Eaglenest Biodiversity Project – I

(2003 – 2006)

Conservation Resources for Eaglenest Wildlife Sanctuary

Ramana Athreya

Kaati

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7. Peter Schmidt: on pages 58, 105, 170
8. Mike Waite: on page 46
9. Google Earth images: on pages 25, 36, 37
10. adapted from Forest Department maps: on pages 26, 34
11. the Author: rest of the images

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  - The Ford Foundation, India, through Winrock International India (October 2005 – June 2006)
- With the permission of the Forest Department, Government of Arunachal Pradesh

Front cover: A panoramic view of the western hills of Eaglenest, in a montage of the fauna of the area

Rear cover: A Bugun lady in traditional dress during the inauguration of the Phua Rung Tourist facility

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(2003 – 2006)

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Ramana Athreya

Kaati Trust, Pune
December 2006

Kaati

Biodiversity

research
education
conservation

with contributions from

Ishan Agarwal, Pratap Singh, Viral Mistry, Dhananjai Mohan and Shashank Dalvi

funded during 2003 – 2005 by a

Rufford Small Grant

funded during 2005 – 2006 by

THE
FORD FOUNDATION
through

Winrock International India

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Maps of the area:

Eaglenest wildlife sanctuary

Ramana Athreya / Eaglenest Biodiversity Project / Kaati (funded by The Rufford-Maurice-Laing Foundation, UK)

Eaglenest is a critical constituent of one of the the largest contiguous closed-canopy forest tracts of Arunachal. This tract in the East and the West Kameng districts of W. Arunachal is the largest protected area complex in that part of the state. It covers 3500 km2 in area and 100-3300m in altitude and includes Eaglenest, Pakke, Sessa, Nameri, and Sonai Rupai sanctuaries and associated reserved forest blocks.

A Summary

Conservation Resources for Eaglenest Wildlife Sanctuary

a biodiversity inventory and local community participation

Arunachal Pradesh hosts India's (and one of the world's) most diverse wildlife assemblage. Since the late 1990s Eaglenest wildlife sanctuary in Arunachal Pradesh faced several problems and was urgently in need of attention. In my opinion Eaglenest offers many advantages for implementing concepts such as community-based conservation and conservation-through-development and for studying the biodiversity. So I started the multi-faceted Eaglenest Biodiversity Project with those aims in 2003, funded by a Rufford Small Grant.

This report deals with activities undertaken between November 2003 and June 2006. I ran out of Rufford's munificence in March 2005. By then the community ecotourism effort had gathered momentum and consumed all my time and I was too embarrassed to request Rufford for a funding extension without having a report for the previous grant. However, the momentum could not be allowed to dissipate and so we[1] pooled together personal money to return to Eaglenest in May 2005. Finally, the Ford Foundation stepped in with a grant through Winrock International India to keep the project solvent till June 2006.

Eaglenest is a constituent of the largest legally protected area in western Arunachal and Assam covering 3500 km^2 of prime forest across 100m-3300m in altitude. Eaglenest in itself only covers 218 km^2 but contains most of the high altitude areas of this protected area complex. Furthermore Eaglenest and its associated Doimara Reserved Forest span the entire altitudinal range and have all the habitat types of the entire complex. Eaglenest has a motorable road running through it from its base to the Eaglenest pass at 2800m offering unparalleled access to pristine forest across the entire altitudinal range, making it a unique place for scientists and ecotourists. In Arunachal, as in many other parts of the world, good forest and road access don't go together; except in Eaglenest.

The immediate and long-term goals proposed in the funding applications were as follows:

1. Inventory the birds, butterflies and herpetofauna of Eaglenest
2. Develop a photo-library useful to scientists, wildlife managers and tourists
3. Increase the local and outside awareness of the ecological wealth of EWS
4. Encourage the participation of the local Bugun tribe in research and tourism activities, thereby engendering in the community a stake in the long-term survival of Eaglenest
5. Developing basic facilities for ecotourists, including training local community members in ecotour organisation

The project team included Indi Glow, Nima Tsering, Dorje Raptan, Jetha, Ishan Agarwal, Pratap Singh, Viral Mistry, Shashank Dalvi and Dhananjai Mohan. Six field visits were made between November 2003 and March 2005, another in May 2005, and a further four between December 2005 and June 2006.

The tasks carried out in this phase may be conveniently grouped under:

1. Biodiversity documentation
2. Community ecotourism project
3. Publicity
4. Local capacity building

[1] Ishan Agarwal, Viral Mistry, Shashank Dalvi and I. I am very grateful to the other three for this gesture.

Biodiversity documentation resources

The butterfly and herpetofaunal survey is to the best of my knowledge the first ever carried out at Eaglenest or in fact in the subtropical and temperate zones of western Arunachal Pradesh.

1. **A preliminary checklist of butterflies** We recorded about 150 species including many rare ones like Bhutan Glory (*Bhutanitis lidderdalii*), Grey Admiral (*Bhagadatta austenia*), Scarce Red-Forester (*Lethe distans*), Dusky Labyrinth (*Lethe yama*), Tigerbrown (*Orinoma damaris*), White Owl (*Neorina patria*), to name only a few.

2. **A preliminary checklist of snakes** We recorded 24 species of snakes in just 5 weeks of field-work including many which were photographed in India for the first time. We obtained the first photographs of a live **Sikkim False-wolfsnake** (*Dinodon gammiei*) which was known to science from just 5 other individuals. A photo database is very important for reptiles and amphibians as the mode of preservation of specimens destroys the colour sometimes leading to confusion (*D. gammiei* is a case in point). We also encountered a snake of the genus *Amphiesma* which may turn out to be a new species.

3. **A preliminary checklist of lizards** We recorded 10 species of lizards including ***Mictopholis austeniana*** which was rediscovered after 125 years.

4. **A preliminary portfolio of amphibian** The survey yielded a rich harvest of amphibians. Identification of these animals has proved to be a frustrating experience given the paucity of reference literature and hence I have refrained from calling it a checklist. For that same reason they are also the most significant find of the project – a faunal group which can absorb a lot of taxonomical and ecological work in the years to come. In my opinion this many new taxa and colour forms are waiting to be discovered in this area.

5. **A checklist of birds** We recorded 329 species inside Eaglenest during the survey, augmenting its list by about 45 species (checklist of 399 species). We recorded about 525 species in all during the project including the bird tours. ***The discovery*** of the project was of a species new to science which has been named ***Liocichla bugunorum*** after the Bugun tribe. We also qualitatively determined the spring, summer and winter distribution of birds.

6. **Audio Library of Birds** We have recorded birdsong of over 150 species which will be of use to scientists and tourists alike.

7. **Establishing distance and altitude markers along the Eaglenest road** Altitude and distance markers have been placed at regular intervals along 40 km of the road inside Eaglenest. This resource can be used by visitors to locate their faunal encounters and thus contribute to building up the database for Eaglenest.

8. **Scientific Papers** We are in the process of completing two scientific papers on birds, and one each on butterflies, reptiles and amphibians. There are also several others on individual species of significance (e.g. the lizard *Mictopholis austeniana*, the new bird species).

9. **A photo portfolio on Eaglenest's biodiversity** was prepared at the request of the Central Empowered Committee of the Supreme Court of India which was hearing an application to build a 4-lane highway through Eaglenest. This was the first project to attempt to inventory a range of the biodiversity of Eaglenest and also the first one to document it in images. The portfolio has been incorporated into and significantly bolsters the case for stopping the highway construction.

Community ecotourism project

10. **Organising and promoting birdwatching tours** In deference to the wishes of the Bugun community I advertised for and led a birdwatching tour for 3 foreign tourists in April 2004. It was meant to showcase the potential of Eaglenest in particular and the area in general. The group spent 10 days at Eaglenest and another week in Kaziranga and Pakke covering a variety of areas/habitats in north-east India. We saw 360 species of birds including some very rare and highly sought-after ones like the Wedge-billed Wren-babbler (*Sphenocichla humei*), Ward's Trogon (*Harpactes wardi*), Beautiful Nuthatch (*Sitta formosa*), Rufous-necked Hornbill (*Aceros nipalensis*), etc apart from many highly endangered mammals. In March-April 2006 I led two tours which yielded a combined list of 485 species (about 400 in each).

    The most significant part of the exercise was our **explicit recognition of the rights of a community to profit from commercial activities in a protected area in its vicinity.** We only employed local camp staff and directly paid a community fee to the Bugun community, in addition to the fee charged by the Forest Department. The amount contributed by each group (in 10 days) was the equivalent of a labourer's wage for a year and will be used to provide local employment and also subsidise the education expenses of local students.

    I am currently working with the Government on making such a community fee mandatory for all tourists visiting Eaglenest.

Local capacity building

11. **Training local people in handling visitors** The project camp staff, drawn from the Bugun village of Singchung, are being informally trained in this aspect. I intend to hold a more formal training programme on handling tourists without damaging the environment - garbage disposal and wood extraction for fuel being the prime issues. I am also encouraging birdwatching among the local people which is potentially a source of future employment as expert bird guides. This ongoing process will require several years to reach fruition.

12. **Research capacity building inside Arunachal Pradesh** I have initiated steps to work with the State Forest Research Institute (SFRI) of the Forest Department of Arunachal to survey the fauna of the state over the next 5 years. The SFRI and the Kaati Trust (of which I am the Managing Trustee) have submitted a MOU on collaborative projects to the Government of Arunachal and we expect to get the final approval shortly. Under this we will co-opt students of Arunachal Pradesh in our field teams for training.

Publicity

13. **Widely disseminating the results of our survey through the internet**[2] I have made publicly available on the internet webpages with over 225 photographs and logistical information designed to attract private tour groups and professional tour agencies. It has also attracted queries from many ecologists and museums from around the world. Of all the efforts this has had the greatest public impact. There were 3 visitors to Eaglenest in 2004 and 3 more in 2005. As a direct result of the publicity from my webpages Eaglenest hosted over 75 visitors including 30 foreigners, in 2006. Reservations for the 2006-07 season has already started coming in.

14. **Magazine and articles** Articles on Eaglenest based on our project have appeared in several magazines like *Outlook Traveller* (an Indian travel magazine), BirdingASIA (of the Oriental Bird Club, U.K) and Sanctuary Asia (an Indian magazine on wildlife and conservation).

[2]The webpages are hosted at http://www.clsp.jhu.edu/people/zak/ramana

Future work (over the next few years)

1. Work with Government officials to have ecotourism community fee implemented in an appropriate manner.

2. Improve the facilities for hosting ecotourists in quality and quantity.

3. Keep Eaglenest continually in the public eye by regularly visiting the area (2-3 times a year) and publishing reports of such visits on the internet … until the flow of tourists attains a self-sustaining mass

4. Encourage amateur naturalists to visit Eaglenest to contribute to the biodiversity documentation (and contribute towards achieving the critical mass of ecotourists)

5. Explore other parts of the sanctuary for distributing the tourist load.

6. Continue with the faunal inventory by identifying and encouraging experts to take up work on other faunal groups.

7. Diversify bird studies to look at details of special birds (the many important birds on the red data book for instance), specific bird groups, population dynamics.

8. Augment the audio library of birds.

9. Print a portfolio of posters of the biodiversity of Eaglenest for display in schools and community halls of the villages around Eaglenest.

10. Regularly visit the area to provide an opportunity for interested local students to gain proficiency in field work and especially taxonomy.

11. Train local guides in handling visitors.

12. Put together a network for taking up eco-development works in Singchung. Efficient and sustainable utilization of fuel wood is a major priority.

Biodiversity Portfolio – 2

Ramana Athreya / Eaglenest Biodiversity Project / Kaati (funded by The Rufford-Maurice-Laing Foundation, UK)

From the Eaglenest-Sessa ridge at 3300m (top), through the Eaglenest Pass at 2800m (mid) and upper tropical forests, to the Assam plains (bottom), Eaglenest has within itself all the habitats of the Kameng complex

Acknowledgements

One of the (few!) pleasures of writing a project report is the opportunity to publicly and indelibly acknowledge the many people who contribute towards its success. I wish to thank (in no particular order):

1. The Rufford-Maurice-Laing Foundation for taking care of the financial aspect of this project. Even more than the money itself the simplicity of the process was of great help and thanks are due to the co-ordinator Josh Cole on this score. Jane Raymond has been very patient in the face of extreme provocation in the matter of this report – sorry and thanks!
2. The Ford Foundation in the person of Dr. Ganesan Balachander for taking a keen interest in this project and providing money at a crucial stage. The grant was made available through Winrock International India. Mr. Neeraj Peters of Winrock ensured that the funds were released expeditiously.
3. Mr. Pekyom Ringu (AP Forest Dept) and Mr. Omak Apang for their enthusiastic help in providing the perfect local contacts! This project took a major step towards completion in Mr. Ringu's office when he decided that my goals were feasible enough to warrant serious consideration and participation by like-minded Arunachalis. Omak took time off from his busy schedule to drive me from Itanagar to Tenga for the sole purpose of personally introducing me to Mr. Indi Glow - a 16-hour drive for 1 hour of work! The gesture went a long way in convincing Indi Glow and me of the seriousness with which the other viewed conservation of Eaglenest and related matters. It was an auspicious start to what I hope will be a long association with Eaglenest and the people of the area!
4. Mr. Indi Glow and family of Tenga for their many kindnesses. To Indi babu should go half the credit for whatever we achieved during the course of the project, especially the bird tours.
5. My fellow-naturalists in the project – Pratap Singh, Ishan Agarwal, Viral Mistry, Shashank Dalvi and Dhananjai Mohan. They contributed liberally of their time, effort and expertise, for free!
6. Vidya and Aarushi – *"They also help who stay at home and wait"* and the two did a lot of it! The time away from home was the only downside of an otherwise fantastic time in Arunachal Pradesh. Vidya contributed in myriad ways throughout the project.
7. The Forest Department of Arunchal Pradesh for all their help. I should mention here specifically Umesh Kumar and Mr. Tana Tapi (ex-DFOs Pakke & Eaglenest) for their encouragement and enthusiastic assistance within the office and in the field; Mr. Sajwan (aPCCF), Mr. Mukhopadhyay (DCF) and Mr. Mohan Singh for help with the permits. Mr. Zhasa (CCF) and G. N. Sinha (Director, SFRI) took keen interest in the project in the later stages. Conversation with Mr. Sinha on the topic of Law was a pleasure not least because it came with dinner thrown in during the several days I spent in Itanagar in May 2005.
8. Goutam Narayan, Nandita Hazarika and Rupali for their unstinting hospitality (how do you guys manage it?!)
9. Navdeep Sood and Rahul Singh for all their contributions to this project: time, money and their best wishes! I look forward to showing you around Eaglenest when you find the time!
10. The webpages proved to be of crucial importance in publicizing the wealth of Eaglenest and Izhak Shafran's, and subsequently Sanjay Bhatnagar's, offer to host the pages on their home pages is much appreciated – Thanks guys!
11. Many people contributed their time to help us identify the animals we had encountered: Ashok Captain, Samraat Pawaar, Varad Giri, Vittal Hegde, Krushnamegh Kunte, Frank Tillack, Patrick David, Gernot Vogel, Motoki Saito, Nikolai Orlov and Firoz Ahmed,
12. Oken Tayeng for some pleasant times in Itanagar and discussions on ecotourism in Arunachal Pradesh.

13. the referees, Mr. Naresh Chaturvedi (BNHS), Prof. Trevor Price (Univ of Chicago) and Dr. Aparajita Datta (NCF) for their generous letters in support of the funding proposal.
14. Nima Tsering, Dorje Raptan and Jeta for unstinting enthusiastic co-operation in camp and field, from the first cup of tea in the morning till the last bucket of warm water at night and all the hours in-between!
15. Sonali Ghosh and Manoj Nair for helping out in Guwahati on several occasions.
16. Mr. Laam Narbu, Mr. Nana Krimeh and Mr. N. D. Thungon of Doimara for the hospitality they showed a complete stranger who stumbled into their corner of the woods, searching for a roof to shelter under and a vehicle to depart in.
17. Mike Waite, Claudio Koller and Ray Ziarno for believing my claims on Eaglenest! A scope for Claudio is like a pair of binoculars for the rest of us. It was entirely in character for him to scope the wedge-billed wren-babbler we called out - what a magnificient view it was from 5m! The trip would have been poorer but for that and the heart-stopping scoped views of beautiful nuthatches! Mike Waite with his *must-see* list and a collection of calls perfectly complemented my knowledge of the area and its birds and Ray made sure that we did not forget it was a vacation! I could not have asked for a more understanding first-bird-tour party. Claudio even returned to Eaglenest with another group of birders – much appreciated!
18. The second and third tour groups – Fredrik Ellin, Peter Schmidt, Hakan Soderberg, Duncan Himes, Mike Catsis, Simon Allen, Margaret and Bud Widdowsons – all made the bird tours a pleasure. But for their contribution the new *Liocichla* species would today still be just a dream.
19. Sarang Sathe who has never baulked at any of my requests for fabricating non-standard camping equipment. His readiness to try anything at all once has been a great source of help and a pleasure to watch.
20. Ronesh of Ecocamp, Potasali, has been very generous of his hospitality on several occasions at his wonderful camp.
21. Krys Kazmierczak of OrientalBirding @ Yahoo! Groups, Vivek Tiwari of NatHistory-India @ Princeton.edu and Nitin Jamdar of Mumbai Birds @ Yahoo! Groups spread the good word of the first bird tour in 2004 on their e-groups.
22. My employers, National Centre for Radio Astrophysics (TIFR), haven't always understood why an astronomer spends so much time chasing birds in Arunachal Pradesh but have been quite generous in sanctioning my vacation requests.

It has been a long project and many people have contributed to it; and this report, once embarked upon, was written at a manic pace. My sincere apologies to those whose names should have been here but isn't.

Biodiversity Portfolio – 3

Temperate broad-leaved forest at the Eaglenest Pass

Eaglenest contains one of the best montane forests with densely packed canopy even above 3000m, so remarkably dense in places as to appear featureless(right of centre in the top image).

Eaglenest (218 km2) and Sessa (100 km2) occupy only a small fraction of the Kameng protected area complex but all the areas above 2000m altitude are restricted to these two sanctuaries. Even in them the precious high altitude forest covers less than a quarter of the area.

Elephants reach their highest altitudinal distribution at 3200m on the Eaglenest ridge when they make their annual summer journey in search of succulent bamboo. The higher reaches are also good for red pandas and tragopans, threatened species all.

Section 1

Introduction

1.1 Motivation

1.1.1 The Eaglenest project

This project was conceived with my head in the clouds, literally, while visiting Eaglenest in January 1995 during my first birdwatching trip to Arunachal Pradesh. I had had an extraordinary experience near the Eaglenest Pass with a humongous mixed bird flock. The next day I was in the midst of a chaotic mass of golden-breasted tit-babblers and black-throated parrotbills sounding like fat rain drops on the foliage, cocooned by swirling tendrils of mist which denied the world beyond. And when the mist cleared, as occasionally it did, I could see the road snaking down through pristine, densely foliaged slopes all the way to the plains of Assam. I can't think of too many places in the world graced by great forest, spectacular wildlife, a motorable road *and* 3000m of altitude. Few montane tracts in the world can match Arunachal's biodiversity and in most of them access and good forests simply have not been able to co-exist.

There should have been hordes of visitors infesting Eaglenest. Ecologists can visit Eaglenest even during the monsoon – when all wildlife breed and cold-blooded are active (only then) – when torrential rains shut down most other protected areas of Arunachal. I did not understand why Eaglenest remained undiscovered by naturalists for so long, but I was quite happy to leave it that way; but it was not ignored by others – saw mills and hunters and the Indian army which decided that the original one-lane road that they built in the 1950s deserved to be a 4-lane highway. Obscurity, it seemed, was no safeguard.

So, I submitted a proposal to the Rufford-Maurice-Laing Foundation for funds to fast-track Eaglenest into fame. For a start we had little information on Eaglenest's wildlife to entice ecologists and tourists with and so a faunal inventory was the logical first step. Furthermore, in my opinion and experience people will only conserve what they know of and appreciate – i.e. a photo-inventory was strongly indicated. I use the word *people* here in its truest sense – governments cannot ensure long-term preservation of forests; official diktats are useful for holding the fort in the short term. But ultimately it requires the sanction of the people in the immediate vicinity.

Arunachal Pradesh more-or-less lived off timber operations until the Supreme Court ban on unsustainable harvesting in 1996. After that rude shock Arunachal has been looking at alternative sources of employment, which has not been easy to come by in a region poor in education and technology. So, apart from a faunal inventory I had some nebulous ideas of local community-based ecotourism and conservation activities. During 1999 -2003 I had traveled extensively across South America in quest of birds, as a tourist, and observed many community-based ecotourism ventures, some which worked while most did not – the latter were most useful in understanding the pitfalls.

