	India
	b. State	Karnataka
	c. Name of Property	Brahmagiri-Pushpagiri-Talakaveri Cluster
	d. Exact location on map & geographical coordinates	The entire area under Brahmagiri WLS, Kerti RF, Padinalknad RF, Talakaveri WLS and Pushpagiri WLS Approximate coordinates 12° 07' to 11° 55'N; 75° 45' to 76°03' E Brahmagiri WLS 12°11' to 12°23'N; 75°22' to 75°33' E Talakaveri WLS 12°28' to 12°40' N; 75° 37' to 75°40' E Pushpagiri WLS Figure 8.5
	e. Maps/plans showing boundary of area proposed for inscription	Brahmagiri WLS 180.61 km^2 Talakaveri WLS 111.02 km^2 Pushpagiri WLS 118.74 km^2 Padinalknad 184.76 km^2 Kerti RF 79.04 km^2 Aralam WLS 60.41 km^2 Total 734.61 km^2
2	**Justification for inscription**	
	a. Statement of Significance	This area has approximately 500 km^2 of low to mid-elevation tropical evergreen forests, shola-grassland ecosystems, and has a unique floristic composition since it falls in the transition zone of the *Mesua ferrea-Pallaquim ellipticum-Cullenia exallirata* and *Dipterocarpus indicus-Kingiodendron pinnatum-Humboldtia brunonis* forest types (Pascal 1988). Species such as *Hopea jacobi* and *H. canarensis* are strictly confined to this region alone (Ramesh et al.1997).
	b. Possible comparative analysis	Table 8.1
	c. Authenticity/Integrity	Will be provided by the Forest Department
	d. Criteria under which inscription is proposed	Natural Criteria (iv)
3	**Description**	
	a. Description of Property	The northeastern corner of Wynaad rises up to a hill range called the Brahmagiris. This forms the western and southwestern border of the Coorg plateau. It descends extremely steeply to the plains of Kerala to the west, drained by a number of small rivers. Only a part of the Brahmagiri western slopes are drained by the Aralampuzha falls in Kerala. This range continues north to the Netravathy watershed and is the northern limit of the southern Western Ghats. The major vegetation types found in this area include

S No.	Item	Description
		low elevation *Dipterocarpus indicus-Kingiodendron pinnatum-Humboldtia brunonis* forests, medium elevation *Mesua ferrea-Pallaquim ellipticum-Cullenia exarillata* forests and medium elevation tree and grass savanna (Pascal 1988). Here plant species such as *Diospyros bourdillonii*, *D. nilagirica*, *Hopea racophloea*, *Semecarpus auriculata* and *Dipterocarpus bourdillonii* find their northern limit. It also has good populations of endemic mammal species such as the Lion-tailed Macaque, Nilgiri langur and Nilgiri Marten besides small populations of flagship and wide-ranging species such as the tiger and elephant. The areas between Talakaveri and Pushpagiri sanctuaries have been excluded from the proposed area mainly due to the fragmentation and habitat degradation caused by the Mangalore-Madikere road. There is no natural forest cover for about 2km on either side of this road. There are some teak and rubber plantations near the road.
	b. History & Development	Will be provided by the Forest Department
	c. Form & date of most recent records of the property	Will be provided by the Forest Department
	d. Present status of Conservation	Will be provided by the Forest Department
	e. Policies & programmes related to the preservation & promotion of the property	Will be provided by the Forest Department
4	**Management**	
	a. Ownership	Karnataka Forest Department
	b. Legal status	Wildlife Sanctuary, Reserved Forests
	c. Protective measures & means of implementing them	Will be provided by the Forest Department
	d. Agency/agencies with management authority	Karnataka Forest Department.
	e. Level at which management exercised	Field Director, Wildlife Warden and DFO
	f. Agreed plans related to property	Will be provided by the Forest Department
	g. Source & level of finance	Will be provided by the Forest Department
	h. Source of expertise training in conservation & management techniques	Will be provided by the Forest Department

S No.	Item	Description
	i. Visitor facilities & statistics	Will be provided by the Forest Department
	j. Property management plan & statement of objectives	Will be provided by the Forest Department
	k. Staffing level	Will be provided by the Forest Department
5	**Factors affecting Property**	
	a. Development pressures	Proposed hydroelectric project above the Iruppu falls. Encroachers clearing patches for marijuana plantations. Poaching of elephants and poaching by plantation staff (Ahmed 2002). Based on a field visit to this area, it was observed that there are high levels of anthropogenic disturbance near the Munrode settlement on the edge of the Talakaveri Sanctuary. There is some grazing pressure at the southern end of Pushpagiri WLS. Invasion of Eupatorium sp. Within the Talakaveri WLS in and around previously clear–felled area.
	b. Environmental pressures	Nil
	c. Natural disaster & preparedness	Will be provided by the Forest Department
	d. Visitor & tourism pressures	Will be provided by the Forest Department
	e. Number of inhabitants within the property, buffer zone	Will be provided by the Forest Department
6	**Monitoring**	
	a. Key indicators for measuring state of conservation	Will be provided by the Forest Department
	b. Administrative arrangement for monitoring property	Will be provided by the Forest Department
	c. Result of previous exercise	Will be provided by the Forest Department
7	**Documentation**	
	a. Photographs, slides & where available film/video	Will be provided by the Forest Department
	b. Copies of property management plan	Will be provided by the Forest Department
	c. Bibliography	Ahmed, 2002; Nair, 1991; Ramesh et al. 1997
	d. Address where inventories, records & archives are held	Will be provided by the Forest Department

(c) Nomination for Silent Valley – New Amarambalam RF Sub-Cluster

S No.	Item	Description
1	**Identification of property**	
	a. Country	India
	b. State	Kerala
	c. Name of Property	Silent Valley – New Amarambalam RF Cluster
	d. Exact location on map & geographical coordinates	Silent Valley National Park, New Amarambalam RF, parts of Kalikavu range, Attapadi RF. Approximate coordinantes: 11°00' to 11°21'N; 76°38' to 76°49'E — Silent Valley NP 11°23' to 11°39'N; 76°32' to 76°55'E — New Amarambalam RF 11°11' to 11°29' N; 76°33' to 76°46'E — Kalikavu Range 11°06' to 11°21'N; 76°43' to 76°52'E — Attapadi RF
	e. Maps/plans showing boundary of area proposed for inscription	Figure 8.6
	f. Area of the proposed inscription & proposed buffer zone	Silent Valley NP 91.84 km^2 New Amarambalam RF 246.97 km^2 Kalikavu range 117.05 km^2 Attapadi RF 65.75 km^2 Total 521.62 km^2 Part of this area will be designated as a buffer zone.
2	**Justification for inscription**	
	a. Statement of Significance	The forests of Silent Valley NP harbor a disproportionately large number of rare, endangered and endemic species of flora and fauna. Twenty-one species of birds, mammals and amphibians that are listed on the IUCN Red Data List (2002) occur in Silent Valley. The area, located at the southwestern corner of the Nilgiris, is enclosed on all sides with high and continuous ridges along the northern and eastern corners. Birdlife International and its Indian partner, the Indian Bird Conservation Network of the Bombay Natural History Society, have also declared the area an Important Bird Area. Three endangered species, namely the tiger, Lion-tailed macaque (LTM) as well as Nilgiri tahr occur here.
	b. Possible comparative analysis	Table 8.1
	c. Authenticity/Integrity	Will be provided by the Forest Department

S No.	Item	Description
	d. Criteria under which inscription is proposed	Natural Criteria (iii) and (iv)
3	**Description**	
	a. Description of Property	The area consists of Silent Valley NP, Silent Valley National Park, New Amarambalam RF, Old Amarambalam RF and Attapadi RF. Silent Valley NP has been described as a cliff forest, which suddenly drops from 2380m to 150m across a short distance. A total of 34 species of mammals have been reported from the Silent Valley NP. The evergreen area is characterised by endemic arboreal mammals such as the endangered Lion-Tailed Macaque (LTM) and the vulnerable Nilgiri langur. The Silent Valley-Attapadi RF area good habitat for a viable LTM population. The sub cluster also contains all the lesser carnivores found in the Western Ghats, including the highly endangered Brown palm civet. A list of about 211 species of birds recorded in Silent Valley NP has been compiled. This includes the rare Peninsular bay owl, Tiger bittern, Ceylon frogmouth, and Legge's Baza. The Silent Valley- New Amarambalam RF area provides a number of diverse ecosystems for amphibians and reptiles. 2 new frog species and 1 new caecilian species has been described from the area. The major forest types found in the area include tropical evergreen, montane wet temperate and sub-tropical broad-leaved hill forests. Attapadi RF however has a few plantations. The grasslands of Silent Valley contain a unique grass genus *Silentvalleya* and its associated orchid *Ipsea malabarica*. Silent Valley NP is also characterised by a large number (100 species) of orchids as well as epiphytes, lianas and climbers. 25 taxa of flowering plants have been described which occur nowhere else on earth.
	b. History & Development	Will be provided by the Forest Department
	c. Form & date of most recent records of the property	Will be provided by the Forest Department
	d. Present status of Conservation	While, Silent Valley NP is relatively well protected, the undisturbed New Amarambalam RF needs to be afforded legal protection urgently. Attapadi RF has a few plantations
	e. Policies & programmes related to the preservation & promotion of the property	Will be provided by the Forest Department

S No.	Item	Description
4	**Management**	
	a. Ownership	Kerala Forest Department
	b. Legal status	National Park & Reserved Forests
	c. Protective measures & means of implementing them	Will be provided by the Forest Department
	d. Agency/agencies with management authority	Forest Department of Kerala.
	e. Level at which management exercised	Field Director, Wildlife Warden and DFO
	f. Agreed plans related to property	Will be provided by the Forest Department
	g. Source & level of finance	Will be provided by the Forest Department
	h. Source of expertise training in Conservation & management techniques	Will be provided by the Forest Department
	i. Visitor facilities & statistics	Will be provided by the Forest Department
	j. Property management plan & statement of objectives	Will be provided by the Forest Department
	k. Staffing level	Will be provided by the Forest Department
5	**Factors affecting Property**	
	a. Development pressures	Presence of tribals within the Attapadi RF who have historically practiced slash and burn cultivation. Records
	b. Environmental pressures	Nil
	c. Natural disaster & preparedness	Nil
	d. Visitor & tourism pressures	Silent Valley NP has a tourism zone that handles tourists.
	e. Number of inhabitants within the property, buffer zone	No settlements inside Silent Valley NP. However tribal settlements do exist within Attapadi RF as well as New Amarambalam RF.
6	**Monitoring**	
	a. Key indicators for measuring state of conservation	Will be provided by the Forest Department

S No.	Item	Description
	b. Administrative arrangement for monitoring property	Will be provided by the Forest Department
	c. Result of previous exercise	Will be provided by the Forest Department
7	**Documentation**	
	a. Photographs, slides & where available film/video	Will be provided by the Forest Department
	b. Copies of property management plan	Will be provided by the Forest Department
	c. Bibliography	Pushpangadan and Kumar, 1999; Balakrishnan, 1999; Easa and Shaji, 1999; Sugathan, 1999; Ramachandran, 1998; Sasidharan et. al., 1999; Yoganand, 1999; KFRI, 1990; DST, 1980
	d. Address where inventories, records & archives are held	Will be provided by the Forest Department

(d) Nomination for Anamalai Sub-cluster

S No.	Item	Description
1	**Identification of property**	
	a. Country	India
	b. State	Tamil Nadu, Kerala
	c. Name of Property	Anamalai Cluster
	d. Exact location on map & geographical coordinates	Grass Hills NP, Eravikulam NP, Part of Chinnar Wildlife Sanctuary, Kariyan shola, Mannavan shola, Mankulam range and the Malayathur Reserved Forest, which is a proposed extension area of the Eravikulam NP. Approximate coordinates: 10°20'-10°26'N; 76°35'-76°50'E Grass hills 10°15'N and 77°5'E Eravikulam
	e. Maps/plans showing boundary of area proposed for inscription	Figure 8.7
	f. Area of the proposed inscription & proposed buffer zone	Eravikulam NP 116.58 km^2 Grass Hills NP 46.75 km^2 Kariyan shola 8.80 km^2 Mannavan shola 11.26 km^2 Mankulam range 52.84 km^2 Total 236.25 km^2 Part of Chinnar WLS 20 km^2 Extension of Eravikulam NP 30 km^2 This area will form the core zone. Evergreen forest patches in the vicinity of this area such as Mannavan shola and Karian shola maybe considered as satellite core zones. Buffer zone yet to be identified.
2	**Justification for inscription**	
	a. Statement of Significance	The proposed site is among the largest contiguous blocks of high altitude montane wet evergreen "shola" – grassland formations, unique to the southern Western Ghats. This area is rich in biodiversity and endemicity and supports many species of rare and endangered flora and fauna.
	b. Possible comparative analysis	Table 8.1
	c. Authenticity/Integrity	Will be provided by the Forest Department
	d. Criteria under which inscription is proposed	Natural Criteria (ii), (iii) and (iv)