There was another aspect which drew me to Eaglenest. The conservation brigade in India has been fighting the long defeat for several decades now with only occasional victories – it turns out that even Project Tiger is far from being the success story it had been portrayed as. There is a depressing sense of futility in this field which deepens with each passing defeat. I chose Eaglenest not because its needs were more pressing than any other but because its problems seemed tractable. We can all do with more success stories – success feeds on itself. I later realised that Eaglenest was actually in need of urgent attention unbeknownst to the rest of the country (the proposed highway) but the attraction of Eaglenest was its tractability and my 3 years there have only reinforced that opinion.

1.1.2 The importance of detailed inventories

There is another major reason for making a detailed inventory of the biodiversity of Arunachal Pradesh. Arunachal Pradesh still has many large tracts of more-or-less pristine forests. There are a lot of national and global inputs for conservation in Arunachal Pradesh at the macro level but all these are understandably painted on a wide canvas with a broad brush. In my opinion, while these inputs are useful in shaping policies at the highest levels they are pretty much useless for location-specific conservation strategies. Location-specific conservation is of critical importance for two reasons: (i) the advent of large-scale development projects (e.g. the Subansiri project) and (ii) the case of silent forests.

It is clear to any observer who has repeatedly visited Arunachal Pradesh that much of its wilderness will not survive the next 25 years. Roads, dams and saws will all take their toll. If half the present extent of forests survives I would consider it an achievement. In this scenario we do not have enough knowledge to make a choice – would a road through location A result in more damage to biodiversity than through location B? If the tract C is submerged by a dam does it have any flora or fauna which are found nowhere else or are there healthy populations elsewhere? It will come down to making many choices and the scientific community has no answers at the micro level to present to administrators.

Silent Forest, apparently a world-wide problem, refers to vast tracts of seemingly intact forest which are devoid of the larger fauna, especially mammals and large birds, because of intensive hunting. Satellite imagery shows a lot of greenery in Arunachal Pradesh but no one knows what fraction of those actually have an intact faunal assemblage at all levels. In fact, all that is green on a satellite image need not be intact forest. The torrential rainfall of Arunachal Pradesh can easily swaddle in verdure a clear-felled area in just a couple of years but the re-growth is seriously deficient in flora and fauna, particularly those that require primary forest niches.

The biodiversity inventory in Eaglenest is intended to be a first step towards remedying this deficiency.

1.2 This project

1.2.1 Proposal

In November 2003 I initiated the Eaglenest Biodiversity Project with the aim of (i) documenting as wide a range of its faunal diversity as possible (ii) helping the Bugun community (the tribe who live on the periphery of Eaglenest) start an ecotourism venture and (iii) initiate a dialogue with the community on the necessity of long-term conservation of Eaglenest and ways and means of achieving it while keeping in view their legitimate economic aspirations.

The immediate (till mid-2005) and long-term goals proposed in the funding application were to:

1. Inventory the biodiversity of Eaglenest wildlife sanctuary starting with birds, butterflies and herpetofauna with information on seasonal distributions.
2. Develop a photo-library useful to scientists, wildlife managers and tourists
3. Increase the local and outside awareness of the ecological wealth of Eaglenest
4. Encourage the participation of indigenous people in research and tourism activities, thereby engendering in the community a stake in the long-term survival of Eaglenest

1.2.2 The Beginning

The first stroke of luck was the Rufford-Maurice-Laing Foundation which generously provided the money with no hassles. The second, major, stroke of luck was finding Mr. Pekyom Ringu, a Forest

Officer in the Government of Arunachal Pradesh, in his office when I went there to obtain the necessary permits from the Forest Department. Ringu led to Mr. Omak Apang who introduced me to Mr. Indi Glow, one of the leading members of the Bugun tribe who live in Singchung on the periphery of Eaglenest. Three years down the line I cannot conceive of the Eaglenest Biodiversity Project without Mr. Indi Glow's active participation.

As a scientist my primary focus was on inventorying the biodiversity of Eaglenest; the long term goal was to use the results to attract other scientists and ecotourists to look upon Eaglenest as a destination, which would address to some extent the socio-economic development of the Bugun community. However, at my first meeting with them it became clear that their enthusiastic participation would be given to conservation activities which had a decidedly strong component of community development; and they wanted the community to reap benefits in the present and not at some unspecified time in the future. So I had to put the cart before the horse, as it were, and make hurried plans to organize a bird tour. The tour was to serve as a demonstration to the birding world the potential of Eaglenest. More crucially it was to demonstrate to the Buguns that there was money to be made in conserving Eaglenest – they did not believe that anyone would pay anyone else money to see birds. The bird tour was a success and the Bugun community appreciated he prompt manner in which I addressed their priority. They have started having discussions, among themselves and with me, on the importance of conservation of Eaglenest, both, as a natural heritage and a community economic resource. We have drawn up plans on (i) the community's role in protecting the area from poachers (ii) reducing its dependence on firewood from primary forest (iii) participation in ecological studies and (iv) training its members to handle ecotourists to the area.

I look forward to being involved for several years to come in exploring and nurturing a multi-faceted project with tight linkage between local community development and conservation, while at the same time devoting time to documenting one of the most remarkable faunal assemblages of the Indian subcontinent.

1.2.3 Project Team

The team and their roles in the project are given below:

Co-ordinator	Ramana Athreya
Bird survey	Ramana Athreya, Pratap Singh, Dhananjai Mohan, Shashank Dalvi
Reptile Survey	Ishan Agarwal, Ramana Athreya, Viral Mistry, Shashank Dalvi
Frog Survey	Viral Mistry, Ishan Agarwal
Butterfly Survey	Ramana Athreya, Viral Mistry, Shashank Dalvi
Logistics	Indi Glow, Ramana Athreya, Nima Tsering, Dorje Raptan, Jetha
Ecotourism	Ramana Athreya, Indi Glow, Nima Tsering, Dorje Raptan, Vidya Athreya
Vacations for Conservation	Shashank Dalvi, Nirmal Kulkarni

The profiles of the team members are provided at the end of this report.

The bird tour participants also contributed to the bird data. They include:

1st tour, April 2004 – Mike Waite, Claudio Koller and Ray Ziarno

2nd tour, March 2006 – Duncan Himes, Fredrik Ellin, Peter Schmidt, and Hakan Soderberg

3rd tour, April 2006 – Simon Allen, Mike Catsis, Margaret Widdowson and William Widdowson

1.2.4 Field Visits

Indi Glow, Nima Tsering, Dorje Raptan and Jetha live in and around the village of Singchung on the outskirts of Eaglenest and and one or more of them always accompanied us (the naturalists) into the field. So their names are not included in the list below:

29 Oct - 18 Nov, 2003	RA (birds, GPS markers, preliminary organisation)
20 Mar - 19 Apr, 2004	RA (pilot bird tour)
18 May - 10 Jun, 2004	PS+SD (birds)
01 Oct -23 Oct, 2004	RA+IA+VM (butterflies and herps)
15 Dec - 0 4 Jan, 2005	RA+DM (birds)
23 Jan - 28 Jan, 2005	DM+PS (birds)
16 Dec - 07 Jan 2006	RA (birds and ecotourism)
25 Feb - 09 Mar 2006	VA+RA (ecotourism and birds)
21 Mar - 28 Mar 2006	SD (Vacations for Conservation)
21 May - 07 Jun 2006	SD+RA+NK (Vacations for Conservation)

The weather was mostly overcast or wet as is usually the case with Eaglenest. The only exceptions were during December – January (2005 and 2006) and, rather unusually, May-June 2004, when the weather was mostly clear.

1.3 Structure of this report, and an apology

This project was initiated by a Rufford Small Grant in November 2003. I completed the Rufford project as per plan in January 2005. Normally I should have submitted this report by mid 2005 and applied for a grant to continue the project. I put up a summary of the project on the Eaglenest Biodiversity Project webpage in March 2005 but in the absence of a report I felt it was inappropriate to approach Rufford for a second grant. Various circumstances conspired to thwart the birth of this report. Principally, the ecotourism part of this project had begun to roll and all my spare time went into making sure that it continued to roll. Such initiatives have a nasty habit of refusing to restart once they stall. I knew that the conservation component of the project was a non-starter without local support and local support was entirely predicated to at least some real economic benefit from the forest. So I resolutely turned away from writing this report and concentrated on making the ecotourism season of winter 2005-06 a success – writing several magazine articles extolling Eaglenest, sending countless emails to tour operators all over the world to interest them in Eaglenest as a eco-destination and collating and editing the recorded calls of about 250 species for the March-April 2006 bird tours. The results have been gratifying – the number of visitors in 2005-06 was over 75, up from 3 the previous two years … which I hope will go some way in mitigating the serious crime of delaying this report by over a year. The Rufford-Maurice-Laing Foundation has been very patient and I owe them an apology for this delay regardless of the circumstances.

Nevertheless I still needed money, which I couldn't ask Rufford, to make sure that the ecotourism effort did not stutter. Fortunately, Dr. Ganesan Balachander and Ford Foundation stepped into the breach with a generous grant through Winrock International India.

With the end of the tourist season in June 2006 I buckled down to the task of writing this report. While I initially planned on writing separate reports for the Rufford- and Ford-funded phases I finally decided that one consolidated report – on the faunal database as well as the wisdom gleaned on ecotourism – made more sense. Indeed the two periods seamlessly merged into one another. However, where it is not obvious I have explicitly acknowledged the source of funding (Rufford and/or Ford) for each sub-activity.

This report starts with a **Summary** of this project.

It is then followed by **Acknowledgments.** Though this report has largely been written in the first person there should be no doubt that many, many people contributed to the project

Section 1 (this section) describes the motivation behind the project and the initial stages.

Section 2 provides an overview of the geography, some history, and the ecology and ecological importance of successively Arunachal Pradesh, western Arunachal Pradesh and Eaglenest, bringing out how the last named fits into the first.

Section 3 describes the area inside Eaglenest with the potential visitor in mind. It also gives detailed maps of the Eaglenest road and altitudinal and distance information of close to 100 locations along it. I hope visitors will use this database to help us document the faunal distribution inside Eaglenest.

Section 4 provides a summary of the faunal inventory work between November 2003 and April 2006 including results from the (few) previous bird surveys in that area.

Section 5 describes the bird tours in some detail and the publicity which went into attracting visitors. Soon after the 1st (demonstration) bird tour during the Rufford phase the Arunachal Pradesh Forest Department asked me to submit a report on their role in promoting community-based ecotourism at Eaglenest. Half that report is based on the Rufford phase but I could only take it to a proper conclusion during the Ford phase. So I have briefly described that work in this section but have attached the full report to be submitted to the Forest Department in appendix A-9.

Section 6 discusses conservation issues, recommendations to the forest department and suggestions for future course of action

Then comes the list of **References** cited in this report followed by the appendices

Appendices 1-3 present the bird data from this project

Appendices 4-7 present the herpetofaunal data

Appendix 8 presents the checklist of butterflies

Appendix 9 is the ecotourism report being submitted to the forest department

Appendix 10 is a brief description of the Eaglenest Biodiversity Project webpages

Appendix 11 describes the new species of Liocichla discovered in Eaglenest.

A series of full page photo montages of the biodiversity of Eaglenest have been sprinkled throughout this report. This is a portfolio I prepared for the Central Empowered Committee of the Supreme Court of India which is looking into the application to construct the highway through Eaglenest.

Biodiversity Portfolio – 4

Forest canopy in Eaglenest (contd)

Temperate forest at 2200m

Subtropical forest at 1500m

The unmarred canopy from the highest ridge to the Assam plains offer a pristine refuge for a complete ensemble of biodiversityacross the altitudinal range. Lowland forests are most susceptible to exploitation and destruction. Few protected areas of Arunachal Pradesh have good forest from as low as 100m and of them only Eaglenest ranges up to 3300m

Section 2

An Overview Of

Eaglenest Wildlife Sanctuary and Its Environs

2.1 Arunachal Pradesh

2.1.1 Geography

The state of Arunachal Pradesh is located in the north-eastern tip of India. Its area of 83743 km^2 makes it the largest state in the region. It shares a state border with Assam to the south and international borders with Bhutan (west), China (north and east) and Myanmar (south-east).

Arunachal Pradesh has a very precipitous terrain. Over a distance of less than 150 km it rises from an altitude of just 100 m on the Assam border at the edge of the Brahmaputra valley to several snow peaks nudging 7000m on the Tibetan border. In fact the hill districts were pried away from the old Assam state to form the North-East Frontier Tract which was finally renamed Arunachal Pradesh or the Land of the Dawn Mountains. The mountains of Arunachal Pradesh constitute the easternmost section of the Himalayas and include the Aka, Dafla, Miri, Abor and Mishmi hills north of the Assam valley. The Patkai range in the south-eastern part of the state is to the south of the Assam valley. The tall mountains form an effective barrier against the northward movement of the monsoon and average rainfall across the state can vary from about 1000mm on the Tibetan border to over 3500mm on the southern slopes.

The Himalayas here are riven by deep north-south gorges of major rivers systems which drain the heavy rainfall that these mountains are subject to. The River Tsangpo of Tibet enters India (picking up the names of Siang, Dihang and finally Brahmaputra) in the gap between the Abor and Mishmi hills and is joined by the Kameng, Subansiri, Dibang, Lohit and Noa Dihing making it the largest river in India.

2.1.2 Forests and Biodiversity

Arunachal Pradesh ranks first in India for the fraction of area with forest cover (FSI 2003). While all that appear green on satellite imagery are not necessarily "good" forests it would be safe to say that a quarter of the state is still covered by intact forests.

Its steep topology with a wide altitudinal range, a gradient in precipitation extending to very high rainfall, largely intact forests, and special location at the junction of the Palearctic and the Indo-Malayan biogeographic realms (in fact Arunachal is also at the junction of the Indian and Indo-Burmese sub-regions within the Indo-Malayan realm) makes Arunachal Pradesh the top biodiversity region in India. Myers et al (2000) rank this area sixth on their list of "hottest of hotspots" of world biodiversity after considering a variety of factors including endemism, area and total species of several faunal groups. Arunachal also makes it into the Global 200 ecoregions of Olson & Dinerstein (1998). Price et al (2003) have estimated that about 600 species of birds breed in a 250km quadrat centred on Arunachal Pradesh, i.e. more than 50% of the birds of mainland India, apart from another 150 species which make this area their winter refuge.

However it must be emphasised that most of these investigators have worked with a very broad brush and few places have detailed data and hard numbers required for drawing up effective conservation strategies at the micro level.

2.1.3 Demography

Arunachal has a population of only 1.1 million (2001 census) which makes this the least densely populated state in India. However the census also showed that this state had the highest decadal growth rate, 26%, in the country. In a process analogous to biodiversity, and for much the same reason (insularity of areas within the state), Arunachal Pradesh exhibits an incredible range of cultural diversity. The population is predominantly tribal comprising 82 major tribes and sub-tribes of Indo-Mongoloid and Mongoloid lineage (Singh 1999). Even a short traverse from one valley to the next results in mutually incomprehensible languages and customs. Most of the population practice subsistence farming and animal husbandry.

Western Arunachal Pradesh showing the principal borders, roads (brown), rivers (blue), towns and wildlife areas (names in red). Guwahati, the capital of Assam, is about 150 km due west of Nagaon.

2.2 Western Arunachal Pradesh

2.2.1 A brief history of names

There has been a considerable flux in the names of areas associated with Arunachal Pradesh and consequent confusion and difficulty in locating places in ecological literature. Until 1972, the hill districts of Assam – Aka, Dafla, Miri, Abor and Mishmi ranges of the Eastern Himalayas north and west of the Brahmaputra and the Patkai range south and east of the river – were administered by the Governor of Assam as the North-East Frontier Agency (NEFA). It was designated a Union Territory in 1972 and subsequently attained full statehood in 1986.

The western part of NEFA from Subansiri to the Bhutanese border used to be called the Western Section of the North-East Frontier Tract by the British who then changed it to Balipara Frontier Tract in 1919, after the village of Balipara in Assam at the foot of these hills. The Balipara Frontier Tract was divided into the Sela Sub-Agency and Subansiri Area in 1946. The Sela Sub-agency was renamed the Kameng Frontier Division in 1954, after the major river draining that area, and subsequently the Kameng District. This district was bifurcated into East and West Kameng districts in 1980. In 1984 the Tawang Subdivision, subsequently designated a District, was hived off from West Kameng. District bifurcation is still active in Arunachal Pradesh and several new districts have been carved out of existing ones in the last few years though not in West Kameng.

Pakke tiger reserve used to be called the Pakhui wildlife sanctuary until recently.

2.2.2 Geography and Climate

The southern border of Western Arunachal Pradesh is bounded by the plains of Assam, approximately at an altitude contour of 100m, where the foothills first rise. To the north the state is hemmed in by the tall peaks (several above 6000m) of the Gori-Chen range on the Indo-Tibetan border. Bhutan lies on the western border of this region while it adjoins the Papum Pare district in the east. A bird's eye view of western Arunachal Pradesh is depicted on page 25.

The area is drained by one of the principal tributaries of the Brahmaputra, called Kameng in Arunachal Pradesh and Jia Bhoreli in Assam. The Kameng also forms the boundary between the East and West Kameng districts, as also the boundary between the Sessa and Eaglenest sanctuaries on the one hand and the Pakke tiger reserve on the other. The Kameng, or rather the Jia Bhoreli as it is called in Assam, has proved to be a major line of defence in the conservation of Nameri tiger reserve though it is not clear how long it will continue to do so. The entire stretch of forest on the west bank of the river has vanished in the last few years though the forest across the river continues to be in a healthy state.

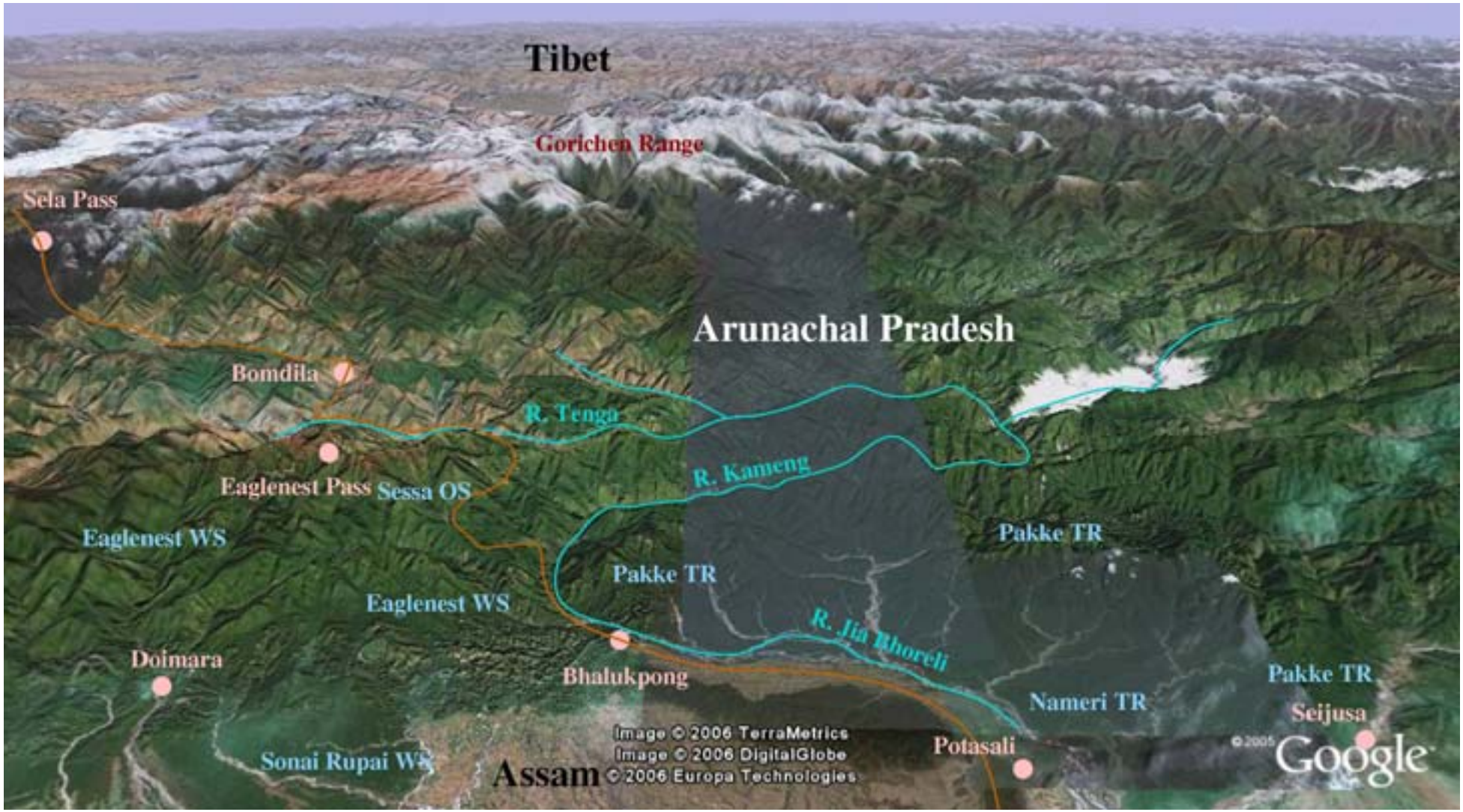
W. Arunachal is very precipitous with the elevation rising from 100m on the Assam-Arunachal state border to over 3250m on the Eaglenest Ridge and plunging again to 1200 in the Tenga valley, all within a straight-line distance of 30 km. The ridge-lines north of Eaglenest are of a similar altitude until one reaches the Sela Ridge which is considerably higher with an altitude of between 4200m and 5000m and separates Tawang from W. Kameng. The Sela Pass at 4200 is the lowest on this ridge and carries through it the highway connecting Tezpur and Tawang. The highest peaks in the Gori-Chen range include Kangto (7090m), Nyegyi Kangsang (7047m) and Gori-Chen (6538m). The outer Himalayan ranges here are called the Aka and Dafla hills west and east of the Kameng river, respectively.