S No.	Item	Description
3	**Description**	
	a. Description of Property	The Grass Hills-Eravikulam proposed WHB site is among the largest continuous areas of high-elevation montane evergreen "shola" grasslands, unique to the Western Ghats. The main physical features of this landscape are the gently rolling hills of the Eravikulam plateau, which abruptly ends in steep cliffs towards the western escarpments. The highest peak in south India is situated here (Anaimudi, 2695 m). It is an area of exceptional natural beauty. More than 300,000 tourists visit Eravikulam NP, less than 100 km^2 in area, every year. The aesthetic beauty of Grass Hills (now forbidden to tourists) was appreciated as early as 1902 when King George II planned a visit to the area (he did not make the visit, however). It is also of historical significance that the Eravikulam area was owned and protected by Tea Planters from colonial days till recently. The major vegetation types here are the Shola Grassland formations, endemic to southern Western Ghats. Sholas occur in valleys while montane grasslands cover the slopes and crests surrounding these valleys. The trees are usually 10-20 m tall and undergrowth is dense and often impenetrable due to intermingled cane and acanthaceous shrubs. Precipitation and humidity are high throughout the year and shola forests are host to many endemic species. This area, along with adjacent low elevation forests known as the Anamalai Hills forms perhaps one the richest areas of butterfly diversity in the Western Ghats, with over 95% of the species found in the Western Ghats occurring here. On the whole, the number of butterfly species found in the entire Anamalai Hills total at almost 2% of the global butterfly diversity. This is an incredible diversity concentrated in an area as small as 800 km^2. This area also presents a unique opportunity to study the effects of climate change due to its high altitude forest composition. It represents a benchmark area to be used for assessing climate change related changes in vegetation types elsewhere.
	b. History & Development	Will be provided by the Forest Department
	c. Form & date of most recent records of the property	Will be provided by the Forest Department
	d. Present status of Conservation	Eravikulam and Grass Hills are NPs, while the proposed extension areas of the Eravikulam NP are Reserved Forests. Chinnar is a Wildlife Sanctuary.
	e. Policies & programmes related to the preservation & promotion of the property	Will be provided by the Forest Department
4	**Management**	
	a. Ownership	Tamil Nadu and Kerala Forest Department

S No.	Item	Description
	b. Legal status	Wildlife Sanctuary, National Park, Reserved Forests
	c. Protective measures & means of implementing them	Will be provided by the Forest Department
	d. Agency/agencies with management authority	Forest Departments of Tamil Nadu and Kerala.
	e. Level at which management exercised	Wildlife Warden and DFO
	f. Agreed plans related to property	Will be provided by the Forest Department
	g. Source & level of finance	Will be provided by the Forest Department
	h. Source of expertise training in conservation & management techniques	Will be provided by the Forest Department
	i. Visitor facilities & statistics	Will be provided by the Forest Department
	j. Property management plan & statement of objectives	Will be provided by the Forest Department
	k. Staffing level	Will be provided by the Forest Department
5	**Factors affecting Property**	
	a. Development pressures	None
	b. Environmental pressures	None
	c. Natural disaster & preparedness	Fire control measures are in place.
	d. Visitor & tourism pressures	Only a designated tourist area of Eravikulam NP is open to tourism. The other areas are closed for tourists.
	e. Number of inhabitants within the property, buffer zone	Will be provided by the Forest Department
6	**Monitoring**	
	a. Key indicators for measuring state of conservation	Will be provided by the Forest Department
	b. Administrative arrangement for monitoring property	Will be provided by the Forest Department
	c. Result of previous exercise	Will be provided by the Forest Department
7	**Documentation**	
	a. Photographs, slides & where available film/video	Will be provided by the Forest Department
	b. Copies of property management plan	Will be provided by the Forest Department
	c. Bibliography	Kunte, 2003; Kumar, 2003; Karunakaran, 2003
	d. Address where inventories, records & archives are held	Will be provided by the Forest Department

(e) Nomination for Periyar-Ranni-Konni Sub-Cluster

S No.	Item	Description
1	**Identification of property**	
	a. Country	India
	b. State	Kerala
	c. Name of Property	Periyar-Ranni-Konni Sub-Cluster
	d. Exact location on map & geographical coordinates	Periyar Tiger Reserve (TR), Srivilliputtur WLS, Ranni Divn, Konni Divn, Achankovil Divn, Tirunelveli Divn. Approximate coordinantes: 9°16' to 9°36'N; 76°56' to 77°24'E Periyar TR 9°11' to 9°28'N; 76°50' to 77°17'E Ranni Divn 9°02' to 9°15'N; 76°50' to 77°17'E Konni Divn. 9°02' to 9°12'N; 77°03' to 77°16'E Achankovil Divn. 9°16' to 9°36'N; 77°24' to 77°56'E Srivilliputtur WLS 9°03' to 9°24'N; 77°12' to 77°23'E Tirunelveli Divn.
	e. Maps/plans showing boundary of area proposed for inscription	Figure 8.7
	f. Area of the proposed inscription & proposed buffer zone	Periyar Tiger Reserve 752.86 km^2 Ranni Forest Division 828.53 km^2 Konni Forest Division 261.43 km^2 Achankovil Forest Division 219.90 km^2 Srivilliputtur WLS 462.38 km^2 Tirunelveli Forest Division 234.67 km^2 Total 2759.80 km^2 Part of this area will be designated as a buffer zone.
2	**Justification for inscription**	
	a. Statement of Significance	Periyar TR has a large number of rare, endangered and endemic species of flora and fauna. The area is characterised by several ranges separated by deep valleys. Periyar lake occupies an area of 26 km^2 in the heart of the reserve. Periyar TR is continuous with parts of the adjacent Ranni, Konni and Achankovil Raffs in Kerala and Tirunelveli RF in Tamil Nadu. Srivilliputtur Grizzled Squirrel WLS can serve as a buffer for the sub-cluster. Birdlife International and its Indian partner, the Indian Bird Conservation Network of the Bombay Natural History Society, have also declared the area an Important Bird Area. Several rivers including the Periyar, the Mullakkudy and the Pamba drain the area.
	b. Possible comparative analysis	Table 8.1
	c. Authenticity/Integrity	Will be provided by the Forest Department
	d. Criteria under which inscription is proposed	Natural Criteria (iii) and (iv)

S No.	Item	Description
3	**Description**	
	a. Description of Property	The sub-cluster consists of two existing protected areas; Periyar Tiger Reserve and Srivilliputtur WLS. Also included are contiguous portions Ranni, Konni and Achankovil Forest Divisions in Kerala as well as parts of Tirunelveli Forest Division in Tamil Nadu. A total of 49 species of mammals have been reported from the Periyar TR, out of which 9 are IUCN Red Data List (2002). The reserve is reported to have a healthy population of tigers as well as other carnivores including leopards and dholes. The evergreen area is characterised by endemic arboreal mammals such as the endangered Lion-Tailed Macaque (LTM) and Travancore flying squirrel. The elusive Mouse deer too has been reported from the area. Otters have been sighted in the Periyar Lake. Grizzled squirrels are found in Srivilliputtur WLS. 265 species of birds and 119 species of butterflies has been recorded in Periyar Tiger Reserve. This includes rare butterfly species such as *Discophora lepida*, *Libyetha myrrah carma* and *L. lepita lepitoides*. A total of 1963 flowering species have been documented for this area. The major forest types found in the area include tropical evergreen, semi-evergreen and moist deciduous forests. Parts of Ranni forest division also have *Myristica* swamps. Eucalyptus plantations occur within Periyar Tiger Reserve.
	b. History & Development	Will be provided by the Forest Department
	c. Form & date of most recent records of the property	Will be provided by the Forest Department
	d. Present status of Conservation	Periyar TR is relatively well protected but other areas within the subcluster such as parts of Ranni and Konni forest divisions need to be afforded legal protection urgently to protect them from proposed developmental activities.
	e. Policies & programmes related to the preservation & promotion of the property	Will be provided by the Forest Department
4	**Management**	
	a. Ownership	Forest Department(s) of Kerala and Tami Nadu
	b. Legal status	National Park, Wildlife Sanctuary & Reserved Forests