The region has a variety of climates from the tropical to permafrost. The south-west monsoon (June – October) contributes more than three-quarters of the annual rainfall. The average rainfall on the southern slopes is over 3000 mm (Choudhury 2003). Not surprisingly, the north-moving monsoon

clouds dump much of their burden on the southern slopes of the first ridge in their path, i.e. on Eaglenest, Sessa, Pakke and adjoining areas. This has also resulted in relatively drier inner (northern) valley and mountains. Generally, November-January is the driest period though heavy rainfall can occur in any monthr. March-April usually experience bursts of heavy rain. June-August is the warmest period while February is the coldest. The areas above 3500m are usually snowbound between January and June while ground snow rarely lasts more than a few days below 3000m

2.2.3 Vegetation Types

The wide altitudinal range (100m – 7000m), and the dispersion in precipitation from from very high rainfall in the south to drier facies on the Tibetan border has resulted in a wide diversity of vegetation types and consequently floral and faunal diversity. Six broad vegetation types have been identified in the state including lowland tropical evergreen (below 1000m), subtropical (1000m – 2000m), temperate broad-leaved and temperate conifers (2000 – 4000m), alpine vegetation (above 4000m) and permafrost (Kaul & Haridasan, 1987). According to the classification of Champion & Seth (1968) the forests below 800m in the Balapara Frontier Tract (i.e. Pakke and lower Eaglenest) are the Upper Assam Valley Tropical Wet Evergreen Type C2b (Mesua) forest. The forests between 1800m and 3000m in the heavy rainfall areas of the Aka hills (i.e. Eaglenest) are the Eastern Himalayan wet temperate forest.



An aerial view of western Arunachal Pradesh looking due north from Assam. The Assam-Arunachal boder runs along the foothills, a few kilometers south of Doimara, north of Sonai Rupai wildlife sanctuary, through Bhalukpong, north of Nameri tiger reserve, south of Pakke tiger reserve and through Seijusa. The major river draining the area is called Kameng in Arunachal Pradesh and Jia Bhoreli in Assam. Bhutan is just off the left edge of the image. The plains of Assam (alt. 100m) and the snow peaks of the Gori-Chen range which nudge 7000m on the Indo-Tibetan border are separated by just 100 km along a straight line. The 3500 km^2 Kameng complex of protected areas – Eaglenest, Sessa and Pakke in Arunachal Pradesh and Sonai Rupai and Nameri in Assam and the associated Reserved Forest blocks (all the green areas south of the line of the R. Tenga) – form one of the largest tracts of contiguous forest in Arunachal Pradesh and the best (only?) hope for such wide-ranging animals as the Asian Elephant in western Arunachal Pradesh

2.2.4 People

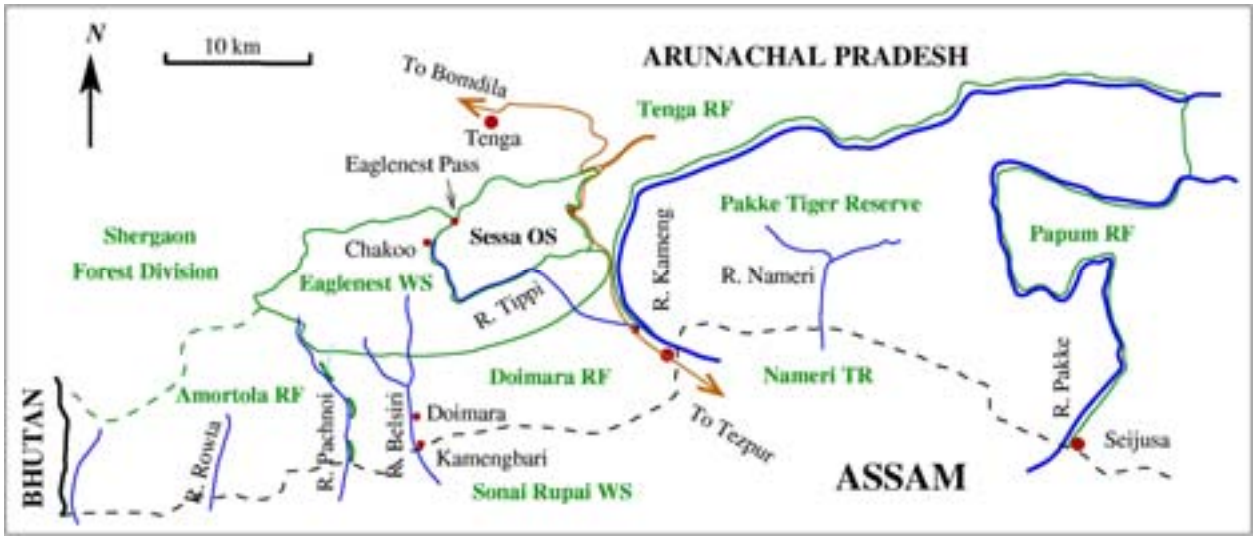
Kameng is particularly rich in this respect as it plays host to a variety of tribes including Mompas (more numerous in Tawang), Mijis, Sherdukpen, Bugun, Akas and Nishis (more numerous in E. Kameng and Papum Pare). The isolation imposed by the terrain is such that the languages of each of these tribes are incomprehensible to the others. In fact, even today the fastest way of traveling between parts of Arunachal Pradesh is to go down a river valley into Assam and traverse the corresponding section in the plains and then move back up a river valley of the destination.

2.2.5 The Kameng protected-area complex (KPAC)

The protected areas of East and West Kameng and the adjacent areas of Assam comprise one of the largest contiguous tract of reasonably intact forest in Arunachal Pradesh. This Kameng protected-area complex includes

1. Pakke tiger reserve (Arunachal): 862 km^2; alt. 100m – 2000m; lowland evergreen and semi-evergreen forests; subtropical forests; successional grassland and forests on the floodplains of the rivers.
2. Nameri tiger reserve (Assam): 349 km^2; alt. 50 - 150m; “terai” forest including swamp forests, riverine woodland, and successional grassland and forests on the floodplains
3. Sonai rupai wildlife sanctuary (Assam): 175 km^2; alt. 50 - 150m; with vegetation similar to Nameri
4. Sessa orchid sanctuary (Arunachal): 100 km^2; alt. 1000 - 3100m; subtropical and temperate broad-leaved forests and bamboo.
5. Eaglenest wildlife sanctuary (Arunachal): 218 km^2; alt. 500 - 3250m; lowland evergreen and semi-evergreen forests; subtropical forest; temperate broad-leaved and conifer forests; bamboo at all elevations.
6. Surrounding blocks of Reserved Forests of Papum, Doimara, Amortola and Shergaon forest division which total another 2000 km^2 of forests of variable quality but which form an important buffer zone especially for the movements of elephants.

In all, this complex encompasses over 3500 km^2 of diverse types of forests covering 3300m of elevation from lowlands to well into the temperate regions. This complex, the largest such in western Arunachal Pradesh, has by far the most critical role in the conservation of biodiversity in that area and should be the focus of conservation strategies there.



Kameng protected area complex. The legally protected areas are labeled and bounded in green, sanctuaries in solid lines and reserved forests in dashed lines (adapted from the map provided by the Forest Department, A.P.)

The Critical Ecosystem Partnership Fund (CEPF), a consortium of many major international and regional organizations, have identified the Eastern Himalayan region around Arunachal Pradesh (Nepal, Bhutan and all of North-East India) as one of the critical global biodiversity-rich area deserving of conservation focus. CEPF (2005) provides a detailed profile of this region. They have identified the **North-Bank Landscape** (i.e. north bank of Brahmaputra, extending up the Eaglenest slopes) and the **Tawang** region as worthy of particular focus.

In particular this area is extremely important for the continued well-being of the Asian Elephant. Elephants of that area regularly move up from the Assam plains to the Eaglenest ridge at 3250m in summer; perhaps the highest altitude that elephants reach in India. Extensive clearing of forests through illegal encroachments in Assam adjacent to Eaglenest has exacerbated elephant-man conflict in the plains; it has also meant that elephants now have to stay longer in the Eaglenest area and may lead to depletion of their food resource dominating over the rate of regeneration.

Recognising the importance of this area for elephant conservation the entire KPAC has been designated an Elephant Reserve (analogous to a tiger reserve). However, a lot more work needs to be done in drawing up an effective management strategy and implementing it.

Eaglenest and its buffer zones (Doimara and Amartola reserve forests) contain within them all the forests types and elevational zones found within KPAC excepting only the lowland swamp forests found in Nameri. Furthermore all the high altitude areas (above 2000m msl) of KPAC are confined to Eaglenest and (the smaller) Sessa. This was one of the two principal reasons for my focus on Eaglenest (the other being the accessibility provided by the road).

2.2.6 Faunal Studies

For all the access provided by the road network of western Arunachal Pradesh very little is known of its biodiversity. The Zoological Survey of India may have done some work but little of that is in the public domain. In the recent past documentation of the flora and fauna of the area are:

1. Pratap Singh visited western Arunachal Pradesh, including Eaglenest, during his extensive travels across Arunachal Pradesh to document the birdlife of the state (Singh 1994).
2. Ramana Athreya and S. Kartikeyan documented the birds and butterflies of specifically Pakke-Sessa-Eaglenest and also provided details on visiting the areas (Athreya & Kartikeyan 1995).
3. Aparajita Datta carried out a study of the hornbills of Pakke and surrounding areas as part of a Ph.D thesis (Datta 2001) and also published a number of faunal records obtained during that period (see literature listed at the end of the main section of this report)
4. Anwaruddin Choudhury carried out bird surveys in Eaglenest and its surrounding areas during many visits between 1997 and 2002 (Choudhury 2003).
5. Suresh Kumar and Pratap Singh surveyedW. Kameng (including Eaglenest) and Tawang for pheasants as part of a wider survey of pheasants in Arunachal Pradesh (Kumar & Singh 1999)
6. Pratap Singh added depth to his bird surveys in Arunachal Pradesh by intensively surveying a few selected areas in which Eaglenest, Dirang and Tawang figured prominently (Singh 1999)
7. Suresh Kumar and Pratap Singh reported the presence of a new taxon of the genus Lophophorus (monal pheasants) while surveying Arunachal Pradesh for that group (Kumar & Singh 2000)
8. Samraat Pawar and Aysegul Birand surveyed several lowland areas of Arunachal including Pakke for birds and herpetofauna which yielded many significant herpetofaunal records including rediscoveries of several species after close to a century (Pawar & Birand 2001).
9. Charudutt Mishra, Aparajita Datta and M.D.Madhusudan carried out a high altitude survey of fauna in W. Kameng and Tawang which has yielded several significant mammalian discoveries (Mishra, Datta & Madhusudan 2003)

2.3 Eaglenest wildlife sanctuary

2.3.1 A brief history

Eaglenest wildlife sanctuary was legally notified in 1989 along with Sessa orchid sanctuary. The area has traditionally been claimed by the Sherdukpen tribe of Rupa though they have never had any settlement inside the boundaries of the sanctuary. Doimara (outside and below Eaglenest) used to be a thriving settlement during the days of commercial logging operations (up to 1998) but is now going to seed with less than a dozen farming families permanently stationed there. Access into Eaglenest from the north is through the community lands of the Bugun tribe which has its principal settlement at Singchung near Tenga. A good fraction of Sessa has traditionally been claimed by the Buguns as part of their territory.

Eaglenest apparently derives its name from Eagle regiment of the Indian army which used to be posted in that area.

2.3.2 Administration and Protection

The sanctuary is under the charge of the Divisional Forest Officer at Seijusa who is also the Field Director of Pakke Tiger Reserve. He is assisted by a Range Forest Office in Singchung and Beat Forest Offices in Ramalingam (close to Singchung) and Khellong. In practice, the lack of resources, including manpower, and motivation has meant that the Department has no presence inside the sanctuary area. In all my 3 years of work as part of this project I saw Department staff inside the sanctuary once and my entry permits were never checked at all.

Local hunters do operate inside Eaglenest, in particularly large numbers during the traditional New Year festivities in February (Losar festival). The absence of any settlement inside the boundaries of Eaglenest has meant that the problem of hunting is less serious than it could have been. While there were rumours of some timber smuggling clearly it is not a significant issue inside the sanctuary primarily because the road cannot accommodate large timber trucks. However I encountered a large number of Assamese timber poachers in the Doimara reserve forest close to the state border.

2.3.3 Geography and Climate

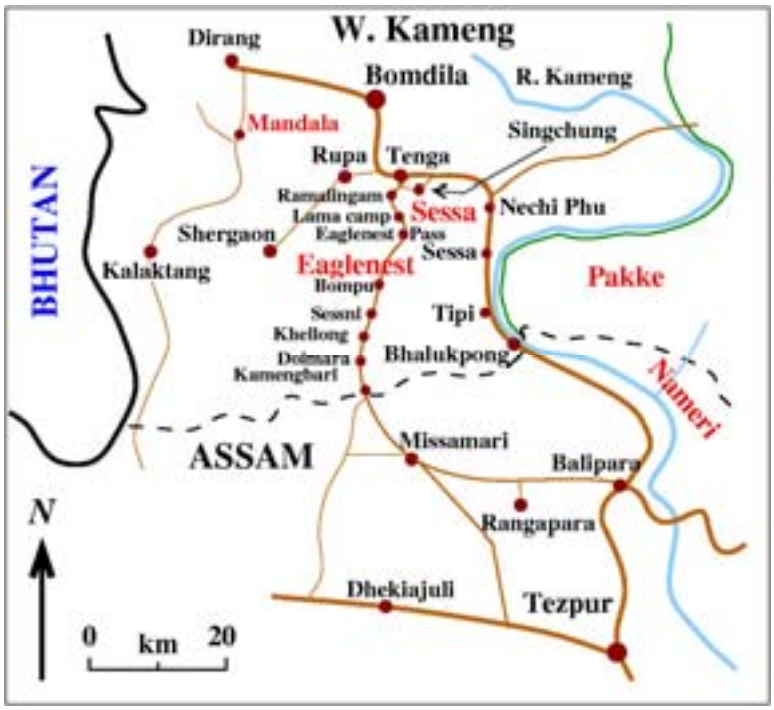
Eaglenest and Sessa sanctuaries together occupy a rough east-west rectangle with the latter occupying the north-east quadrant. Eaglenest is bounded to the north by the Eaglenest Ridge and the reserved forests of the Bugun community (Lama Camp area). The Bhalukpong-Bomdila highway (and Pakke immediately beyond) forms its eastern boundary. There are no prominent geographical features delineating its western and southern boundaries. An idea of the geography of Eaglenest may be obtained from the map on page 34 and Google Earth views on pages 36 and 37.

For obvious reasons the survey team focused on the accessible area in the immediate vicinity of the road and two of the forest foot paths in the Lama Camp and Chakoo-Bra Top areas.

The Eaglenest and Sessa ridges rise to an elevation of 2700 – 3250m and are the first major barrier to the monsoon system as it moves northwards from the plains of Assam. Consequently they get the lion’s share of the rain – over 3000 mm on the southern slopes to about 1500m on the northern slopes (Choudhury 2003).

T he eastern half of Eaglenest-Sessa area is drained by the Tippi Naala (Naala = river) which joins R. Kameng at the village of Tippi on the Bhalukpong-Bomdila highway. The streams from the western half of the area flow down to join the Brahmaputra separately.

In summer (May-June) the lower elevations can get very warm while the upper elevations remain pleasant when dry. Overcast and rainy conditions or winds from the snow-laden ridges of Sela can cause a substantial drop in temperature (10-20^{o}C) any time of the year, especially higher up.



West Kameng district localities and roads around Eaglenest

February is the coldest month of the year. Occasional snowfalls occur during January-February above 2000m but snow rarely stays on the ground for more than a few days. However, frost and frozen water is a regular possibility along the road above 2600m between December and March but the magnitude is not sufficient to block the road.

The principal rainy season lasts from June to October. March-April also tends to have a very unsettled weather with bursts of heavy rain. December is driest and most cloud-free month of the year though it can rain anytime at all during the year.

The elevation between 1700m and 2500m is prone to heavy fog all through the year, especially in the afternoon. When viewed from the plains of Assam Eaglenest area tends to be foggy more often than the hills on either side.

2.3.4 Vegetation

The project team was handicapped by a serious lack of botanical expertise and that shows in this report. The vegetation has been described only in very general terms under place descriptions in the next section.

2.3.5 Eaglenest Road

The Eaglenest road was constructed by the Indian Army in the late 1950s as part of the first motorable road between Tawang and Assam. The subsequent construction of the wider Bhalukpong-Bomdila highway led to a neglect of the Eaglenest road for over 30 years. This neglect allowed the disturbed (blasted) soil substrate and hill slopes to stabilize and the wilderness crept back on to the margins of the road without actually blocking the road in a major manner. This has resulted in a motorable road passing through largely intact forests across 3000m of altitude – a truly unique situation which offers unrivalled opportunities to researchers and tourists to study and savour one of the finest ensembles of biodiversity in India.

Unfortunately, unknown to the Forest Department and bypassing mandatory environmental clearances GREF (road-bulding section of the Indian Army) decided to develop this road into a major highway and blasted large sections in an effort to simplify the alignment and the gradient. This effort was finally stopped by a judicial stay, pending a final decision, of the Supreme Court of India in 1998 but not before extensive damage had been done between 2000m and 2600m altitude.

The effect of this latest round of road building continues to be felt in the form of recurring landslides which have yet to stabilize even after 8 years.

This road enters Arunachal Pradesh at Kamengbari at altitude 100m and winds up past the villages of Doimara and Khellong, before entering the sanctuary area above Khellong at about 1200m. It continues through the campsites at Sessni (1250m), Bompu (1945m), Chakoo (2400m) and Sunderview (2465m) , before crossing the ridge at Eaglenest Pass at 2780m (the lowest point between the Eaglenest and Sela ridges). It then descends past Lama Camp and Ramalingam campsites to join the currently operatonal highway at Tenga.

Heavy monsoon rains turn some stretches into deep mud and block others with landslides. Almost all these problem stretches occur in the sections subject to road-making in the recent past. The advantage of this broad jeepable road is that even when jeep access is blocked by landslides one can easily access the interior areas on a motor-cycle or on foot. Even such an access is an impossible luxury during the monsoon in most other sanctuaries and national parks of Arunachal Pradesh.

Once the landslides are cleared after the monsoon (after October) the road remains open to vehicles until June when rains start again.

2.3.6 Faunal studies

Prior to this project Eaglenest was zoologically terra incognita with the notable exception of its birds. Even birdwise this project has added 45 species to Eaglenest's list and yielded range-altitude extension records for over 75 species.

Michelia in bloom: In March all of Eaglenest is powdered with white blossoms

The Arunachal Macaque *Macaca munzala*

This primate was discovered by a team of biologists from the Nature Conservation Foundation only in 2003 during an expedition to the high altitude regions of W. Arunachal Pradesh. The Arunachal Macaque seems to be closely related to the Assamese Macaque but its exact taxonomic status I still unclear.