S No.	Item	Description
	c. Protective measures & means of implementing them	Will be provided by the Forest Department
	d. Agency/agencies with management authority	Forest Department(s) of Kerala and Tamil Nadu
	e. Level at which management exercised	Field Director, Wildlife Warden and DFO
	f. Agreed plans related to property	Will be provided by the Forest Department
	g. Source & level of finance	Will be provided by the Forest Department
	h. Source of expertise training in Conservation & management techniques	Will be provided by the Forest Department
	i. Visitor facilities & statistics	Will be provided by the Forest Department
	j. Property management plan & statement of objectives	Will be provided by the Forest Department
	k. Staffing level	Will be provided by the Forest Department
5	**Factors affecting Property**	
	a. Development pressures	A high-tension electric line from the *Kakki* hydroelectric project, which is within Ranni Divn., has caused electrocution of wild animals. Illegal *ganja* cultivation exists in the interior forests of the Reserve. This involves clearing of prime forests as well as associated damages such as including poaching. *Pachakkanam* cardamom Estate occupying a total area of 208.576ha exists on the boundary of the Periyar Tiger Reserve. There is also a proposed railway line to Sabarimala Rail.
	b. Environmental pressures	Nil
	c. Natural disaster & preparedness	Nil
	d. Visitor & tourism pressures	The Sabarimala Ayyappan Temple in Periyar Tiger Reserve attracts around 5 million pilgrims during the annual 60-day duration of the pilgrimage. This brings with it associated problems such as fuel wood collection from forest, garbage, degradation of forests and demand for more land. Kerala Tourism Development Corporation runs three luxury hotels and five boats as an independent agency.

S No.	Item	Description
	e. Number of inhabitants within the property, buffer zone	No settlements inside Periyar Tiger Reserve. However permanent settlements of the Kerala State Electricity Board exist within Ranni Divn.
6	**Monitoring**	
	a. Key indicators for measuring state of conservation	Will be provided by the Forest Department
	b. Administrative arrangement for monitoring property	Will be provided by the Forest Department
	c. Result of previous exercise	Will be provided by the Forest Department
7	**Documentation**	
	a. Photographs, slides & where available film/video	Will be provided by the Forest Department
	b. Copies of property management plan	Will be provided by the Forest Department
	c. Bibliography	Palot et. al., 1997; MoEF, 2001
	d. Address where inventories, records & archives are held	Will be provided by the Forest Department

(f) Nomination for Agasthyamalai Cluster

S No.	Item	Description
1	**Identification of property**	
	a. Country	India
	b. State	Tamil Nadu, Kerala
	c. Name of Property	Agasthyamalai Cluster WHS
	d. Exact location on map & geographical coordinates	Part of Kalakad-Mundanthurai Tiger Reserve, Tamil Nadu and Parts of Neyyar, Peppar, and Shendurney Wildlife Sanctuaries, Kerala and Part of Kulathupuzha Reserved Forest, Kerala. Approximate coordinates: 8°30'-8°38'N; 77°8'-77°17'E – Neyyar WLS 8° 34' 30" to 8° 41" 25" N; 77° 61 50" to 77°141 5" E Peppara WLS 8° 25' to 8° 53' N and 77°10' to 77°35' E - KMTR
	e. Maps/plans showing boundary of area proposed for inscription	Figure 8.8
	f. Area of the proposed inscription & proposed buffer zone	Part of KMTR 330 km^2 Part of Shendurney WLS 140 km^2 Part of Neyyar WLS 23 km^2 Part of Peppara WLS 27 km^2 Part of Kulathupuzha RF 200 km^2 Total 720 km^2 This area will form the core zone. Buffer zone yet to be identified.
2	**Justification for inscription**	
	a. Statement of Significance	KMTR, along with the other Sanctuaries lying across the administrative boundary in Kerala state (Neyyar, Peppara, and Shendurney), forms a tract of forest ranging over 1,500 km² in the Agasthyamalai -Ashambu hill range. This makes it one of the most significant areas for conservation of biological diversity in the Western Ghats (Johnsingh 2001). In the Western Ghats, KMTR and adjoining areas have one of the largest and last remaining contiguous tracts (600 km²) of tropical rainforest. A total of 33 fish, 37 amphibian, 81 reptile, and 76 mammal species have been recorded from KMTR (Johnsingh 2001). The herpetofauna includes the recently rediscovered rainforest lizard *Calotes andamanensis* and the microhylid frog *Melanobatrachus indicus* and is described in two recent studies from the area (Vasudevan 2000, Ishwar 2001, Ishwar et al. 2001, Vasudevan et al. 2001). Of the non-volant mammals, 8 species are endemic to the Western Ghats. The large carnivores include the tiger *Panthera tigris*, leopard *P. pardus*, dhole *Cuon alpinus*, and sloth bear *Melursus ursinus*. Eight species of small carnivores occur in the rainforests of KMTR (Mudappa 1998). Other mammals