The pink spectacles against a dark face, the orange-buff crown patch with a dark wedge through it, a short tail, the strikingly prognathous skull, the prominent ruff (white in the above winter photographs and orange-buff in many individuals in October) and dense white fur on the underside seem to be the typical characters of this taxon

Biodiversity Portfolio – 5

Fungi

Ramana Athreya / Eaglenest Biodiversity Project / Kaati (funded by The Rufford-Maurice-Laing Foundation, UK)

Section 3

Inside

Eaglenest Wildlife Sanctuary

Information for the visitor

This section describes the localities inside Eaglenest which a visitor is likely to visit, i.e. along the road and the few footpaths in the vicinity. The information provided is expected to help people plan their visit and includes geography of the camping sites, the available camping facilities, a sketchy description of the vegetation and some of the more interesting fauna that one may expect to see. This information is also available on the project webpages[3] which also have extensive information on the surrounding areas of Pakke, Dirang and Tawang.

3.1 Preparing for a visit

3.1.1 Forest Permits

Tourist and Research permits for Eaglenest wildlife sanctuary are issued by the Chief Wildlife Warden at the Office of the Principal Chief Conservator of Forests, Forest Department, Government of Arunachal Pradesh, Itanagar. Tourist permits may also be obtained from the Divisional Forest Officer in charge of Pakke and Eaglenest at Seijusa in East Kameng district.

3.1.2 Inner Line Permits

Indians and foreigners require Inner Line (ILP) and Restricted Area (RAP) permits, respectively, to enter Arunachal.

ILPs can be obtained from any one of

- the Secretary (Political), Govt. of Arunachal Pradesh, Itanagar.
- Arunachal Pradesh Resident Commissioners in Kolkata, New Delhi, Guwahati and several other places in north-east India.
- District administration (Circle Officer, Assistant Commisioner) inside Arunachal Pradesh but only for their own districts

1-week tourist permits, costing Rs. 25, are routinely issued. Proof of citizenship is sometimes demanded for which a copy of passport, ration card, voter's ID, or driver's license will suffice. This process takes a day (or occasionally two) and can be initiated by a FAX. Tour agencies can also apply for permits on behalf of their clients. Once inside Arunachal the district officials can either extend the old permit or issue a new one.

RAPs can be obtained from

- Indian embassies/consulates; easiest for a single-country group.
- Home Ministry, Govt of India.
- Home Commissioner, Govt of Arunachal.

The 10-day permit requires a group of 4-14 tourists all with valid visas and costs 50$ per person (minimum 200$ per group, i.e. 4 people). Permits can be obtained within a week though it is safer to allow a month’s time. It is mandatory for the tour to be organised by an Arunachal tour operator. In practice, obtaining a permit is part of the tour operator's job - foreign tourists dont have to do

[3] http://www.clsp.jhu.edu/people/zak/ramana

anything other than get an Indian visa and pay the tour operator. These permits are checked at the entry point for Eaglenest which is at Bhalukpong and the entry formalities only take a few minutes.

3.1.3 Logistics

One can enter Eaglenest either from the north (Tenga) or from the south (Kamengbari/Doimara).

The nearest markets for provisioning a tour group are at Tenga and Missamari (south-east of Kamengbari on the road to Balipara/Tezpur). However these are small settlements and visitors should not expect to find special articles like non-standard batteries, slide film rolls or specific medicines. These villages are also the nearest centres for medical treatment and even that of a very basic level. There are no facilities or shops inside Eaglenest of any kind.

Tenga and Kamengbari/Doimara may be reached by public transport but one should factor in delays due to the vagaries of weather and public transport. Tenga is on the Bhalukpong-Bomdila-Tawang highway and several buses pass through the area daily (between Itanagar, Tezpur and Guwahati on the one hand and Bomdila, Dirang and Tawang on the other). Shared public taxis also ply between Tezpur and Bomdila/Tawang. A bus operates between Tezpur and Doimara 5 days a week but is prone to truancy. So it is best to exit from Tenga to be sure of getting out as per schedule.

Renting a jeep for the duration of the visit is a more convenient option and works out to be reasonable for groups of 4-6 visitors. Rental vehicles are available in Tenga market, Bomdila and Tezpur. Vehicles may also be rented in Guwahati but all drivers from Guwahati are not familiar with navigating mountain roads. Porters may also be hired at Tenga for a trek into Eaglenest. One can also rent a vehicle for entering and exiting from Eaglenest while trekking in between.

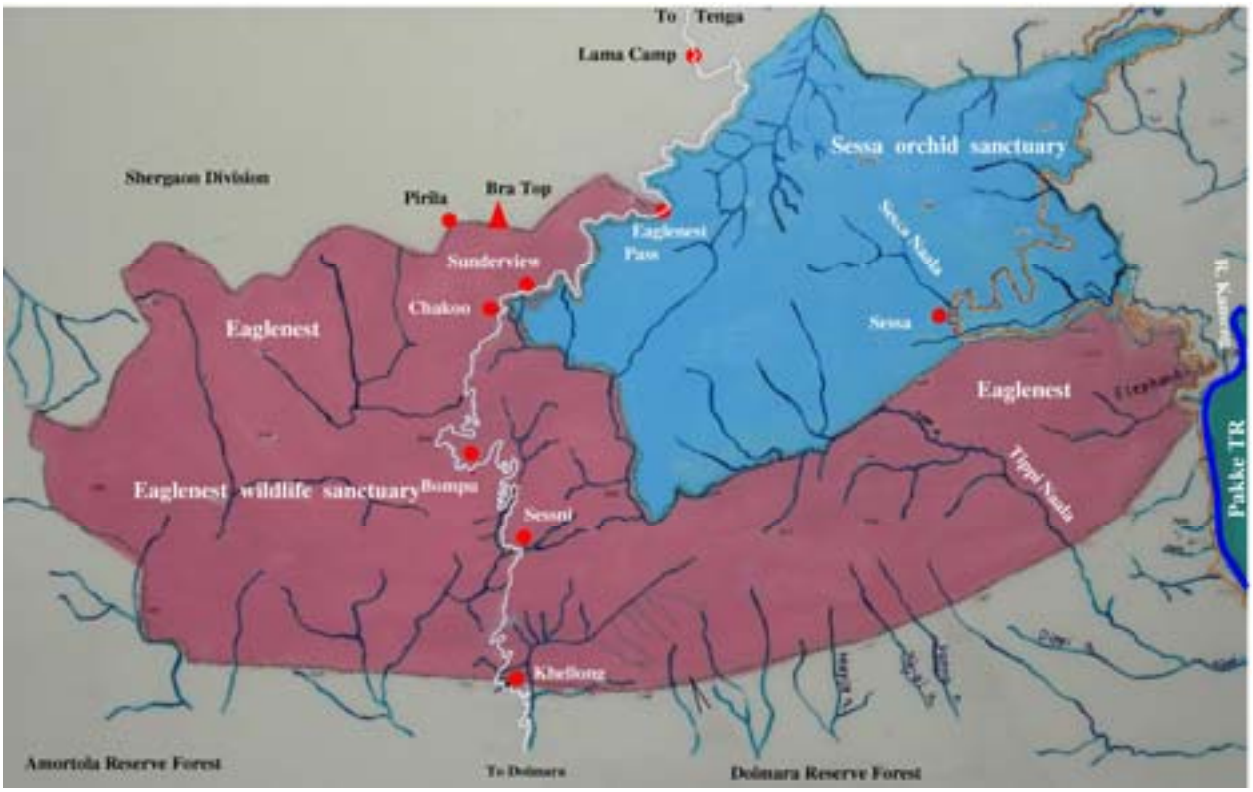
The Eaglenest road runs from Kamengbari in the south on the Assam-Arunachal border to Tenga in the north inside Arunachal Pradesh. From Kamengbari the road passes through Doimara and Khellong before crossing into the sanctuary above Khellong. The road exits from the sanctuary at the Eaglenest Pass before continuing past Lama Camp and Ramalingam to Tenga where it joins the new Bhalukpong-Tawang highway.

The road is best navigated in a 4-wheel drive vehicle though any sturdy vehicle (jeep-type) will do. The road is essentially single lane with regular broader sections where vehicles can pass. The soft stretches are just north of the Eaglenest Pass (first 2 km) and the 3 km of road from Sunderview to Chakoo which has been destabilized by the recent road construction activity.

Landslides can block the vehicular traffic, especially during the monsoon. Even these are mainly concentrated in sections of the road which saw recent construction activity. The worst slide is just above Sunderview camp where a whole hillside is gradually but inexorably sliding down every season. Landslides are cleared after every monsoon though last year just enough was done to allow a vehicle to cross the Sunderview slide with great care. Towards the end of the season in June we accessed the upper reaches of Eaglenest from Tenga and the lower reaches from Kamengbari. During heavy rains, as in the monsoon, it is best to limit vehicle usage to ferrying heavy equipment and provision restricting local movement inside the sanctuary to hikes.

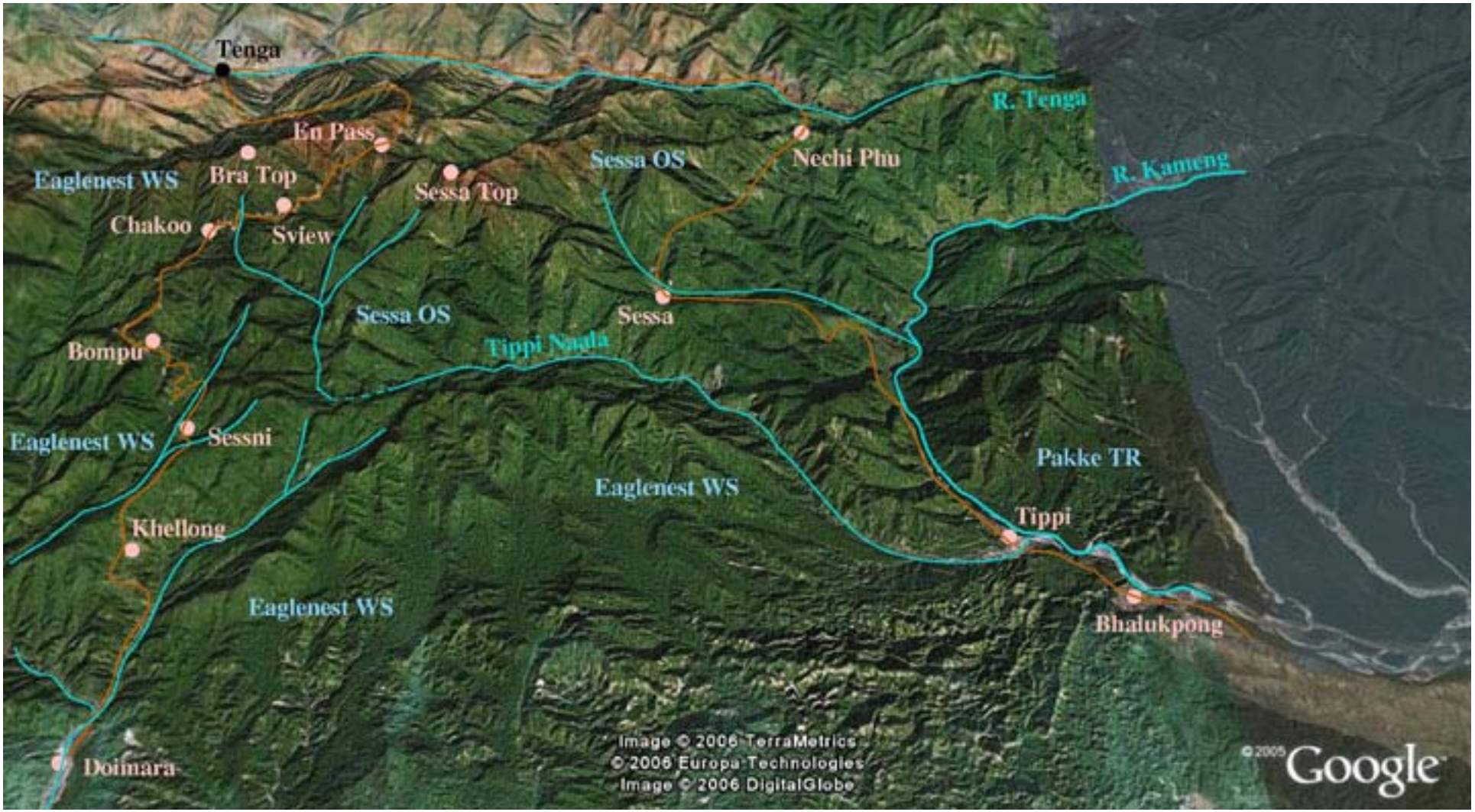
We have also used motorcycles to move about in the sanctuary especially for daily movements from the base camp. They can also be dragged/lifted across landslides and so are useful in all seasons.

There are several campsites across the altitudinal range inside and in the periphery of Eaglenest. These are dealt with in greater detail later in this section.



Eaglenest and Sessa sanctuaries (provided by the Forest Department, Arunachal Pradesh). The brown line on the right is the Bhalukpong-Tawang highway while the white line through Eaglenest is the Eaglenest road. Pakke is just across the highway and River Kameng (thick blue line).

The sun dips into Bhutan beyond the last slopes of Eaglenest



A bird's eye view (from Assam) of the southern slopes of Eaglenest, Sessa and Pakke. Most of the visible area is inside Arunachal except for a small wedge in the bottom right corner in Assam. The Eaglenest ridge-line has a reddish shade in this image and runs north-east from Bra Top (3215m), then south-eastward down to the Eaglenest Pass (2780m), up to Sessa Top (3100m) and north-eastward from there (see Figure # for a better view). This high barrier ensures that Eaglenest and Sessa get the bulk of the monsoon precipitation and is responsible for the relatively drier inner (northern) valleys in Dirang. The entire region is highly precipitous with the altitude changing from 100m at Bhalukpong to 3250m above Bra Top on the ridge and plunging to 1200m in the Tenga valley across a linear distance of just 30 km. The brown line on the right along the R. Kameng is the Tezpur-Bhalukong-Tenga-Bomdila-Tawang highway while the one on the left from Doimara to Tenga (through Bompu, and Eaglenest Pass) is the Eaglenest road.

A bird's eye view (from the north-east) of the Tenga Valley and the northern slopes of the Eaglenest Ridge. Doimara and the plains of Assam on the southern side of the ridge are visible in the top left corner of the image. The high ridges are more distinct in this image, as also the Eaglenest Pass through which runs the Eaglenest road (through the Pass, Lama Camp and Ramalingam). This road joins the main Bhalukpong-Tawang highway, which can be seen running along the length of the Tenga Valley, at Tenga. An ancient footpath runs from Rupa to Chakoo through the Pirila Pass which used to be the usual route before the advent of road

3.2 Road Markers

The first task taken up as part of the Eaglenest Biodiversity Project in November 2003 was to put up distance and altitude markers at regular intervals along the 40 km of road inside the sanctuary. This was considered essential for ensuring that all members of the team, despite visiting the area separately, had a well defined set of points to anchor their distributional records. I typically walked each section of road about 6 times with a GPS unit (Garmin eTrex Summit) in hand to determine the altitudes and distances.

Hand-held GPS units are very convenient devices for recording tracks and distances but are less useful for recording absolute altitudes. They also underestimate the errors on occasion. The principal reason for this is the bias introduced into the path of the signal by atmospheric and geographic features. If the satellites being tracked are distributed in all directions the horizontal error is likely to be well estimated. If most of the satellites are in one quadrant of the sky then the actual error is likely to be significantly greater than the value displayed. Since all the satellites are always “above” the earth the biases and errors are least constrained in the vertical directions and so GPS altitude measurements are particularly prone to large errors even up to 75m. A simple way of checking this is to take repeated measurements at the base camp or note the dispersion of tracks of the same section of a road on a map. In particular, in Eaglenest I noticed that the altitude value for Chakoo always started out very high (2450-2475m) before gradually settling down to 2400-2420m (topo sheet value = 2405m) after about 10 minutes of constant acquisition. The area around Sessni was also prone to large errors on account of it being hemmed in by steep mountain sides. One should also be careful in using contour values from topo sheets as they could also be in error of 25-50m in some locations.

A good strategy for marking altitudes is to first identify standard locations and then use barometers (eTrex Summit also provides barometer altitudes) to determine the relative altitudes of places near them. The absolute altitudes of barometers need to be set regularly but their relative measures of altitudes are more accurate than values from satellites. Of course changes in atmospheric conditions will corrupt the absolute calibration of barometers. So I would calibrate the barometer at known locations as often as possible while quickly moving along the road and measuring the altitudes of points before the weather had a chance to change.

I identified altitude standards by selecting clearly defined locations on a topo sheet which also had a clear view of a large section of the sky. I confirmed their altitudes using satellite measurements on multiple occasions when more than 6 satellites were visible. The best standards were the Eaglenest Pass 2780m and Bompu 1940m. Other less useful or less accurate standards are Bra Top 3215m, Lama Camp GREF shed 2400m, and Chakoo 2405m.

Alphanumeric markers (have been placed at regular intervals (less than 0.5 km in distance or 25m in altitude, whichever sooner) and also at prominent locations (water falls, rivers, etc). The labeling was done in stages while staying in different campsites and so there is a well-defined progression of markers in both directions away from a campsite. However, this campsite-centric measurement has produced discontinuities and even reverse progression in the overall sequence.

I chose to mark location labels rather than paint actual distance and altitude values on the signboards. This is because I had to measure the values alone, on foot and in stages over 2 weeks. While the relative accuracy between adjacent locations is better than 5-10m in altitude there may be locations with significantly higher absolute errors (see previous discussion of problems in estimating absolute values). Any future corrections to compilations of faunal data are easier incorporated by assigning name labels to markers than displaying the actual values on them.

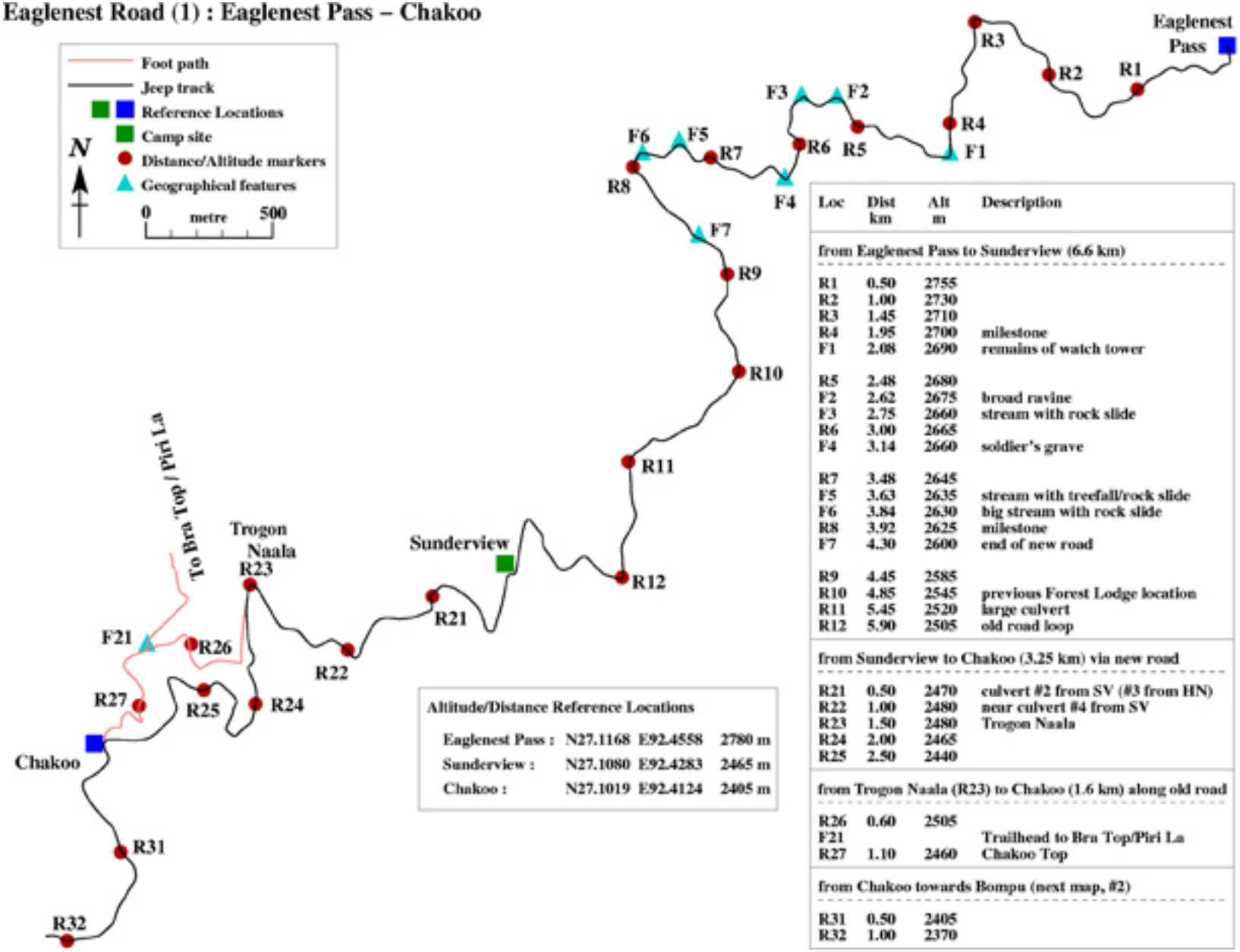
Road marker **R71** between Bompu and Sessni (see the road track on page 42 for details of R71).