S No.	Item	Description
		occurring in the rainforest include the Asian elephant *Elephas maximus*, gaur *Bos gaurus*, sambar *Cervus unicolor*, mouse deer *Moschiola meminna*, lion-tailed macaque *Macaca silenus*, bonnet macaque *M. radiata*, Nilgiri langur *Trachypithecus johnii*, Nilgiri tahr *Hemitragus hylocrius*, Malabar giant squirrel *Ratufa indica*, large brown flying squirrel *Petaurista philippensis*, seven other species of rodents, and three species of shrews (D. Mudappa, Pers. Comm.). At least 17 bat species are known from KMTR (Johnsingh 2001)
	b. Possible comparative analysis	Table 8.1
	c. Authenticity/Integrity	Will be provided by the Forest Department
	d. Criteria under which inscription is proposed	Natural Criteria (iii) and (iv)
3	**Description**	
	a. Description of Property	The southernmost reaches of the Western Ghats is the Agasthyamalai Hills that extends from Mahendragiri near Kanyakumari in the extreme south to the Ariyankavu (Shenkottai) pass, near Shenkottai. This is a compact range of hills with a main range, descending equally steeply to both the western and eastern sides. Agasthya koodam peak is the highest peak with 1869 meters above MSL. Among the best tropical moist forests in the Western Ghats are in found stretch. The rainfall in the western slope varies from 3000 to 5000 mm per annum. Majority of the western slopes are in Kerala state and the entire eastern slope and a small part of the western slope of the Ashambu hills are in Tamil Nadu. In the Kerala part, Kallada, Achankoil, Vamanapuram, Karamana and Neyyar drains from this region. The eastern slopes in Tamil Nadu are the catchments of.Thambraparni. In the Kerala part of the Ashambu Hills there are three sanctuaries, Shendurney, Peppara and Neyyar covering a total area of about 280 km^2, while the Tamil Nadu side has the Kalakkad Mundanthurai Tiger Reserve. The area leftout from the Protected Area network, in between Shendurney and Peppara Wildlife Sanctuaries are prime evergreen forests of Kulathupuzha, Sankhili and Palode Reserves. These areas are famous for Asian Elephant and gaur populations. The area also forms the best reed brake in the Western Ghats south to Pooyamkutty - Edamalayar reed belt. Kulathupuzha - Sankhili - Palode Reserved Forests are contiguous with the wildlife sanctuaries on either side but coming under Thiruvananthapuram Forest Division. The forest north to the Shendurney Sanctuary, extending up to the Aryankavu/Shenkottai pass comes under the Thenmala division. The Kulathupuzha - Sankhili forests harbour the best *Myristica* swamps in the southern Western Ghats. The *Myristica* swamps are considered to be unique ecosystem, with high rate of endemism, which deserve special measures in conservation. The associations in

S No.	Item	Description
		these swamps are curious with *Myristica fatua* and *Gymnacranthera* spp. as the dominant tree species and *Lagenandra* spp. dominant among the undergrowths. Mohanan (2001) reported 1106 flowering plants from the Neyyar and Peppara WLS of which 26%(286 species) are endemic to the Western Ghats and among these 47 species are endemic the Agasthyamala region. Many of these plants are restricted in distribution to one or two localities within these Sanctuaries. The recent surveys have resulted in the discovery of 35 new species from this stretch of land (Nayar, 1997). The celebrated example is the distribution of the endemic tree Gluta travancorica that is confined to this hill range. Agasthyamalai harbours some populations of the highly endangered Nilgiri tahr. The Varayattumottai extending across the Neyyar-Kalakad interstate boundary is supposed to harbour the largest population of tahr in the region. There are reports of sighting of tahr in the Nachiarmottai in the Neyyar sanctuary. One or two other isolated populations of tahr occur along the hill tops of KMTR
	b. History & Development	Will be provided by the Forest Department
	c. Form & date of most recent records of the property	Will be provided by the Forest Department
	d. Present status of Conservation	Kalakad and Mundanthurai are Wildlife Sanctuaries and come under Project Tiger. Neyyar, Peppara and Shendurney are Wildlife Sanctuaries. However, the Kulathupuzha is still a Reserved Forest, and is in urgent need of upgradation in protection status.
	e. Policies & programmes related to the preservation & promotion of the property	Will be provided by the Forest Department
4	**Management**	
	a. Ownership	Tamil Nadu and Kerala Forest Department
	b. Legal status	Wildlife Sanctuary, National Park, Reserved Forests
	c. Protective measures & means of implementing them	Will be provided by the Forest Department
	d. Agency/agencies with management authority	Forest Departments of Tamil Nadu and Kerala.
	e. Level at which management exercised	Field Director, Wildlife Warden and DFO
	f. Agreed plans related to property	Will be provided by the Forest Department

S No.	Item	Description
	g. Source & level of finance	Will be provided by the Forest Department
	h. Source of expertise training in conservation & management techniques	Will be provided by the Forest Department
	i. Visitor facilities & statistics	Will be provided by the Forest Department
	j. Property management plan & statement of objectives	Will be provided by the Forest Department
	k. Staffing level	Will be provided by the Forest Department
5	**Factors affecting Property**	
	a. Development pressures	Dams in both states, as well as pressure from illegal encroachments and legal enclosures within the protected areas
	b. Environmental pressures	Nil
	c. Natural disaster & preparedness	Nil
	d. Visitor & tourism pressures	Heavy pressure from religious pilgrims who visit the Agasthyamalai peak and other important temples within the PAs
	e. Number of inhabitants within the property, buffer zone	Will be provided by the Forest Department
6	**Monitoring**	
	a. Key indicators for measuring state of conservation	Will be provided by the Forest Department
	b. Administrative arrangement for monitoring property	Will be provided by the Forest Department
	c. Result of previous exercise	Will be provided by the Forest Department
7	**Documentation**	
	a. Photographs, slides & where available film/video	Will be provided by the Forest Department
	b. Copies of property management plan	Will be provided by the Forest Department
	c. Bibliography	Raman, 2003; Vasudevan, 2003; Kumar, S., 2003; Kunhikrishnan, 2003
	d. Address where inventories, records & archives are held	Will be provided by the Forest Department

(g) Nomination for Namdapha-Kamlang-Jairampur Sub-cluster

S No.	Item	Description
1	**Identification of property**	
	a. Country	India
	b. State	Arunachal Pradesh
	c. Name of Property	Namdapha-Kamlang-Jairampur Cluster
	d. Exact location on map & geographical coordinates	Namdapha National Park, Kamlang Wildlife Sanctuary and part of Jairampur Forest Division, Arunachal Pradesh. Approximate coordinates: 27o 23' - 27o 39' N and 96o 15'-96o 58' E
	e. Maps/plans showing boundary of area proposed for inscription	Figure 8.10
	f. Area of the proposed inscription & proposed buffer zone	Namdapha NP 1985 km² Kamlang WLS 783 km² Jairampur Forest Divn. 307 km² Total 3075 km² Part of this area will be designated as a buffer zone.
2	**Justification for inscription**	
	a. Statement of Significance	The proposed site is among the largest contiguous blocks of evergreen forest with a wide altitudinal range from 100 m to > 4000m. It includes the northern lowland evergreen forest in the Namdapha NP, Kamlang WLS and Jairampur FD, as well as subtropical, temperate and alpine vegetation in the higher reaches of Namdapha. This area is also a designated Tiger Reserve and is unique in that it has four species of large cats; tiger, leopard, snow leopard and clouded leopard. Recently, two species of deer have been recorded for the first time in India in the forests of Jairampur FD and Namdapha, being the first additions to the large mammal fauna of India in hundred years
	b. Possible comparative analysis	Table 8.2
	c. Authenticity/Integrity	Will be provided by the Forest Department
	d. Criteria under which inscription is proposed	Natural Criteria (i), (ii) & (iv)
3	**Description**	
	a. Description of Property	Namdapha NP, Kamlang WLS and Jairampur Forest Division are adjacent Protected Areas in eastern Arunachal Pradesh. These areas have a very high altitudinal range from about 100 m to more than 4000 m above sea level. This wide range in altitude results in an astonishing diversity of vegetation and habitat types, ranging from lowland wet evergreen to alpine and permanent snow covered peaks.

S No.	Item	Description
		More than 100 species of mammals have been reported from Namdapha-according to a list prepared by the Forest Department. A list of about 300 species of birds recorded in Namdapha NP has been compiled, but the areas covered by different surveys have been in a very narrow, low altitude, belt. In view of distributional range of different bird species, the checklist can easily be over two times larger than the current list. The area is part of the Eastern Himalayas Endemic Bird Area and contains several restricted Range Species. This biodiversity rich area supports a unique forest type *i.e.* the tropical wet evergreen (Hollong - Dipterocarp) forests. This is the only location in India where such forests are protected. Other forest types include tropical semi evergreen forests, subtropical broad-leaved forests, subtropical pine forests, temperate broad-leaved forests, alpine meadows, bamboo brakes, secondary forests, riverine grasslands, etc. The flora consists of over 1200 species as per available information. Some of the rare and endangered species include *Sapria himalayana*, *Rhopalocnemis phalloides*, *Aegenitia indica*, *Balanophora dioica*, *Magnolia giffithii*, *Aquilaria agallocha*, *Cyathia gigantea*, and *Psilotum nudum*.
	b. History & Development	Will be provided by the Forest Department
	c. Form & date of most recent records of the property	Will be provided by the Forest Department
	d. Present status of Conservation	Though Namdapha NP and Kamlang are relatively well protected against development activities and habitat loss, hunting continues to be a serious problem.
	e. Policies & programmes related to the preservation & promotion of the property	Will be provided by the Forest Department
4	**Management**	
	a. Ownership	Arunachal Pradesh Forest Department
	b. Legal status	Wildlife Sanctuary, National Park, Reserved Forests
	c. Protective measures & means of implementing them	Will be provided by the Forest Department
	d. Agency/agencies with management authority	Forest Department of Arunachal Pradesh.
	e. Level at which management exercised	Park Director, Wildlife Warden and DFO
	f. Agreed plans related to property	Will be provided by the Forest Department
	g. Source & level of finance	Will be provided by the Forest Department

S No	Item	Description
	h. Source of expertise training in Conservation & management techniques	Will be provided by the Forest Department
	i. Visitor facilities & statistics	Will be provided by the Forest Department
	j. Property management plan & statement of objectives	Will be provided by the Forest Department
	k. Staffing level	Will be provided by the Forest Department
5	**Factors affecting Property**	
	a. Development pressures	Development of Gandhigram threatens forest connectivity with Myanmar and increases pressure on Namdapha
	b. Environmental pressures	Nil
	c. Natural disaster & preparedness	Landslides are a common occurrence
	d. Visitor & tourism pressures	Namdapha has a tourism zone that handles tourists.
	e. Number of inhabitants within the property, buffer zone	No settlements inside Namdapha. Number not known for Jairampur and Kamlang
6	**Monitoring**	
	a. Key indicators for measuring state of conservation	Will be provided by the Forest Department
	b. Administrative arrangement for monitoring property	Will be provided by the Forest Department
	c. Result of previous exercise	Will be provided by the Forest Department
7	**Documentation**	
	a. Photographs, slides & where available film/video	Will be provided by the Forest Department
	b. Copies of property management plan	Will be provided by the Forest Department
	c. Bibliography	Pawar and Birand, 2001; Captain, 2002; Choudhury, 2002; Haridasan, 2002, Singh, 2002; Datta et al., 2003
	d. Address where inventories, records & archives are held	Will be provided by the Forest Department

(h) Nomination for Pakke-Nameri Cluster

S No.	Item	Description
1	**Identification of property**	
	a. Country	India
	b. State	Arunachal Pradesh, Assam
	c. Name of Property	Pakke – Nameri Cluster
	d. Exact location on map & geographical coordinates	Pakhui, Eagle's nest Wildlife Sanctuary, Sessa Orchid Sanctuary, Papum and Doimara Reserved Forests, Arunachal Pradesh and Nameri National Park, Assam. Approximate coordinates: 92°36' – 93°09'E and 26°54 – 27°16'N
	e. Maps/plans showing boundary of area proposed for inscription	Figure 8.11
	f. Area of the proposed inscription & proposed buffer zone	Pakhui WLS 862 km^2 Eagle's Nest WLS 217 km^2 Sessa Orchid 100 km^2 Papum RF 1064 km^2 Doimara RF 216 km^2 Nameri NP 349 km^2 Total 2808 km^2 Part of this area will be designated as a buffer zone along with the adjacent Sonai-Rupai Wildlife Sanctuary (220 km^2).
2	**Justification for inscription**	
	a. Statement of Significance	The proposed site is among the largest contiguous blocks of evergreen forest with a wide altitudinal range from 150 m to > 3000m. It includes alluvial grasslands in the Nameri NP, wet evergreen forests in Pakhui and adjoining RFs, and sub tropical and temperate forests in Eagle's nest WLS. This area is also a designated Tiger and Elephant Reserve and has among the highest densities of three species of hornbills.
	b. Possible comparative analysis	Table 8.2
	c. Authenticity/Integrity	Will be provided by the Forest Department
	d. Criteria under which inscription is proposed	Natural Criteria (i), (ii) & (iv)

S No.	Item	Description
3	**Description**	
	a. Description of Property	Pakke TR (862 km^2, 92°36' – 93°09'E and 26°54 – 27°16'N) lies in the foothill forests of Arunachal Pradesh, Eastern Himalaya in East Kameng district of AP. It was declared a Sanctuary in 1977, and was earlier part of the Khellong Forest Division. It has also been declared a National Park and Tiger Reserve based on a proposal in 1999. Towards the south and southeast, the park adjoins Reserved Forests and Nameri NP (349 km^2) of Assam. To the east, lies the Pakke River and Papum Reserve Forest; to the west, it is bounded by the Bhareli or Kameng River, Doimara RF and Eagle's Nest Wildlife Sanctuary and to the north again by the Bhareli River and the Shergaon Forest Division (Tenga RF). Both Papum (1064 km^2) and Doimara RF (216 km^2) along with Amartala RF (west of Doimara RF) fall in Khellong Forest Division. The area of Doimara RF is 216 km², while Papum RF encompasses an area of 1064 km². Thus, contiguous forests on most sides surround the park. Selective logging on a commercial scale occurred in the reserve forests until 1996. Rivers in the east, west and north delineate the park. In addition, a number of small rivers and perennial streams of the Bhareli and Pakke Rivers, both of which are tributaries of the Brahmaputra, drain the area. The main perennial streams in the area are the Nameri, Khari and Upper Dikorai, all of which run in a southerly direction. The terrain of Pakke TR and adjoining areas is undulating and hilly. The altitude ranges from 150 m to over 2000 m above sea level. The park slopes southwards towards the Brahmaputra valley. Higher hills exist in the northern areas of the Sanctuary. Seijusa, the Park Headquarters, located on the boundary between Assam and Arunachal Pradesh, is 60 km away from Tezpur (the nearest town and airport) in Assam. The western part of Pakke TR has another range at Tipi, which can be approached along the Tezpur-Bomdilla road via Bhalukpong, situated 5 km before Tipi. The divisional headquarters of Khellong Forest Division is at Bhalukpong, with several ranges in the 3 RFs. A vast portion in the central and northern part of the Park is relatively inaccessible due to the dense vegetation, hilly terrain and the lack of trails. Consequently, few people including local tribals venture into the interior of the forest. The Bhareli River acts as a barrier to human disturbance, though occasionally local tribals (*Akas*) do cross over to hunt or cut cane and trees. A village (Mabusa, ca. 100 ha) near the southern boundary of the Park was relocated outside on the other side of the river in 1994. Two small villages exist in the extreme northern end of the Park towards Seppa. Towards the southern boundary adjoining Pakke River, access is much easier since the river is fordable most of the year. Instances of hunting and trapping of birds is more common in this area. In addition, villagers from Assam regularly enter the NP, adjoining RFs and Nameri NP to collect cane