Furthermore it is easier to specify a label to identify the location of a specific faunal record than just an altitude value.

The GPS tracks, marker labels and their altitudes and distances are shown on road tracks on pages 40-43. I hope this resource will be extensively used by visitors to contribute to building up the faunal distribution database for Eaglenest.

The birding in Eaglenest is mostly from the road. The close proximity of primary forest to roadside scrub has resulted in a birders' paradise

Eaglenest Road (1) : Eaglenest Pass – Chakoo

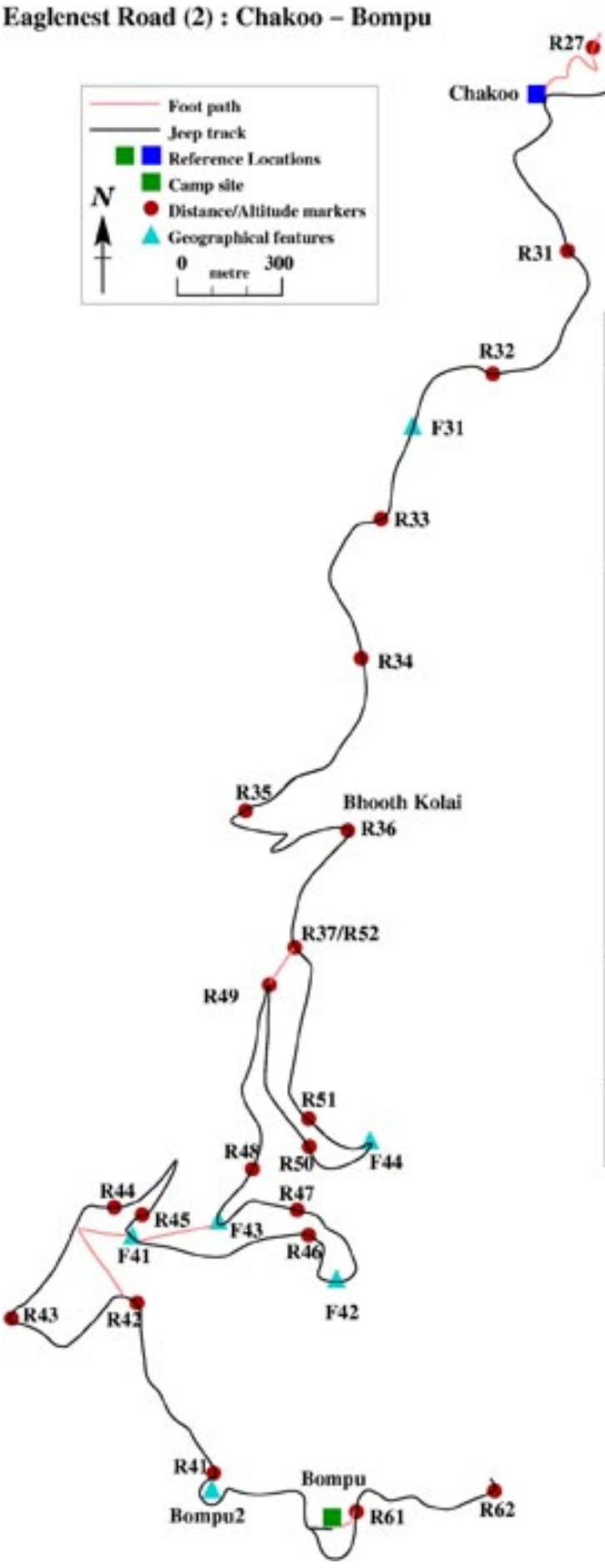


Altitude/Distance Reference Locations

Eaglenest Pass :	N27.1168	E92.4558	2780 m
Sunderview :	N27.1080	E92.4283	2465 m
Chakoo :	N27.1019	E92.4124	2405 m

Loc	Dist km	Alt m	Description
from Eaglenest Pass to Sunderview (6.6 km)			
R1	0.50	2755	
R2	1.00	2730	
R3	1.45	2710	
R4	1.95	2700	milestone
F1	2.08	2690	remains of watch tower
R5	2.48	2680	
F2	2.62	2675	broad ravine
F3	2.75	2660	stream with rock slide
R6	3.00	2665	
F4	3.14	2660	soldier's grave
R7	3.48	2645	
F5	3.63	2635	stream with treefall/rock slide
F6	3.84	2630	big stream with rock slide
R8	3.92	2625	milestone
F7	4.30	2600	end of new road
R9	4.45	2585	
R10	4.85	2545	previous Forest Lodge location
R11	5.45	2520	large culvert
R12	5.90	2505	old road loop
from Sunderview to Chakoo (3.25 km) via new road			
R21	0.50	2470	culvert #2 from SV (#3 from HN)
R22	1.00	2480	near culvert #4 from SV
R23	1.50	2480	Trogon Naala
R24	2.00	2465	
R25	2.50	2440	
from Trogon Naala (R23) to Chakoo (1.6 km) along old road			
R26	0.60	2505	
F21			Trailhead to Bra Top/Piri La
R27	1.10	2460	Chakoo Top
from Chakoo towards Bompu (next map, #2)			
R31	0.50	2405	
R32	1.00	2370	

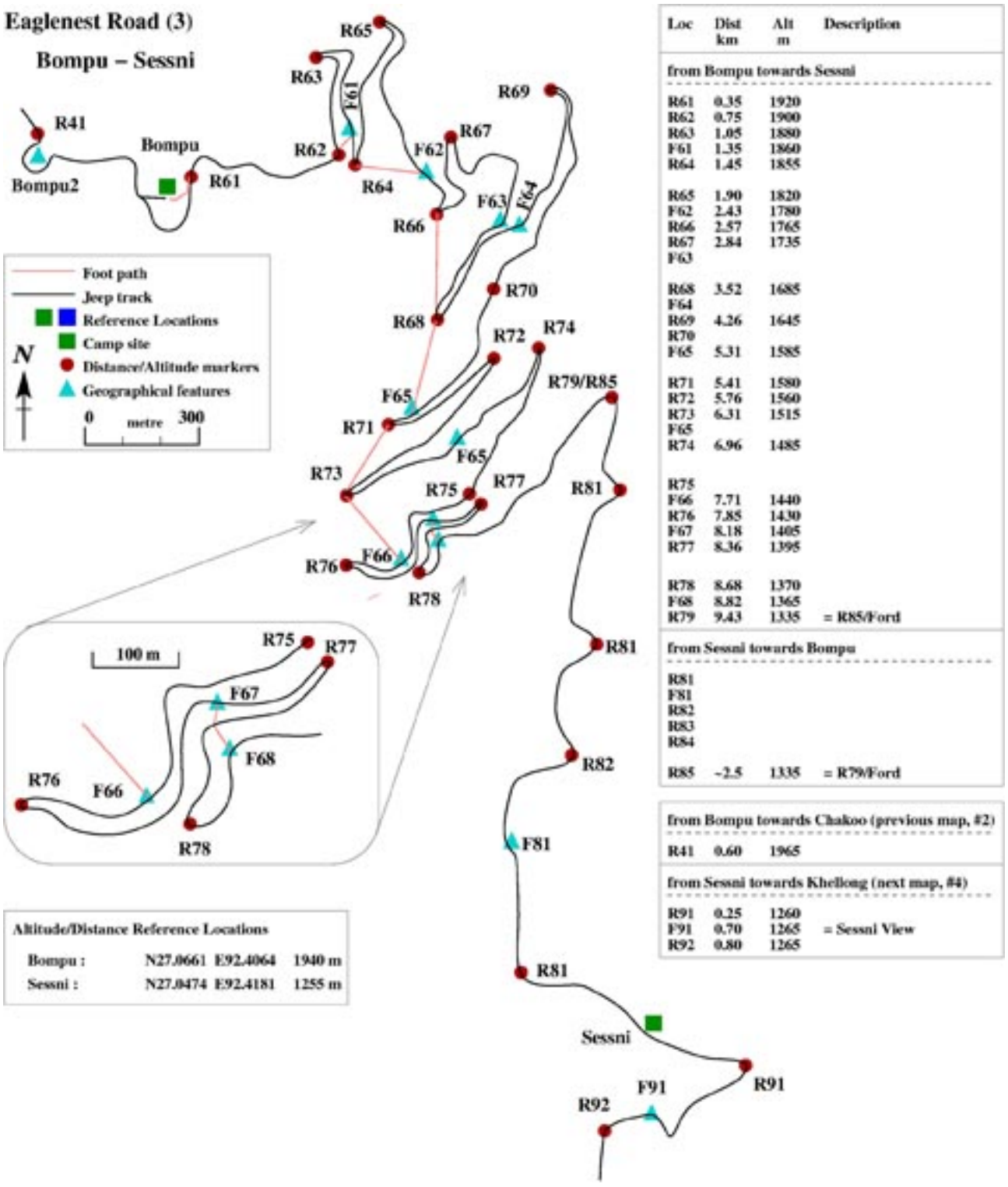
Eaglenest Road (2) : Chakoo – Bompu



Altitude/Distance Reference Locations

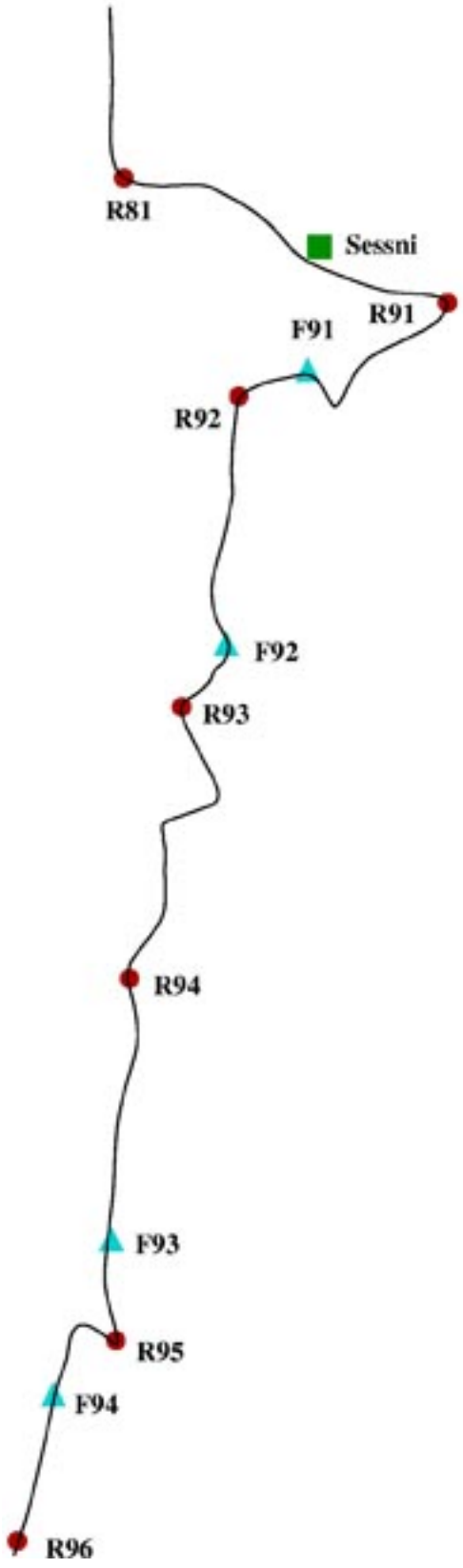
Chakoo :	N27.1019 E92.4124	2405 m
Bompu :	N27.0661 E92.4064	1940 m

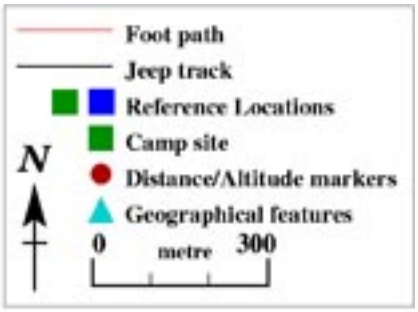
Loc	Dist km	Alt m	Description
from Chakoo (towards Bhooth Kolai) to R37			
R31	0.50	2405	
R32	1.00	2370	
F31	1.28	2360	paths down both slopes
R33	1.51	2375	milestone
R34	2.02	2400	remains of watch tower
R35	2.50	2380	
R36	3.10	2335	Bhooth Kolai
R37	3.50	2300	= R52; short-cut #1 (#3 from Bompu)
from Bompu (towards Chakoo) to R52			
R41	0.60	1965	
R42	1.17	2000	camp water source
R43	1.60	2025	
R44	2.08	2045	
R45	2.59	2085	
F41	2.68	2090	between shortcuts #1 and #2
R46	3.13	2120	
F42	3.32	2130	BIG curve; old shortcut to Bompu
R47	3.63	2150	
F43	3.88	2165	shortcut #2 exit
R48	4.07	2175	
R49	4.62	2215	shortcut #3 (entry)
R50	5.14	2250	
F44	5.36	2285	Trogon Bend
R51	5.66	2270	
R52	6.10	2300	= R37; shortcut #3 (exit)
from Chakoo towards Sunderview (previous map, #1)			
R25	0.75	2440	via new road
R24	1.25	2465	via new road
R27	0.6	2460	via old road – Chakoo Top
from Bompu towards Sessni (next map, #3)			
R61	0.35	1920	footpath descends onto the road
R62	0.75	1900	Last View Corner



Loc	Dist km	Alt m	Description
from Bompu towards Sessni			
R61	0.35	1920	
R62	0.75	1900	
R63	1.05	1880	
F61	1.35	1860	
R64	1.45	1855	
R65	1.90	1820	
F62	2.43	1780	
R66	2.57	1765	
R67	2.84	1735	
F63			
R68	3.52	1685	
F64			
R69	4.26	1645	
R70			
F65	5.31	1585	
R71	5.41	1580	
R72	5.76	1560	
R73	6.31	1515	
F65			
R74	6.96	1485	
R75			
F66	7.71	1440	
R76	7.85	1430	
F67	8.18	1405	
R77	8.36	1395	
R78	8.68	1370	
F68	8.82	1365	
R79	9.43	1335	= R85/Ford
from Sessni towards Bompu			
R81			
F81			
R82			
R83			
R84			
R85	~2.5	1335	= R79/Ford
from Bompu towards Chakoo (previous map, #2)			
R41	0.60	1965	
from Sessni towards Khellong (next map, #4)			
R91	0.25	1260	
F91	0.70	1265	= Sessni View
R92	0.80	1265	

Eaglenest Road (4) : Sessni and lower





Altitude/Distance Reference Locations

Sessni :	N27.0474	E92.4181	1255 m
Khellong View :	N27.0278	E92.4132	1255 m

Loc	Dist km	Alt m	Description
from Sessni towards Khellong			
R91	0.25	1260	Big stream
F91	0.70	1265	Sessni view
R92	0.80	1265	
F92	1.25	1290	stepped culvert
R93	1.35	1300	view point
R94	1.95	1320	
F93	2.05		
R95	2.55	1290	hairpin bend
F94	2.78	1270	New Khellong clearing
R96	3.05	1255	Khellong view
from Sessni towards Bompu (previous map, #3)			
R81			

3.3 Place descriptions

3.3.1 Ramalingam (1780m; 1200 – 2000m)[4]

Ramalingam is on the northern slopes of Eaglenest. It is 8 km along a winding mountain road above Tenga and Singchung though local people cut across the steep slopes to cover the distance in less than 30 minutes. Ramalingam is in a terminally degraded area with a mosaic of extensive farmland, heavily eroded slopes, pine trees maintained by regular burning of undergrowth and fruit plantations.

Nevertheless, Ramalingam is a good place to look for animals of open habitats which are difficult to see in the intact forest inside the sanctuary. In particular Wallcreeper has only been seen in this area. Other birds only or best seen here include Yellow-breasted Greenfinch, Hodgson's Redstart, Cinnamon Tree-Sparrow, Golden Bush-Robin, Red-headed Tit, Ultramarine Flycatcher, Grey-Collared Blackbird, Common Buzzard etc. The open areas are also good for butterflies.

Ramalingam has a Forest Rest House and the residences of some Forest Department staff. There is no electricity and the nearest provision shop is 5 km towards Tenga.

3.3.2 Lama Camp (2350m; 1500 – 2850m)

Lama Camp is 10 km beyond Ramalingam FRH and midway between the latter and the Eaglenest Pass. The Eaglenest Biodiversity Project has plans for making Lama Camp a research station to facilitate its field activities. The Bugun community has set up the Phua Rung facility for visitors at Lama Camp. It consists of several large tents (3m x 3m), a large canopied dining area and toilet facilities.[5] On a clear day visitors can savour spectacular views of the mountain on the Tibetan border while having their breakfast in the dining room. There are also several concrete shacks 1 km further up the road which can be used by visitors.

Phua Rung camp. The dining room is on the extreme left

[4] The first altitude is of the campsite; the range is that accessible to a hiking party during a daily foray.
[5] The facility was set up in March 2006 using the funds provided by the Ford Foundation.

View from Phua Rung dining room. The not-so-distant snow-peaks mark the Tibetan border

Clear days are however at a premium at Lama Camp as it falls in the cloud-forest zone. Nevertheless Lama Camp is one of the top birding locations in that area. Its combination of intact forest adjacent badly degraded scrub makes available a variety of niches to birds and birdwatchers. The new species Bugun Liocichla *Liocichla bugunorum* was discovered in Lama Camp. Other birds which have been seen in the vicinity of the campsite are 5 species of Wren-Babblers, Fire-tailed Myzornis, Blue-fronted Robin, several *Ficedula* flycatchers, Rusty-bellied Shortwing, many species of Laughing-thrushes, Slender-billed Scimitar-Babbler, Yellow-rumped Honeyguide, Beavan's bullfinch, etc. Several individuals of the rare agamid *Mictopholis austeniana* have also been observed in that area.

A broad foot path ascends from the road to the ridge about a kilometre above Lama Camp. This trail, which I have very appropriately though somewhat unimaginatively named the Tragopanda Trail, passes through an excellent stretch of temperate broad-leaved forest with an understorey of rhododendron and bamboo, which seems tailor-made for tragopans and red pandas! Indeed I have seen temminck's tragopan on two occasions (out of 3) along that trail while others have seen red pandas. The path skirts a 1 ha. pool at about 2650m altitude. Ward's Trogon, Green Shrike-Babbler, Spotted Laughing-thrush, White-browed Shortwing, Rufous-fronted Tit and Yellow-bellied Bush-Warbler have also been seen there. The path tops the ridge at 2850m and descends into a slope of extensive bamboo.

3.3.3 Eaglenest Pass (2780m)

The pass is the northern boundary of Eaglenest along the road. The road runs along the boundary of Sessa orchid sanctuary along the edge of a very steep hillside all the way from Sunderview till Lama Camp. The nearest campsites are Lama Camp (10 km) and Sunderview (6.75 km). Local people camp on the road while collecting bamboo but this is not recommended as it is a favourite haunt of elephants and the cold wind can be very sapping.

The area has extensive bamboo along with oak, birch and rhododendron. The vegetation is rather scrubby but the area has a lot of special birds of the higher elevations of Eaglenest. Birding can be seriously depressed by strong winds. Red pandas have been seen in this area.

There are no off-road foot paths in that area. There used to be a logging track descending into Sessa somewhere between Lama Camp and Eaglenest but is now fully overgrown and not useable. I will be proposing the clearance of a ridge trail from Eaglenest Pass to Bra Top and Pirila along the sanctuary boundary. This would be the most convenient way of accessing the highest altitudes of Eaglenest.

3.3.4 Sunderview (2465; 2300 – 3200m)

Sunderview has a couple of concrete sheds, a site for tents and water piped in from a nearby stream (in bamboo pipes!). This was an thriving labour camp during the recent road construction activity. The labour force have all moved out after construction stopped in 1998 but pending a final decision on the issue by the Supreme Court of India a sentry has been posted to keep an eye on the sheds.