S No.	Item	Description
		Calamus tenuis, *C. erectus*, *C. flagellum*, and *C. floribundus*, *Canarium strictum*, the rare and threatened *Aquillaria malaccensis* and other minor forest products. But most of Pakke TR, except the forests near the southern boundary, has undisturbed primary forest.
	b. History & Development	Will be provided by the Forest Department
	c. Form & date of most recent records of the property	Will be provided by the Forest Department
	d. Present status of Conservation	Pakhui, Eagle's Nest and Sessa Orchid are Wildlife Sanctuaries, Nameri is a National Park and Doimara and Papum are Reserved Forests
	e. Policies & programmes related to the preservation & promotion of property	Will be provided by the Forest Department
4	**Management**	
	a. Ownership	Arunachal and Assam Forest Department
	b. Legal status	Wildlife Sanctuary, National Park, Reserved Forests
	c. Protective measures & means of implementing them	Will be provided by the Forest Department
	d. Agency/agencies with management authority	Forest Departments of Arunachal and Assam.
	e. Level at which management exercised	Park Director, Wildlife Warden and DFO
	f. Agreed plans related to property	Will be provided by the Forest Department
	g. Source & level of finance	Will be provided by the Forest Department
	h. Source of expertise training in conservation & management techniques	Will be provided by the Forest Department
	i. Visitor facilities & statistics	Will be provided by the Forest Department
	j. Property management plan & statement of objectives	Will be provided by the Forest Department
	k. Staffing level	Will be provided by the Forest Department

S No.	Item	Description
5	**Factors affecting Property**	
	a. Development pressures	Will be provided by the Forest Department
	b. Environmental pressures	Nil
	c. Natural disaster & preparedness	Nil
	d. Visitor & tourism pressures	Will be provided by the Forest Department
	e. Number of inhabitants within the property, buffer zone	Will be provided by the Forest Department
6	**Monitoring**	Will be provided by the Forest Department
	a. Key indicators for measuring state of conservation	
	b. Administrative arrangement for monitoring property	
	c. Result of previous exercise	
7	**Documentation**	
	a. Photographs, slides & where available film/video	Will be provided by the Forest Department
	b. Copies of property management plan	Will be provided by the Forest Department
	c. Bibliography	Pawar and Birand, 2001; Choudhury, 2002; Haridasan, 2002; Singh, 2002; Datta, 2003
	d. Address where inventories, records & archives are held	Will be provided by the Forest Department

(i) Nomination for Terai Ecoregion Sub-cluster

S No.	Item	Description
1	Identification of property	
	a. Country	India
	b. State	Uttaranchal, Uttar Pradesh
	c. Name of Property	The Terai Landscape Cluster
	d. Exact location on map & geographical coordinates	Terai East Forest Division (TEFD), Pilibhit Forest Division (PFD), Kishanpur Wildlife Sanctuary (KWLS), North Kheri Forest Division (NKFD), Dudwa National Park (DNP), & Katerniaghat Wildlife Sanctuary (KGWLS) Approximate coordinates: 28° 13' 00" to 28° 47' 00" N 79° 52' 00" to 81° 20' 00" E Bio-Geographic Zone/Province: 7A Gangetic Plain/Upper Gangetic Plain
	e. Maps/plans showing boundary of area proposed for inscription	Figure 8.12
	f. Area of the proposed inscription & proposed buffer zone	Approximate area TEFD 100 km^2 PFD 615 km^2 KWLS 203 km^2 NKFD 60 km^2 DNP 680 km^2 KGWLS 200 km^2 Total 1858 km^2 Buffer zone not yet identified.
2	Justification for inscription	
	a. Statement of Significance	The proposed site lies within one of the most important Global 200 ecoregions of the world; the Terai-Duar Savannas and Grasslands. The site is part of the largest remaining & relatively continuous habitat representing the unique terai, and supports obligate species such as the One-horned rhinoceros (*Rhinoceros unicornis*), Swamp deer (*Cervus duvaucelli duvaucelli*), Hispid hare (*Caprolagus hispidus*), & Swamp francolin (*Francolinus gularis*), to name a few. The site is also of utmost important for in-situ conservation of many threatened species of the terai and of National and International value, and has been identified as one of the priority sites for Greater Asian one-horned rhino populations, by WWF's Asian Rhino and Elephant Action Strategy (AREAS) and for Tiger conservation. The area supports a significant population of the endangered Gangetic river dolphin and other fresh water species such as the Gharial (*Gavialis gangeticus*) & Muggers (*Crocodylus palustris*). Among the most indigenous people of the *terai*, the Tharu tribe, also inhabit the site.
	b. Possible comparative analysis	The nomination of the site is based on the uniqueness of this terai landscape in-terms of habitat characteristics and their biological value. The evaluation was based on a comparative ranking protocol (Table 8.4).