Sunderview camp. Photo by Mike Waite

Sunderview is the equivalent of Lama Camp in terms of altitude, vegetation, excellent birding and of course mist and rain, rather more of it. A tour group with a vehicle for moving inside the sanctuary would be better off staying at Lama Camp and Bompu. On the other hand for those trusting to their feet to get around the sanctuary Sunderview is a compulsory camping site. Areas between altitudes 2300m and 3200m are within 6-7 km of this campsite.

Eaglenest Pass, Bra Top/Pirila and the Chakoo-Bompu road are all within a comfortable day's birding hike. The state of the road between Sunderview and Chakoo, which bore the brunt of the new construction, is the worst in the whole sanctuary. The slope above Sunderview periodically deposits a massive slide on the road from time to time. The soil and the drainage of the road is poor resulting in soft patches. Of course this is not an issue for trekking parties. For tour parties with vehicles Sunderview is a convenient dividing point – the areas below are best visited while camping in Bompu and the areas above are conveniently explored from Lama Camp.

The Sunderview campsite itself is very good for birds. The new road alignment excised a loop of the old road starting at R12. This loop is somewhat overgrown but is good for birds – Common Hill-Partridge, Temminck's Tragopan, Ward's Trogonhave all been seen here.

The vegetation along the path from Sunderview to Eaglenest Pass is quite similar to that between Lama Camp and Eaglenest Pass. It consists of a lot of bamboo, degraded temperate broad-leaved forest with a lot of scrub and some conifers.

The stretch between Sunderview and R22 and again between R23 and Chakoo does not offer great birding by Eaglenest standards because of the damage caused by road construction (high embankment on one side and steep valley on the other) though some good birds are occasionally seen there. The stretch between R22 and R23 is excellent for birding and abounds with mixed flocks. Ward's Trogon has also been seen there on several occasions.

Bra Top-Pirila Trail (2500-3200m): A signposted trail starts from F21 and follows an elephant trail up to the ridge at Bra Top. The trail is steep and requires moderate levels of fitness. It passes under the forest canopy first through good forest and then extensive bamboo at about 2900m where I have seen Red Panda and Temminck's Tragopan (simultaneously!) and also Fulvous-fronted Parrotbill. The path passes through excellent birch forest to eventually reach the ridge-line at a fork at about 3100m. The right branch goes further up to Bra Top at 3215m. The left fork goes to Pirila Pass from where the path descends to Rupa town in the Tenga valley. Bra Top is a flat, open,

marshy area ringed by bamboo, birch and fir. There are several marshy pools in that area above 3000m. Bra Top is probably not the highest peak in Eaglenest. The topo sheets indicate another peak 50-75m higher away to the north-east but I have not meet anyone who has visited that peak nor could I see it through the heavy mist when I went up Bra Top.

Chakoo-Bompu Road (2300-2400m): Chakoo used to be the biggest labour camp of the area while the road was being constructed in the 1950s. Evidence of that is amply available in the lack of trees in that area – Chakoo lies in a large meadow. Chakoo has gone down into the folklore of the Great Indian Election spectacle as the "remotest-election-booth-with-3-voters". There was such a news item even during the last election though I am not sure how they roused up those 3 voters and where they voted. There are no people living there now. There is no water source nearby and so Chakoo is not a convenient place for camping.


Hanging moss and Ward's Trogon characterize the excellent temperate forest between Chakoo and Bompu

The stretch between Chakoo and R37 has one of the finest areas of Eaglenest. The road runs along a flattish ridge and the tall temperate forest starts right at the road's edge. This area is the haunt of Fire-tailed Myzornis, Vivid Niltava, Tragopans (perhaps both species), Rufous-bellied Shrike-Babbler, Common Hill-Partridge, Ward's Trogon, Shortwings, Blue-fronted Robin, etc.

3.3.5 Bompu (1940m; 1300-2400m)

Bompu is a corruption of bamboo which is found in abundance all around the campsite. Bompu was the principal labour camp for the recent round of road construction activity and includes two sites separated by about 300m. The main Bompu site is a flat knoll with a grand view of the hill slopes all the way down to the Assam plains in the distance, where the lights of Missamari can be seen twinkling on clear nights. There are several serviceable shacks in Bompu as well as places for many tents. Water is piped in from a nearby stream. Two families of GREF sentries still live in Bompu.


Bompu is clothed in vast stands of bamboo, which gives the location its name

The depredations of the large labour force billeted in Bompu have created a mosaic of habitat types from very open fields to dense forest. Finches, Tesias, Blyth's Tragopan, Chestnut-breasted Hill-Partridge, Parrotbills, 3 species of Shortwings, and vast flocks of babblers and warblers of many species make for one of the finest birding experiences anywhere in India. Mixed flocks of Beautiful Nuthatch and Cutias, and Rufous-necked Hornbills are regularly encountered in the slopes below Bompu (towards Sessni). Other than Lama Camp the new *Liocichla* species has only been seen in the Bompu area. The rare butterfly Bhutan Glory may also be seen in this area.

The road towards Chakoo passes through excellent mixed temperate broad-leaved and bamboo forests with very good birding. There are also three shortcuts which provide access to the forest floor under primary forest canopy (for herpetofauna and birds of the forest floor).

The road to Sessni descends down the steep hillside in a series of sharp hairpin bends. The road through the steep slope has resulted in substantial degradation of the original vegetation but the proximity of untouched forest just a little way off the road has resulted in a vibrant and diverse bird community along the roadside scrub. The distance from Bompu to Hathi Naala (R79/R85) is 9.5 km along the road but a series of very steep shortcuts allow local people to cover that distance in 45 minutes. These shortcuts are excellent for encountering hill-partridges which is confirmed by the number of noose traps (laid by road construction workers) that may be seen along them. They also provide access to the forest floor though the forest is in a worse shape than above Bompu.

3.3.6 Sessni (1255m; 1000 – 1500m)

Sessni camp site is named after the profusion of sessni (local name for stinging nettle) in the vicinity. The fecund growth of lush vegetation – creepers, undergrowth and all – is indicative of the location of Sessni in the upper tropical zone. Sessni has two large sheds and a flat area suitable for camping but elephants can be a problem for campers between May and November .

Sessni is very good for birds – Sultan Tit, Wedge-billed Wren-Babbler, Rufous-necked Hornbill, Beautiful Nuthatch, Long-tailed Broadbill, Grey-headed Parrotbill, Coral-billed Scimitar-Babbler, White-gorgeted Flycatcher, Red-faced Liocichla, many Laughing-thrushes and huge mixed flocks of babblers and warblers.

Sessni is also very good for herpetofauna and butterflies. The only disadvantage of Sessni is that there is little change in elevation in the 4-km stretches of the road on either side of Sessni but the area is so rich that that is not of much concern.

The road exits from the sanctuary 3-4 km below Sessni (*below* in a generic sense, i.e. towards Khellong and Assam, though the road climbs on both sides of Sessni) and one enters extensive patches of degraded scrub and remnant forests all the way down to Khellong.

3.3.7 Khellong (750m; 500 – 1000m)

Khellong is outside the sanctuary area in a vast open field. The Forest Department has a few shacks in various stages of disrepair but which can be used as an alternative to camping. The forest around is badly degraded though there are good areas away from the road. There are good birding areas about 3 km along the road below Khellong. Khellong is also good for herpetofauna and butterflies.

3.3.8 Doimara (450m; 300 – 500m)

Doimara is an outpost of the Sherdukpen community of Rupa. It used to be a thriving hub of a saw mill operation prior to the Supreme Court ban on unsustainable timber operations in 1996. Now there are only a few families eking out a living from subsistence farming. One can stay in some of the houses lying empty with the permission of the Gaon Booda (=Village Elder) or one can camp inside the electric fence surrounding the entire village to keep out elephants.

The area is good for herpetofauna and butterflies. It is also probably good for birds though I haven't spent much time looking for birds there. Pakke is a much better lowland locality for birding (the forest is better preserved) though Pakke requires a higher investment of time to visit from Eaglenest. Future exploration may show that this area is good for lowland birds (a very likely outcome) making Eaglenest a complete location for birds from the foothills all the way to 3200m.

3.3.9 Other areas inside Eaglenest

There are several other areas of Eaglenest which I haven't had the time to personally explore. There is a footpath from Shergaon to Doimara through the lower elevations. There is the footpath from Rupa to Chakoo through the Pirila Pass. I have already mentioned the timber track which descends into the Sessa valley from midway between Lama Camp and Eaglenest Pass. My Bugun friends

once went on a community trek from Eaglenest to Sessa village (across the Sessa ridge and down to the village on the Bhalukpong-Bomdila highway). There used to be a regular trail which with some effort can be opened up to introduce tourists to a new area. Old hunters also mention the first track cut by the Indian army in the 1950s to pull up artillery pieces which directly climbs up the Sunderview valley to Eaglenest Pass.

3.3.10 Areas around Eaglenest

Eaglenest is an excellent showcase for biodiversity between 400m and 3000m. Other areas in the vicinity like Kaziranga (50m; grassland and woodland), Nameri (100m; swamp forests), Pakke (100-300m; lowland evergreen foothill forest) and Dirang (1500-4200m; conifers, alpine scrub etc) complete the suite of biodiversity of this region. A description of those areas is beyond the scope of this report but they have been described in detail on the project webpages[6].

3.3.11 Confusion in names

Bra Top – Pirila: The Pirila Pass is an old route used by the Rupa community to walk to Doimara and the trail is named the Pirila trail. By association the Bra Top peak has acquired the name Pirila as well, to which my earlier report (Athreya & Kartikeyan 1995) was partly responsible. But Bra Top and Pirila are two separate locations, and as the names clearly indicate the former is the peak while the latter is a mountain pass (la = pass, as in Sela and Bomdila) at a lower elevation further south-west along the ridge. I found the name Bra Top in a Survey of India topo sheet.

Hathi Naala: Local wisdom has it that the stream at R23 (between Sunderview and Chakoo) is the same one which flows over the road at R79/R85 between Bompu and Sessni and so both are named Haathi Naala. They are actually different streams, which I confirmed by carefully studying Google Earth images in 3-dimensions. The lower stream (R79/R85) sees a lot of elephant activity and should retain the term Haathi Naala (= elephant stream). I use the term ***Trogon Naala*** for the upper stream but visitors must be aware of the earlier ambiguous name which is more widely used by the locals.

[6] http://www.clsp.jhu.edu/people/zak/ramana

Biodiversity Portfolio – 6

***Primula* sp.**

Section 4

Faunal Inventory

We focused on inventorying four faunal groups in Eaglenest – birds, reptiles, amphibians and butterflies. We also encountered many other species at Eaglenest but we neither had the time nor the expertise to document them – fungi, insects, spiders, other invertebrates, orchids, mammals, and of course top quality forests with plants which will probably occupy botanists for years to merely identify them. I have displayed the images of those we photographed on the Eaglenest Biodiversity webpages at http://www.clsp.jhu.edu/people/zak/ramana . Some of them may also be seen in the photo-portfolio on the biodiversity of Eaglenest included in this report.

4.1 Bird survey[1]

4.1.1 Goals

Several of us had already visited Eaglenest before this project (Athreya & Kartikeyan 1995; Singh 1994; Singh 1999) and Choudhury (2003) had recently published the results of a bird survey in Eaglenest. So I did not expect the project to add many birds to the species list nor result in many range extensions. The goals, which were all achieved, were to

1. Determine the seasonal/altitudinal distribution of birds
2. Compile a library of birdcalls for Eaglenest
3. Identify good birdwatching areas at higher (in Dirang; 1500-4200m) and lower (in Pakke-Nameri; 100-300m) altitudes than easily accessible in Eaglenest to develop a complete bird tour covering the entire elevational range in that region.

4.1.2 Field Methods

The dates of the field visits are listed in Sec. 1.2.4. The bird survey was carried out by regularly walking along the Eaglenest road noting visual and aural records of species as well as the altitudes using the markers described in sec. 3.2. Initially I had intended to put numbers to species abundance and so planned for two visits in spring/summer and winter exclusively for counting bird across the altitudinal range. However the community ecotourism effort in March-April 2004 took all my time and I could only make one bird-counting trip in December 2004. Pratap Singh carried out the May 2004 bird survey but we found it difficult to reconcile the biases inherent in our observations to make any meaningful quantitative comparisons. On the other hand the bird tours actually improved the volume of data we collected. The focused effort at finding birds by many pairs of very intent eyes yielded more birds, especially the rarer species, than I had expected. In summary, this project has resulted in a more complete qualitative idea of bird distributions inside Eaglenest and its surrounding areas (Kameng Protected Area Complex) than what we had planned for; quantitative estimates of bird distributions await future efforts. The approximate number of man-days spent observing birds in the field (excluding travel, getting permits and loss to weather) are as follows:

	man-days	**Birdwatchers**
November 2003	10	Ramana Athreya
March-April 2004	40	Ramana Athreya + 1st bird tour participants
May-June 2004	25	Pratap Singh + Shashank Dalvi
October 2004	04	Ramana Athreya
December-January 2004	25	Ramana Athreya + Dhananjai Mohan
December-January 2005	5	Ramana Athreya
March-April 2006	160	Ramana Athreya + participants of 2nd and 3rd bird tours

[1] Ramana Athreya, Pratap Singh, Shashank Dalvi, Dhananjai Mohan + bird tour participants (see sec. 1.2.3)

One problem I had not appreciated was that counting birds cannot be combined with any other activity like recording birdcalls or photography – at least not with the budget this project had. I had planned on counting during the morning hours and doing the other things the rest of the time but the lack of a vehicle (which I had not planned to use inside the sanctuary) made that impossible. It also requires more support staff than had been budgeted for.

4.1.3 Highlights

The number of species recorded during the survey strongly supports my initial feeling (before the start of the project) that the Kameng Protected Area Complex is one of the *birdiest* areas of India! As explained earlier Eaglenest in itself contains all the altitudes and habitats of KPAC and every species in KPAC should be found within Eaglenest. We recorded a total of 454 species in KPAC (total list now has 505 species) and an additional 20 and 54 species in Dirang/Tawang and Kaziranga, respectively. The checklist for KPAC and Dirang/Tawang now stands at 538 species. We also added some 45 species to the Eaglenest list which is now at 399.

Of the species seen during the project in the Kameng Complex and Dirang 19 are in the IUCN red list (9 Near Threatened, 8 Vulnerable, 1 Endangered and 1 Critical). Of these white-winged duck, Rufous-necked Hornbill, Great Pied Hornbill, Ward's Trogon, Beautiful Nuthatch, Rufous-throated Wren-Babbler and Wedge-billed Wren-Babbler are relatively easy to encounter. Small flocks of 1-12 Black-necked Cranes have been regular winter visitors to Dirang for many years now. In March 2006 we heard and saw many individuals of Chestnut-breasted Hill-Partridge and Blyth's Tragopan.

However the rarest and most exciting species of the project must surely be the babbler Bugun Liocichla ***Liocichla bugunorum*** **sp nov** that I discovered in Eaglenest during the course of this project. As of now we only know of a definite population of 14 birds.

This project has also yielded range (geographic and altitudinal) extension of over 75 species.

We have also recorded the vocalizations of over 150 species from Eaglenest on digital media. An initial compilation has already been used to call out rare and difficult-to-see species during bird tours. These calls will be useful in estimating the populations of some of the rare species.

4.1.4 Detailed Data

The data on all the bird species have been organised in the appendices of this report as follows:

1. Appendix A-1 presents the full checklist of western Arunachal Pradesh including the seasonal and altitudinal distribution of birds inside Eaglenest in a qualitative manner.
2. Appendix A-2 presents notes on species with range extensions
3. Appendix A-3 describes the status of IUCN red data book species and endemic species

4.2 Herpetofaunal survey[2]

4.2.1 Goals

To the best of our knowledge no one had ever carried out a survey of herpetofauna at Eaglenest; at least there is no data publicly available. The nearest survey was the one carried out by Pawar & Birand (2001) in the lowland forests (alt. 100-300m) of Pakke tiger reserve. So we focused on documenting as many species as possible.

4.2.2 Field Methods

The dates of the field survey are given in sec 1.2.4. Given the rather cold and overcast weather we spent more time at elevations below 2000m.

The survey was mostly restricted to the road and accessible areas in its vicinity. A portion of the time was spent inside the forest on shortcuts and elephant trails. Streams and roadside water channels were also searched, especially for amphibians. The survey team typically consisted of 1-3 researchers and 1-2 locals. We usually did a search in the morning, another around dusk and a final one after 9.00 PM. We looked for active reptiles (moving about or basking in the sun) as well as for those resting or hiding beneath rocks, logs, bark, leaf litter, culverts etc. Amphibians were partial to water-side vegetation but were also found under rocks, on trees and in holes in road cuttings.

Reptile identification Reptiles were caught, identified, photgraphed and released in the same place thereafter. An identification was made only after examining the scalation in detail and obtaining morphometric measurements where needed as per the standard identification guide. We did not have permits for collecting specimens and so identification was done on live animals, in the field. Consequently, dentition and other internal characters, though important, could not be observed for any of the animals. In case of abundant species (some lizards) only the first 3-5 individuals were rigorously identified by the above methods; subsequent individuals were identified visually without catching them. A 10X magnifying glass, a 2.5X head loupe and a Nikon D70 digital camera with a 60 mm micro lens were used to examine the animals in detail. Length measurements were taken with a digital vernier caliper (1mm accuracy for the longer lengths, viz. tail, total, etc, and 0.1 mm accuracy for the smaller ones, viz. tympanum, eyes, head shields etc). We also photographed some animals on graph paper for subsequent measurements. Acrylic snake tubes were used to restrain snakes, especially venomous ones, to avoid stressing the snakes and the team members during the identification process. The identification references used in the field included Bauer (2003), Das (2002), Eremchenko (2002), Ouboter (1986), Smith (1935, 1943), Whitaker & Captain (2004).

Amphibian identification This effort has relied on a rather eclectic set of resources including published literature, internet pages, expert opinion and, I suspect, some leaps of faith. Therefore, reader beware! All identifications are tentative. Some of the references include Ao & Bordolai (2004), Ao, Bordoloi & Ohler (2003), Bordolai et al (2002), Dubois & Ohler (1999), Dutta (1997), Frost (2002), Inger & Dutta (1986), Wogan et al (2003). Researchers who helped with the identification include Firoz Ahmed (Herpetologist at Aaranyak, Assam), Samraat Pawar (University of Texas), Guinevere Wogan (California Academy of Sciences), and Nikolai Orlov.

4.2.3 Highlights

We recorded 34 species of reptiles (24 snakes, 3 geckos, 3 agamids and 4 skinks) and 35 species of amphibians. Many of these species were being photographed live for the first time. Photo-

[2] Reptile survey team: Ishan Agarwal, Ramana Athreya, Viral Mistry, and Shashank Dalvi
Amphibian survey team : Viral Mistry and Ishan Agarwal with some help from Ramana Athreya and Shashank Dalvi.

documentation of live specimens is very important as the method of preservation of specimens in the museum often destroys their colour.

Our survey yielded many rare species, rediscoveries after close to a century and possibly even new species.

Reptiles The stand-out package of the survey was the rare agamid *Mictopholis austeniana*. It was so far only known from the type specimen (as several web pages and references around the world mention) collected by Col. Godwin-Austen during the Dafla expedition of 1874. Ours was the first live specimen to be photographed. Subsequently we found a few other mis-identified specimens tucked away in the collections of the State Forest Research Institute, Itanagar, and Zoological Survey of India, Kolkata. We also encountered a specimen of the Darjeeling False-wolfsnake *Dinodon gammiei* which was only known to science through 5 specimens and hitherto only from Darjeeling. Other rare species included *Japalura andersoniana, Oligodon cinereus, Pareas monticola*, and snakes of the genus *Amphiesma* which are yet to be definitively identified but may turn out to be a long-forgotten taxon which needs to be elevated to species rank (Patrick David, pers. comm.).

Amphibians The results from the amphibian survey were more ambiguous. We encountered a large variety of some spectacular frogs but the identifications are a lot more tentative in most cases. Clearly, we are grappling with a very exciting group with a large fraction of unknown or poorly known taxa but equally clearly it requires a lot more professional expertise than we are capable of bringing into the case.

4.2.4 Detailed Data

The herpetofaunal data from the survey have been organised in the appendices of this report as follows:

1. Appendix A-4 presents the data of the reptiles that we encountered during this survey
2. Appendix A-5 presents details of our rediscovery of *Mictopholis austeniana*
3. Appendix A-6 presents details of the snake Darjeeling False-wolfsnake Dinodon gammiei
4. Appendix A-7 presents data on the amphibians we encountered during this survey

4.3 Butterfly survey[3]

The butterfly survey was principally carried out during 2 weeks in October 2004 and a week in May 2005. The survey for butterflies was seriously affected by lack of sunshine - in subtropical and temperate forests in the mountains even a brief lack of sunshine leads to a discernible drop in warmth and the activity levels of cold-blooded animals. I was told that the best time for butterflies was the brief periods of sunshine during the peak of the monsoon in August but then for each day of sunshine one has to stay immobile during 4 days of paralysing rain.

The identification guides used included Evans (1932), Wynter-Blythe (1957), Haribal (1992) and Smith (1993).

We recorded about 125 species during the survey taking the checklist for the area to 165 species, including the species from Pakke in Athreya & Kartikeyan (1995). We have also photographed about 65 of these species. Many of the species we recorded are listed as “rare” or “very local” by Wynter-Blythe (1957) though they did not seem to be uncommon at Eaglenest. Some of the rarer and more spectacular species included. Jungle-queen sp, Bhutan Glory, Grey Commodore, Dusky Labyrinth, Tiger-Brown, Scarce Red-Forester, White-edged Bush-Brown, White Owl, etc. Photographs of some of the rarer species may be viewed in Biodiversity Portfolio #8, 9 and 10 on pages 64, 74 and 80.

Much remains to be done and this survey should be seen as merely an appetiser to entice serious lepidopterists to the area.

[3] Butterfly survey team: Ramana Athreya, Viral Mistry, and Shashank Dalvi

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Invertebrates)

Hammer-headed Slug

Invertebrates, especially insects, comprise the bulk of animal biodiversity on Earth. Next to nothing is known of these animals in Eaglenest - simply cataloguing the invertebrates will keep many biologists busy for a long time

? Weevil sp.

? Weevil sp.

? Longhorn Beetle sp.

? ?

? Cicada sp.

? Tarantula in tunnel

? Mantid sp.

? Stick-insect sp.

? Leaf-hopper spp.

? Longhorn Beetle sp.

? ?

? (giant) Earthworm sp.

Ramana Athreya / Eaglenest Biodiversity Project / Kaati (funded by The Rufford-Maurice-Laing Foundation, UK)

Section 5

Promoting Ecotourism in Eaglenest

5.1 Birdwatching tours

5.1.1 The Pilot Bird Tour – April 2004

When I visited Eaglenest in November 2003 I had no thoughts of organizing a bird tour. The project was designed to ultimately facilitate bird tours organized by a local community tourism agency, but not for several years to come. It was to be documentation first. I talked to the Bugun community of Singchung village about my plans for biodiversity documentation and how it would help in attracting visitors to Eaglenest.

The Bugun were not convinced. They had heard of cultural tourists to Arunachal Pradesh and they had heard of ecotourists to Kaziranga but they did not believe that Eaglenest would attract substantial numbers of ecotourists – who would want to pay money to see a few birds? They suggested that I should first prove that ecotourism in Eaglenest was a viable proposition before any further discussion on conservation and such other issues.

I had never led a tour before, I had not even participated in a professional bird tour before; and the Buguns did not believe that anyone would pay good money to see birds. I was initially reluctant as a badly managed tour would have hurt my long-term plans considerably but the Buguns left me no choice. I agreed to run a demonstration tour putting my faith in a simple truth – *there was no way a bunch of birders could not see a tonne of birds in Eaglenest over 10 days* – learnt nine years previously and dusted off and reaffirmed in November 2003 as I watched the impossible sight of more than a dozen Ward's Trogons play follow-the-leader across a clearing! Eaglenest has more than its fair share of iconic species that international birders crave for – Wedge-billed Wren-Babbler, Fire-tailed Myzornis, Beautiful Nuthatch, Rufous-necked Hornbill, Ward's Trogon etc – and I had just seen them all the previous week. I had even watched a Red Panda for an hour while a covey of female tragopans had bustled about in the undergrowth below.

Several internet e-groups[4] were kind enough to permit a commercial-advertisement-for-a-good-cause on their non-commercial email groups. Three brave birdwatchers – Mike Waite from Britain, Claudio Koller from Switzerland and Ray Ziarno from USA – signed up for an unknown destination with an unknown bird guide!

Expectedly many things went wrong: the first vehicle broke down within the first half hour and we lost the first day; our sleeping-cum-dining room inside Eaglenest was just barely inhabitable; the replacement vehicle broke down six days later and we had to walk back 6 km uphill in the dark and bird the next two days without a vehicle; the monotony of the food was only broken by impossible quantities of chilly every now and then; I had to micromanage the campsite (especially hygiene and cuisine) as well as the birding. The only saving grace was, expectedly, the birds of Eaglenest!
The birding was a spectacular success (Waite 2004; Athreya 2004, 2005) – we got the Ward's Trogon and the Wedge-billed Wren-babbler! We had long leisurely looks at the Beautiful Nuthatch through a scope! And we got the Cutia and Rufous-necked Hornbill and 70 other species on an insane Easter Sunday; sanity was only restored that day by the jeep breakdown mentioned before. We ended with 185 species from Eaglenest and overall 360 species over 17 days including

[4]My special thanks to Krys Kazmierczak of OrientalBirding @ Yahoo! Groups, Vivek Tiwari of NatHistory-India @ Princeton.edu and Nitin Jamdar of Mumbai Birds @ Yahoo! Groups.

Kaziranga and Pakke. The visitors went home satisfied having seen many birds that international birders usually only associate with nearby, much, much more expensive, Bhutan.

Apart from birds we also observed a lot of mammals, especially in Kaziranga. We had the Indian Rhinoceros, Asian Elephant, Swamp Deer, Wild Buffalo, Hoolock Gibbon, etc

5.1.2 Lessons from the pilot tour

We learnt a lot of lessons from the birdtour, which was just as well as we made no money at all. In fact one of the main lessons was to be more realistic in estimating the costs!

Having seen a tour group conjured out of thin air the Buguns, led by Mr. Indi Glow, accepted that there may be money in conserving a forest. They appreciated the hard work put into making the tour a success and the substantial fee the tour contributed to the Bugun Welfare Society, a local non-profit NGO. They have ever since been of great help in this project. Several of them have played a central role in subsequent tours.

Identifying good vehicles was the top priority. Training the Buguns to completely take over the camp administration was equally important. In any case this was the idea behind starting the tours. The local cooks had to be taught a varied, even if simple, cuisine appropriate for foreign palates. Hygiene, punctuality and cross-cultural sensitivities also needed working on.

The tour schedule needed working on and visits to higher altitudes were essential. The bird distribution in April was somewhat different from my knowledge gained from visits in November and January. Several birds (e.g. fire-tailed myzornis) had already moved off to higher altitudes in April. The project needed to build up a good picture of the altitudinal distribution of birds across the tourist season from November to May, in Eaglenest and in the higher altitude areas of Dirang and Tawang. One of the advantages of including all altitudes from 50m (Kaziranga) to 4200m (Dirang) in a bird tour is that regardless of the intensity of winter the birds will be found somewhere along the transect, if one knows where to look for them.

5.1.3 Subsequent Tours (led by me)

I led two more bird tours this last season in March and April 2006. A grant from Ford Foundation enabled us to donate portable camping equipment to the Bugun Welfare Society and also construct semi-permanent facilities for tourists at Lama Camp. The money raised by renting out the equipment will be utilized by the Bugun Welfare Society in its local developmental activities. These tours also contributed a substantial fee to the Bugun Welfare Society.

The lessons from April 2004 stood us in good stead. Vidya Athreya guided the local cooks, Nima Tsering and company, in the art of cooking up a feast from available materials during the March 2006 tour. The latter did a commendable job by themselves during the April 2006 tour. Mr. Indi Glow spent considerable amounts of time managing the camp site tasks and he expects to handle it all by himself this year onwards. We chose vehicles with care and did not suffer a single breakdown. Nevertheless we always had a spare vehicle at the campsite against any eventuality.

The brief forays into the high altitude areas of Dirang and Tawang during the Rufford and Ford phases helped us in drawing up a schedule covering the entire altitudinal stretch from 50m to 4200m during a 18 day tour. We recorded 410 species during 18 days in March 2006 tour despite spending only a couple of days in Dirang and Kaziranga. In April 2006 we recorded 395 species despite skipping Kaziranga completely (the group wanted to concentrate on Arunachal Pradesh).

Fredrik Ellin and Peter Schmidt from the March 2006 tour. They are seen here exhibiting all the signs that experts will recognise as arising from a recent encounter with a Ward's Trogon.

Ward's Trogon. Photographed by Peter Schmidt in March 2006

During the course of the two tours I recorded a total of 485 species in Kaziranga and Nameri in Assam and Eaglenest and Dirang in Arunachal Pradesh. Even the list of just specialty species is too long for inclusion here. A summary of the two trips is available at Athreya (2006). More detailed reports on the two tours are available at Catsis et al (2006) and Ellin (in prep.)

Several groups are currently in the process of firming up their tours for the coming 2006-07 season.

5.1.4 Tours led by others

The web pages of the Eaglenest Biodiversity Project generated a lot of interest in Eaglenest and several other tour operators, including Gurudongma Tours & Treks (Kalimpong), Peter Lobo and Odati Adventures (Mumbai), brought in clients to Eaglenest. In all, 6 other groups visited Eaglenest between December 2005 and April 2006 consisting of some 40 visitors in all (plus the 9 I hosted).

5.1.5 Vacations-for-Conservation : A novel scheme

The 2005-06 birding season in Eaglenest was very good with some 50 visitors to the area, up from 3 during the previous two seasons. While the indications are good it is still too early to be sure if Eaglenest has crossed the threshold into being a prominent feature on the Indian birding circuit. It requires sustained visitor rates and consequent publicity on the web (email groups, trip reports etc) for several more years before on can be certain that the visitor flow becomes self-sustaining.

So I proposed the novel Vacations-for-Conservation programme at Eaglenest which was funded by the Ford Foundation. We (Indi Glow and I) organised two VfC tours, in March and May 2006. We offered to organize an inexpensive visit to Eaglenest for amateur naturalists. In return they would help us in documenting the biodiversity of Eaglenest. As I saw it this would benefit everyone involved:

1. This was a non-profit venture and the expenses were kept as low as possible. The participants got an organized vacation at one of India's top wildernesses in the company of experts who knew the area, at an unbeatable price. They also had the satisfaction of contributing to a conservation project while having fun.

2. The programme generated some local employment. The local community gained experience in handling ecotourists and also collected the tourist community fee from the participants.
3. The biodiversity inventory got extra manpower (in fact as much woman-power) at no cost and the data would help the ecotourism initiative.
4. The emails and reports of the participants going about on the internet will help keep the area in public view.

About 25 amateur naturalists participated in this first edition of VfC in March and May-June 2006. I intend to pursue this programme in a big manner in the years to come and expand it to other areas of Arunachal Pradesh as well.

VfC leader, Shashank Dalvi, refusing to accept the reality that a lizard gave him the slip

Image 1: VfC Participants, Kartikeyan and Priya, stalking an insect

The camp team - Kesang, Nima, Khandoo and Jetha - pose at Bompu. Photographed by Vidya Athreya

5.2 Publicity

5.2.1 Webpages of the Eaglenest Biodiversity Project

On completion of the Rufford project in January 2003 I designed a set of webpages for publicising the extraordinary wilderness and biodiversity of Eaglenest. The webpages is geared towards visitors interested in visiting Eaglenest. It provides information on logistics and detailed faunal lists and images This web resource has contributed in no mean measure to what has been achieved at Eaglenest. Apart from directly contributing to the ecotourism programme (both regular tourists adnd VfC) a host of scientists, educators and scientists from all over the world have contacted me after going through the webpages.

A sample webpage and details of information contained therein is presented in appendix A-10.

Perhaps the most important achievement of these webpages is that they brought the extraordinary biodiversity wealth of Eaglenest to the notice of the Central Empowered Committee of the Supreme Court of India. This apex committee deals with legal issues related to conservation all over the country and is currently processing the proposal of the Indian army to build a major highway through Eaglenest. The have used a portfolio of images of the wildlife of Eaglenest (from this project) in their report to bring out the importance of protecting Eaglenest.

5.2.2 Magazine Articles

We have also written articles in several niche magazines on Eaglenest and this project to promote the area. These include:

1. An article in **BirdingASIA** the magazine of the Oriental Bird Club, United Kingdom

   BIRDING HOTSPOT: Eaglenest Wildlife Sanctuary, Arunachal Pradesh, India
   by Ramana Athreya from BirdingASIA 4, December 2005.

   Also available on their webpage
   http://www.orientalbirdclub.org/publications/basiafeats/eaglenest.html

2. An article on the first bird tour covering Kaziranga, Pakke and Eaglenest in the October 2005 issue of **Outlook Traveler** a popular travel magazine in India

3. An article by Ishan Agarwal on the herpetofaunal survey in Sanctuary, India's leading wildlife and conservation magazine

5.2.3 Correspondence with Tour Companies

I have corresponded extensively with Indian and foreign tour companies in a bid to interest them in adding Eaglenest to their list of destinations. Several visited Eaglenest last season on a recce and several more are planning to do so this season. Some even brought along tour groups last season. This activity has to be sustained for several more years until tourism in Eaglenest reaches self-sustaining levels.

5.3 Community-based Ecotourism at Eaglenest

Eaglenest's multiple advantages with respect to ecotourism has always been obvious to me. The challenge during this project was to convince the world about it. The far bigger challenge was to use ecotourism as a vehicle for economic development of the local community as a whole and for the conservation of the area itself.

Any ecotourism initiative has to be run as a commercial venture and that requires sustained efforts from motivated and knowledgeable individuals. Loosely structured communities are incapable of providing the required direction and sustenance. Individual efforts will of course require individual remuneration. Furthermore, realistically speaking, ecotourism at Eaglenest is not capable of making the entire community rich; it may not even make anyone rich but it does have the potential to contribute its mite to the community development. The challenge was to find a model in which individual entrepreneurs with their motivation, ability and profit could co-exist with community substantial benefits to the community as a whole.

There are no universal solutions and some cases may be impossible. In my opinion Eaglenest had many advantages which gave hope that such a model could be found. The tribal communities around Eaglenest, Bugun and Sherdukpen, are not very numerous. The Buguns, whom I work with, number less than a thousand and the particular village of Singchung which claims the Eaglenest buffer zone and parts of Sessa as part of its ancient community land has a population of a less than 200. Thus even the small income that one can realistically expect during the initial years of ecotourism can make a significant difference to the community. Additionally much of the timber extraction currently going on in periphery of Eaglenest was to feed the furnaces of the army settlement in the Tenga valley often without much economic returns to the Buguns themselves. Eaglenest also does not have a serious land ownership problem. Though Eaglenest itself is claimed by Sherdukpens they have never had settlements inside the boundaries of the sanctuary.

I have proposed that local and outside tour operators may be freely allowed to bring tour groups and they may be allowed to earn their profits according to their abilities. However the local community will draw up a list of guidelines that these tour groups will have to follow (keeping in mind the health of the ecosystem). The tour operators should be encouraged to employ local people as support staff in the camps and all visitors shall pay a per diem entry fee to the local community in lieu of the fee usually charged by the Forest Department. The local community shall have the right and the responsibility of utilizing the money for its own development as it sees fit. That is private initiative and profit paying what is due to community development.

Some officers in the Arunachal Pradesh Forest Department asked for a report on promoting community-based ecotourism after the pilot bird tour (April 2004). There is actually a precedent from the Great Himalayan National Park (GHNP), Himachal Pradesh, where a society run by the local community and the forest department collect the revenue from ecotourism (and not the Govt. Treasury) and the money is spent on community development. My colleague Dhananjai Mohan discussed this issue with Mr. Sanjiva Pandey the Director of GHNP, who initiated the community partnership there. Based on that and my experience at Eaglenest I have written a report on the role that the Forest Department can play in facilitating this scheme in Arunachal Pradesh. The report is based on wisdom gleaned from both the Rufford and Ford phases of the Eaglenest Biodiversity Project though the actual writing happened during the Ford phase. It is presented in appendix A-12 of this report.

The Phua Rung Tourist Facility at Lama Camp was inaugurated on 10th April 2006 by a gathering of the Bugun community, special invitees from the Sherdukpen community of Rupa, and participants of the April 2006 bird tour. The facilities were funded by a grant from the Ford Foundation. Kaati Trust and Ecosystems–India were involved in the field work. The common area serves as a dining room, has a heater to help tired tourists relax at the end of the day, and will progressively be decorated with informative posters on the wildlife and conservation of Eaglenest.

Biodiversity Portfolio – 8

Harlequin Moth

A very cursory survey of the butterflies of Eaglenest has yielded 150+ species; the total is probably 500-600 species. Several Bhutan Glory, an endangered Schedule I butterfly, were encountered in Eagle- nest. Many species which are rare elsewhere, have been seen in good numbers in Eaglenest

Orange Staff-Sergeant

? Chocolate Demon ?

Fluffy Tit

Dusky Diadem

Red Lacewing

Junglequeen sp - rare

Striped Ringlet - rare

Ramana Athreya / Eaglenest Biodiversity Project / Kaati (funded by The Rufford-Maurice-Laing Foundation, UK)

Section 6

Conservation Strategy for Eaglenest

Issues, recommendations and future work

Some of the recommendations are listed under more than one subsection. This is unavoidable as many of these issues are inter-related and are only being categorized here for ease of reading and assimilation.

6.1 Community-based Ecotourism

The issue of ecotourism has been dealt with in Appendix A-9 in great detail. I will only mention the principal recommendations here for the sake of completeness:

1. Ecotourism at Eaglenest ***does not*** require massive investment in infrastructure and it ***does not*** require a major road through the sanctuary. It only requires basic camping facilities and low-level maintenance of the current road to keep it functional.
2. The Government should focus on streamlining and simplifying the issue of tourist permits and improving the security in the area.
3. The Government should take steps to formally hand over the responsibility of collecting ecotourism revenue and its utilization to a local community NGO. Such an NGO should be jointly managed by the representatives from the local communities as well as the senior Forest Officer of the area to ensure good co-ordination between the community and the Department and an appreciation by each of the other's point of view.
4. NGOs should organise training programmes for local personnel to handle visitors and carry out studies to assess the (negative) impact of tourism and propose ways to minimize them.
5. The Government should encourage research programmes ranging from simple documentation (absolutely critical for tourism) to more detailed studies. Research programmes cost the Department nothing and are a valuable source of publicity for the area apart from being an essential tool for managing the area.

6.2 Sanctuary administration

6.2.1 Lines of Authority

Both Eaglenest wildlife and Sessa orchid sanctuaries are in W. Kameng but are managed by the Divisional Forest Officer at Seijusa in E. Kameng district, who is also the Field Director of Pakke tiger reserve. The distance between Seijusa and Eaglenest is a major hindrance in the effective management of Eaglenest.

Additionally there are crossed lines of authority in an area (Eaglenest and Sessa) which should be managed under one authority as an integral whole. The actual areas of Eaglenest and Sessa are under the DFO (wildlife) at Seijusa. The northern approaches to Eaglenest through Tenga are under the control of Shergaon Forest Division (Territorial) at Rupa. The southern approach through the Doimara Reserve Forest is under the Bhalukpong DFO (Territorial?). So not only are there different officers but these officers come under different wings of the Forest Department who have very different and often conflicting goals.

My recommendations are as follows:

1. Pakke, Eaglenest, Sessa and surrounding areas must be viewed as one wildlife area to be managed under an integrated management plan which includes diverse elements such as wildlife protection, habitat improvement, social forestry for villages outside the periphery,

ecodevelopment, tourism, management of forest produce etc. Even if these activities are managed by different sections in the Forest Department the overall management must be under the authority of the Wildlife section as these are critical areas for wildlife. If clubbing officials of different wings under one authority is not administratively possible then the entire area must be solely under the wildlife wing.

2. The person in charge of the above area must be a person at the level of a Conservator of Forests or higher. A Divisional Forest Officer, under the authority of this Conservator, must be put in charge of Eaglenest with head-quarters at either Singchung or Rupa.
3. There must be a full strength Range Forest Office at every entry/exit point into Eaglenest (Ramalingam and Doimara), Pakke (Seijusa and Tippi) and Sessa (Sessa).
4. The posts in these Range Offices need not all be filled by permanent staff of the Forest Department. Local community members may be employed on a temporary basis using funds which have either been allocated through the Department or raised elsewhere. In particular a prominent, kowledgeable and motivated member of each community (Nishi in Seijusa, Bugun in Singchung and Sherdukpen in Rupa) may be appointed honorary Range officers or wildlife wardens for their neighbourhood with all the authority available to a regular Range Officer being made available to them for the purpose of patrolling and protection.