S No.	Item	Description
	c. Authenticity/Integrity	To be provided by the Forest Department
	d. Criteria under which inscription is proposed	Natural Criteria (ii) & (iii)
3	Description a. Description of Property	The Terai (Sanskrit for "lowlands") is one of the world's most spectacular landscapes, encompassing the tall grasslands and sal forests of the southern slopes and foothills of the eastern Himalayas. This biologically diverse landscape spans an area of approximately 12.3 million acres (5 million ha.) from Nepal's Bagmati River in the east to India's Yamuna River in the west. The proposed site in this terai landscape is home to several rare and endangered wildlife such as the One-horned rhinoceros (*Rhinoceros unicornis*), Swamp deer (*Cervus duvaucelli duavaucelli*), Hog deer (*Axis porcinus*), Hispid hare (*Caprolagus hispidus*), Bengal florican (*Hubaropsis bengalensis*) and Swamp francolin (*Francolinus gularis*). Many of these species are not only endemic to this landscape but are also highly threatened, surviving in small populations. Sizable populations of Tiger (*Panthera tigris*), Leopard (*Panthera pardus*), Sloth bear (*Ursus melursus*), and the Asian elephant (*Elephas maximus*) also add values to the landscape, and also contains vital migratory and breeding habitat for over 500 bird species. However, in the last few decades, an increase in human populations and the consequent demand for agriculture / livelihood has resulted in high rates of habitat fragmentation of this fragile landscape. This is a serious concern as the loss of this landscape and the last home of the above mentioned endemics would be a global loss. The proposed Heritage Site represents the typical terai landscape in the western region and accommodates many of the endemic species in this system. It also provides the single largest and relatively continuous habitats for these species, and acts as corridors for the wide-ranging species. The biological values of the area have been recognized Nationally, and Dudwa NP, Kishanpur WLS, & Katerniaghat WLS are part of the Protected Area Network in the Country, while DNP & KWLS as a unit has also been recognized as a Tiger Reserve. The neighboring forest areas of the proposed site namely, Pilibhit and Terai east Forest Division forms a continuous habitat with the Tiger Reserve. Parts of the North Kheri Forest Division (Palia & Sampurnanagar Forest Ranges) and Lugga Bugga Forest in Pilibhit Division is of immense value as actual/potential corridor connecting Sukhlaphanta Wildlife Sanctuary (Nepal) in the west and Katerniaghat WLS in the east, enabling movement of species such as Rhino, Tiger and Asian elephants. The Tharu tribes (indigenous people of this landscape) inhabit the northern boundary of the Dudwa NP. The tribes maintain a distinct cultural identity and unique tribal religion, and believed to be the decedents of the Rana's of Rajasthan who settled in Nepal. They are settled cultivators maintaining herds of livestock and live close to forest areas.

S No.	Item	Description
		The Sharada Reservoir (ca. 45 km²) within the Pilibhit FD is not only a major source of water for the area, but also sustains large and diverse flocks of migrant water birds. Apart from the biological values, the site also boosts of a number of ancient/historical forest rest houses dating back to the 1800s and would enhance the historical and heritage values. Details to be provided by the FD. The Government of Uttar Pradesh has laid out plans for the reintroduction of the rhino's in the Surai Forest Range in Terai East FD. Recent field surveys suggest that the Mohaf and Barahi Forest Ranges (Pilibhit FD) adjacent to the Surai Forest Range have large tracts of potential rhino habitat and these areas together have the potential to support ca. 100 rhinos. The Dudwa Tiger Reserve is one of the few recreational sites for the people of this region. Ensured sighting of the endemic Swamp deer and Rhino's attracts people from far away places. The water birds congregation in Sharada Reservoir, wet lands in Kishanpur/Dudwa, & Dolphin/ Gharial watch in the river Garua in Katerniaghat have immense tourist potential.
	b. History & Development	The area, originally under the control of the Rajas as hunting reserves and for commercial use, came under the Government of India control in 1861. Scientific management of the area started with the development of the 1st Forest Working Plan in 1886. Dudwa was declared a Sanctuary in 1968 and upgraded as a NP in 1977, while Kishanpur WLS was declared in 1981 and the Tiger Reserve was declared in 1987. However, the other three sites, TEFD, PFD, NKFD are Reserve Forests. In earlier times these reserve forests were managed for commercial and local needs, while wildlife was only of secondary importance. The human population surrounding the area was minimal, until 1947, when large number of people were resettled from Pakistan and provided with forestlands. In 1952, the Zamindar system was abolished and the land was distributed among the landless. The local population increased dramatically between 1991 and 2001 (ca. 32%). Presently, the terai stands out as one of the high human density areas in India and their needs pose a significant threat to the continued existence of the terai landscape and their biological values.
	c. Form & date of most recent records of the property	To be provided by the Forest Department
	d. Present status of Conservation	To be provided by the Forest Department
	e. Policies & programmes related to the preservation & promotion of the property	To be provided by the Forest Department

S No.	Item	Description
4	Management	
	a. Ownership	Uttaranchal & Uttar Forest Department
	b. Legal status	Wildlife Sanctuary, National Park, Reserved Forests
	c. Protective measures & means of implementing them	To be provided by the Forest Department
	d. Agency/agencies with management authority	Forest Departments of Uttaranchal & Uttar Pradesh.
	e. Level at which management exercised	Chief Wildlife Warden, Uttaranchal State 85, Rajpur Road, Dehradun – 248 001, Uttaranchal. & Chief Conservator of Forests & Chief Wildlife Warden, Uttar Pradesh State, 17 Rana Pratap Marg, Lucknow – 226001, Uttar Pradesh
	f. Agreed plans related to property	To be provided by the Forest Department
	g. Source & level of finance	To be provided by the Forest Department
	h. Source of expertise training in conservation & management techniques	To be provided by the Forest Department
	i. Visitor facilities & statistics	To be provided by the Forest Department
	j. Property management plan & statement of objectives	To be provided by the Forest Department
	k. Staffing level	To be provided by the Forest Department
5	Factors affecting Property	
	a. Development pressures	Encroachment of forestland and agricultural expansion and habitat degradation for fuel wood collection and grazing are potential threats.
	b. Environmental pressures	To be provided by the Forest Department
	c. Natural disaster & preparedness	To be provided by the Forest Department
	d. Visitor & tourism pressures	To be provided by the Forest Department
	e. Number of inhabitants within the property, buffer zone	To be provided by the Forest Department
6	Monitoring	
	a. Key indicators for measuring state of conservation	Regular monitoring of Rhino, and Tiger along with and associated ungulate presence. Population and habitat monitoring of obligate species such

S No.	Item	Description
		as Swamp deer, Hog deer, & river Dolphin. Indicators of human disturbance or development needs regular monitoring.
	b. Administrative arrangement for monitoring property	To be provided by the Forest Department
	c. Result of previous exercise	To be provided by the Forest Department
7	Documentation	
	a. Photographs, slides & where available film/video	To be provided by the Forest Department
	b. Copies of property management plan	To be provided by the Forest Department
	c. Bibliography	Anon., 2002b; Singh, 1965
	d. Address where inventories, records & archives are held	To be provided by the Forest Department

Annexure 8.3

List of Consultants

Eastern Himalayas

1. Dr. Anwaruddin Chaudhary
2. Dr. K. Haridasan
3. Dr. Aparajitta Datta
4. Mr. Samraat Pawar
5. Mr. Pratap Singh
6. Mr. Ashok Captain

Western Ghats

1. Dr. Shankar Raman
2. Dr. Karthikeyan Vasudevan
3. Dr. Ajith Kumar
4. Dr. P.V. Karunakaran
5. Mr. Krushnamegh Kunte
6. Mr. E. Kunhikrishnan
7. Mr. Susanth Kumar

Apart from this we also consulted with Dr. Ullas Karanth who in his capacity as a PCC member gave his detailed assessment of sites in Karnataka.