6.2.2 Protection and Enforcement

The Forest Department does not have the resources to patrol, protect and enforce wildlife laws inside Eaglenest. They require many times more personnel than they currently have in order to discharge their duties efficiently. During the last three years of this project at Eaglenest I have never had my entry permit checked, I have only once seen Department staff inside the sanctuary, and the forest gate was kept open to all comers at all times of the day and night.

Despite this hunting is not a major issue though there is a sharp spurt in hunters in the weeks leading up to the traditional New Year (Losar).

It would be better for the Forest Department to co-opt members of the local community in protection and law enforcement. Enforcement will be seen to be from the community rather than outsiders. The Department can seek other sources of funding (i.e Central grants, special allocations, community development schemes, etc) to pay for the expenses of such auxillary teams. This will also generate some additional employment in those areas. Furthermore this should also engender a sense of responsibility towards conservation of Eaglenest in the local community.

At the same time efforts should be made to educate the local communities of the biodiversity treasures in their backyard.

6.2.3 Research and Tourism Permits

There seems to be some confusion on the identity of the appropriate authority for issuing permits to visit protected areas. Of course this may largely be due to the fact that visitors have been few and far in between. With the Government of Arunachal Pradesh now taking an active interest in promoting tourism the Forest Department may want to clarify these issues and streamline and shorten the process of issuing tourist permits.

During the course of my visits to Arunachal Pradesh over the last decade I have had the fortune of meeting a lot of Forest Department officers who have been very helpful in facilitating my work there. It would have been impossible to work under those tough field conditions without their support. Nevertheless one gets the impression that there is an institutionalised mistrust of researchers. Researchers are indulged, not welcomed. Research projects are grudgingly permitted, not encouraged. Research is seen as a luxury, not a necessity.

Research should be seen as an essential management tool to ensure that management strategies are tailored to the needs of an area. The success of this project in attracting so many ecotourists last season was entirely due to the information we were able to provide, backed by images, on the fauna of the area. Issuing research permits in a timely manner will greatly benefit researchers and in turn help the Department in managing the areas under their responsibility.

My recommendations are:

1. The Divisional Forest Officers and the Range Forest Officers in charge of Pakke and Eaglenest may be authorised to issue short-term (10 days) tourism permits routinely.
2. The Forest Department should draw up a set of guidelines covering various categories of research (**by duration**: short-term, medium-term and long-term; **by techniques**: simple documentation, habitat modifying (clearing trails etc), capture of fauna and specimen collection). The Department may then consider delegating the authority for different categories to different levels down the hierarchy.
3. The Divisional Forest Officer in charge of Eaglenest may be authorised to issue short-term, simple research permits in a routine manner. The Conservator may be authorised to issue medium-term, research permits even if they involve some habitat modification. The Chief Wildlife Warden will continue to be the authority for long-term and invasive research permits involving capture and collection of animals.

6.3 Research projects

The accessibility of Eaglenest makes it one of the best places to carry out wildlife research in Arunachal Pradesh. This project has yielded valuable baseline data which I hope future researchers will utilize and build upon. Some of the projects I hope to take up in the coming years are:

1. Continue with the basic survey of the faunal groups already taken up
2. Encourage surveys of other faunal groups by experts in those fields
3. Augment the library of bird vocalizations and work with undergraduate ecology students and their teachers to analyse the birdcalls already collected. I need to first raise resources to buy professional audio software for analyzing the data in a manner useful to scientists.
4. Estimate the population of birds on the IUCN red list starting with Bugun Liocichla, Ward's Trogon, Wedge-billed Wren-Babbler, Chestnut-breasted Hill-Partridge and Blyth's Tragopan whose songs we have already recorded.
5. Initiate a study of the ecology of the new species Bugun Liocichla
6. Initiate studies of the ecology of some of the rare reptilian species.
7. Initiate a concerted taxonomic study of the amphibians of Eaglenest.
8. Determine the seasonal/altitudinal distribution of birds in a more quantitative manner.
9. Public and college talks to encourage students and their teachers to look at Eaglenest as a research site.

These tasks are not only scientifically interesting and important in themselves but are extremely important for sustaining the public awareness of and interest in Eaglenest for several years until the awareness and interest reaches a self-sustaining critical mass. It is also one way of reinforcing the message to the local communities that their heritage is a valuable one and valued the world over.

6.4 Eaglenest road

The question of upgrading the Eaglenest road into a highway has raised a lot of heat in that area. The army has its own reasons for wanting to build that road. I will limit myself to the civillian aspects. First of all there is the question of money that that big project will bring into the area – local contractors stand to earn business. The arguments for the road range from easy access to the plains of Assam to better development of the Doimara area. I have even been told that a highway will considerably improve the tourist appeal of the area.

One can argue back and forth about whether or not the road upgrade will develop the area and whether the quantum of development and the number of communities involved justify the expenditure. I will not even go into whether the number of people who will benefit from the road justifies the financial and environmental cost. I will only discuss here the effect that a major highway will have on Eaglenest. Arunachal deserves more roads but one can build roads where they do the least harm to the last remaining tracts of wilderness.

A highway through Eaglenest will devastate it – one can have a highway or one can have Eaglenest; to argue that the two can co-exist is wishful thinking at best. One only has to observe the developments along the Bhalukpong-Bomdila highway during the last 10 years to see where a main road will take Eaglenest. As it is the recent road-building activities have caused serious damage especially in the fragile high altitude zone.

The large labour camps which had been constructed inside Eaglenest have led to deforestation for firewood and construction material. I have seen many instances of hunting and trapping of animals by road construction teams. These labourers typically earn about Rs. 1600 per month (about 35

Hunting is rampant among the members of the road construction team. Snares (above) are laid for porcupines and phasianids (top-right). Deer and boar (drying over a fire on the right) are also hunted. The labourers are paid a pittance and the nearest market is 60 km away and it would be impossible to get them to stop hunting for essential protein. The only solution is to move them out.

US$) and have to support families of up to 6 members on that. It is but natural that they turn to the forest for fuel and protein that they cannot afford to buy. They also maintain flocks of goats which freely move about in the forest and are potential carriers of infection to wild ungulates. A hundred of these labourers billeted on the forest will strip the area clean.

The Eaglenest area has survived despite the lack of (wildlife) law enforcement because the present road is not large enough to handle timber traffic. Otherwise it would have gone in the manner of the Bhalukpong-Bomdila highway a long time ago. A highway will bring in a tea-shop; the tea shop will grow into a settlement; and the settlers will clear forests for farming. It is a process which has happened in a hundred areas all over the world and there is no reason for Eaglenest to escape that fate … if a highway becomes a reality.

Furthermore wildlife tourism will not improve if a highway is constructed through Eaglenest. Not one of the tourists who visited Eaglenest this year preferred the more comfortable Bhalukpong-Bomdila highway to the bumpy Eaglenest road. The charm of Eaglenest for ecotourists is its remoteness and the present road with regular low-level maintenance will more than serve the purpose.

To maintain the integrity of Eaglenest, for conservation as well as ecotourism, the road must be maintained in its present category: a single-lane dirt track with regularly spaced wider sections where two vehicles can pass: no black-topping, no double-laning and certainly no new alignments. One should only take up low-impact maintenance – clearing roadside shrubbery, clearing rock-slides, constructing and maintaining drainage channels to prevent water-logging, repairing the surface and maintaining existing bridges – which will not change the character of the forest around. In all cases labourers should be housed outside the boundaries of the sanctuary to reduce their impact on the protected area. A regularly maintained dirt-track will also adequately serve the needs of the small Doimara-Khellong community during their movements to and from Rupa.

Roads are presented as merely a 5m strip of progress through forests. They usually are 500m strips of devastation. The debris is pushed down the slope flattening all vegetation on the down-slope (top-left). The landslide at Sunderview (above) slides across a 200m hillside after every rain necessitating a continuous stream of labourers. And labourers require timber for construction and fuel which results in vast areas being cleared inside the sanctuary as at Sunderview (left).

A tiny runnel near Bompu, barely 20cm wide, found its path choked and cut another channel along the road. It finally caused a 3m x 5m section of the road to collapse (left). The solid red lines delineate the surviving sections of the road and the dotted lines the section which caved in under the assault of the runnel. Heavy truck traffic will magnify these issues a hundred-fold in the fragile mountain-system which is often characterized by loose soil. A road through this sanctuary will be a permanent canker and will eventually destroy it.

Everything looks like lush forest because the heavy rain induces rapid regeneration in all cleared areas; but a little attention to detail brings out the difference between a primary forest (left) and highly degraded and impoverished secondary growth (right) on the two sides of the Bhalukpong-Bomdila highway. The degraded forest is in contact with the road and has no trees of any significant girth. The primary forest, which is separated from the road by a deep valley, shows a different texture due to the canopies of tall emergent trees.

6.5 Community development & capacity building

The combination of the local communities, Forest Department and NGOs can take up several activities which will benefit the communities themselves and Eaglenest in the long run.

6.5.1 Eco-restoration


Slopes around Tenga are devoid of forest and the eroding banks regularly collapse on to the road

The Tenga valley is a bustling market-place on the Bhalukpong-Bomdila highway. It is also hosts a huge military establishment. Firewood and timber for construction is in great demand. These are mostly being met by logging the forest in the Lama Camp area. Lama Camp is part of the Shergaon Territorial division of the Forest Department. It also falls within the community forest lands of the Buguns. The area between Tenga and Lama Camp is almost completely devoid of forest and is highly degraded with extensive loss of soil. Pine predominates over large areas, helped by fires which kill regeneration of other species. A large part is also being cultivated by tenant farmers, mostly Nepalese, who pay a nominal rent to the Bugun owners. The stream draining the valley passes through the principal Bugun village of Singchung before joining the River Tenga. One is beginning to hear fears expressed by some of the more enlightened community members that the lack of forest in the upper valley may lead to severe flooding in times of rain. There is talk of restricting forest clearance in that area, which needs to be actively encouraged and supported.

Nevertheless, the community, and indeed the whole valley, needs firewood. The preferred species for burning is the oak. The wood provides good heat and more importantly embers which last a long time. All the oak comes from the remaining forests in the area and there has been no study of the extraction and regeneration rate. Alder is a fast-growing coloniser species. It is moderately good for burning but local wisdom prefers oak to alder. Alder grows without let or hindrance in all cleared areas and is good for the soil as well (nitrogen-fixing). There are three possible outcomes to this story. The people can use oak while it lasts and then switch to alder and then to even less efficient wood before settling down to whatever is available – this is what has happened all over India. Or they can start using alder and identify ways in which to make it efficient. Thirdly, they can start oak plantations on degraded land and harvest it, for home and market, in a sustainable manner in the years to come. There is great scope for NGOs and the Social Forestry wing of the Forest Department to regenerate the soil, raise commercial plantations, and generate local employment.

I have heard of simple machines which compact even bamboo and twigs of shrubbery to improve their efficacy in stoves. Alternatively, I have also heard of compacted cubes of mud and wood particles which are good at forming embers which retain heat. This is a promising line of enquiry to dilute the dependence on a single species which will ultimately give out.

A similar initiative should be taken up regarding the hardwood species used in construction.

Charred pine deserts (right), devoid of even an iota of biodiversity are widespread around Tenga. They are maintained by regular burning of hillsides (below) to stimulate the growth of fodder grass.

6.5.2 Broad-basing Employment Opportunities

The currently available avenues of employment are Government Service, subsistence farming, civil contract and timber contract. Obviously this set has to be enlarged many-fold: tourism, fruit orchards, orchid cultivation, mushroom cultivation, commercial dairy farming, commercial plantations mentioned earlier, and as educational level improves, engineers, doctors and other professionals.

One of the things that the Bugun community has been discussing is to use the community revenue from ecotourism to improve the quality of education and subsidise it for families which cannot afford it. This is perhaps the most efficient use for ecotourism revenue. Community revenues from ecotourism will not be large enough to make the entire community rich but it will be large enough to help the community take the first step towards prosperity – by improving the educational standard within the community. At the moment this issue has remained restricted to the realm of discussion and needs to be taken forward.

Education is a long-term prospect. In the short term the community, with assistance from experts, should consider seriously the other options available to them for creating employment opportunities.

6.5.3 Conservation Education

Most people living in that area are unaware of the treasures of Eaglenest. It is crucial for conservation that they come to know of it. People will only conserve what they appreciate. An anecdote from my experience is worth relating here. I was visiting the State Forest Research Institute, Itanagar, in May 2005 soon after publishing the webpages of the Eaglenest Biodiversity Project. The Director, Mr. G. N. Sinha, asked me to give a talk and by directorial diktat ensured that every single employee attended the talk. There was no conservation in the talk, no exhortation about responsibilities towards the future generations; I merely showed a lot of images of the animals we had encountered during the course of the project, talked of interesting facets of their lives, and of tourist who came from afar to see them. Expectedly there were a lot of bored faces initially, but at the end of my talk I had to face a long question-answer session from a group whose interest had been piqued. As one of the audience put it "… biodiversity was a meaningless word until I saw the images."

The conservation education strategy I prefer is to liberally sprinkle the community hall and local school with posters of the wildlife of the area with interesting tidbits of their lives; and occasionally

give talks on what those animals need to survive and how their existence benefits the community – water, timber, tourists, and so on. Ethics and aesthetics are also important aspects of the conservation ethos but the posters will be entirely sufficient for conveying that part of the message. In my experience, emphasizing the dangers of non-conservation is not as effective as engendering a fascination allied with economic benefits.

The Indian army in Arunachal Pradesh and their seniors in New Delhi are also an important target for the conservation education programme. Arunachal, which shares a disputed international border with China, has a huge military presence. The army's devastating road building methods, the insatiable demand for fuel wood and construction timber and the non-negligible hunting requires urgent attention.

6.5.4. Training of researchers from Arunachal Pradesh

Last year, the Director of the State Forest Research Institute and I discussed and proposed a Memorandum of Understanding wherein we agreed to have researchers from the State join our faunal surveys. We saw two main advantages in this:

1. The institutional nature of SFRI provides a central repository for storing the data from all such surveys and also a continuity from survey to another and even from one team to another
2. These joint surveys offer local researchers an opportunity to meet outside scientists and keep up with the times and techniques.

We are awaiting a formal approval of this MOU from the State Government.

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Long-banded Silverline – insets show the delicate “inlaid silver-work”

Striped Punch

Powdery-green Sapphire

Grey Commodore – very rare

Indian Tortoiseshell

Dusky Labyrinth - rare

Purple Emperor

Ramana Athreya / Eaglenest Biodiversity Project / Kaati (funded by The Rufford-Maurice-Laing Foundation, UK)

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Other wildernesses in western Arunachal Pradesh in the vicinity of Eaglenest

The Bhalukpong-Bomdila highway in the valley of the river Kameng. The highway divides Eaglenest (left) from Pakke (right).

The gate and memorial at Sela Pass which separates W. Kameng from Tawang. The areas visible range from 4100m to 5000m in altitude.

The lowland and foothill forests of Pakke

The higher elevations of Dirang and Tawang (3000-3800m) have some very fine tracts of fir with an undergrowth of bamboo and rhododendron

Biodiversity Portfolio – 10

Green Commodore

Tailed Red-Forester
rare

Green Sapphire

Tiger Brown - rare

Black Prince

Common Maplet

Scarce Red-Forester
very rare

White-edged Bushbrown
rare

Yellow Woodbrown

? Himalayan Jester ?

Ramana Athreya / Eaglenest Biodiversity Project / Kaati (funded by The Rufford-Maurice-Laing Foundation, UK)

Project Team

Agarwal, Ishan: Ishan is currently a student in the M.Sc course offered by the Wildlife Institute of India, Dehradun. He visited Eaglenest in the interregnum between his bachelor degree in biology and the masters course. His primary interest is herpetofaunal taxonomy. He took the lead in the reptile work presented in this report both in the field and away from it. He has also contributed in a major way to the amphibian work presented here.

Athreya, Ramana: An astronomer by profession, I sunlight as a naturalist whenever the opportunity arises. I started as a birdwatcher two decades ago and have gradually diversified into butterflies, reptiles and everything which offers a sporting chance of being identified. The lack of formal training in biology is a handicap but so little is known of Arunachal Pradesh's biodiversity that even people with little training (but a lot of motivation) can add to the fund of human knowledge of this spectacular area. A two-month faunal survey in Namdapha tiger reserve in 1996-97 was my first serious foray into documenting the fauna of Arunachal. Astronomy kept me in outside India from 1998 but immediately on returning in 2003 I started this project.

Dalvi, Shashank: Shashank recently obtained a bachelor's degree in biology and is planning on continuing into an M.Sc course in wildlife biology. Shashank is also a bit of an all-rounder –good birds, herps, butterflies, and in fact everything within arm's reach is fair game. He has a local reputation in Mumbai for rescuing snakes which enter houses. He took on the responsibility of leading the Vacations-for-Research programme in March and May-June 2006 in Eaglenest. My abiding memory of Shashank in the Eaglenest project of will be our first encounter with the rare lizard *Mictopholis austeniana* – Shashank gathering himself, muttering with muted excitement, to lunge at the lizard on a bush on the edge of a small cliff while I lined up behind to grab him if he went too far. Fortunately, it turned out to be a tame affair!

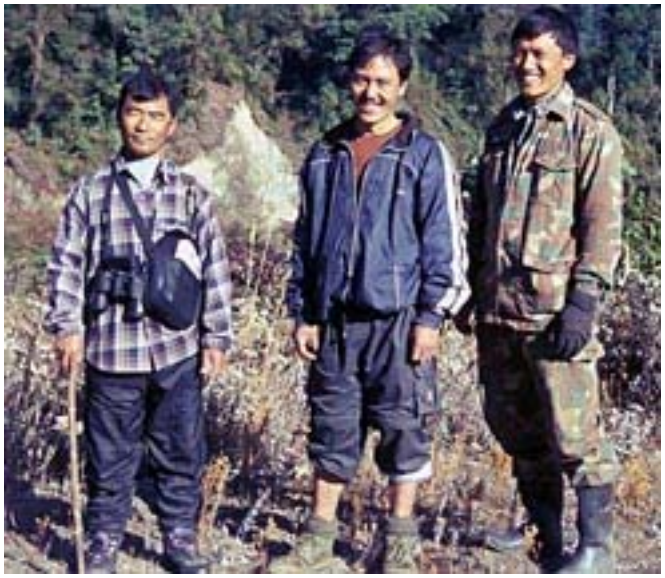
Glow, Indi: Indi babu, as he is called, is one of the respected voices of the Bugun community of Singhchung and the President of the Bugun Welfare Society. He has had a strange career – started as an employee in the Forest Department, threw it up to become a timber contractor during the heydays of the timber business before 1996 and is now more passionately committed to protecting Eaglenest than anyone in that area. His two great ambitions are to improve the educational standards of his community and to make sure that Eaglenest and its surroundings will survive to grace the lives of future generations. Twice during the first bird tour he saved us from certain disaster. When the army commandeered his vehicle late in the evening he spent five hours exploring every single source, finally located a vehicle and drove it all through the night to reach us at the appointed time, showing a commitment that I haven't encountered too often among professional tour agencies! The ecotourism effort these last three years would have been impossible without him.

Mistry, Viral: Viral is an engineer by training and is currently helping his father run their factory. His strengths are excellence in spotting herps in the field. He took the initiative in putting together the amphibian data in this survey. He also contributed to the butterfly checklist. He has been considering moving into ecology full-time.

Mohan, Dhananjai: As my fellow-undergraduate Dhananjai took upon himself the responsibility of ensuring that assignments and grades waited upon quality birdwatching time together – I haven't regretted it! He is an Indian Forest Service officer in the Government of Uttar Pradesh and is among that rare class of forest officers who are also good naturalists, having an excellent knowledge of Indian birds and plants. He is currently on deputation to the Wildlife Institute of India, Dehradun.

Singh, Pratap: Pratap is an officer in the Union Territory cadre of the Indian Forest Service. In that capacity he served many years in Arunachal Pradesh and Andamans & Nicobars. In 1994 he published a paper on the extensive bird surveys he carried out in Arunachal Pradesh during his tenure there. He has devoted the last several years to recording bird vocalizations all over India and possibly has the largest collection of Indian bird calls. He is currently on deputation to the Wildlife Institute of India, Dehradun.

Nima Tsering & Dorje Raptan: Together and separately they have made camping in Eaglenest as comfortable as possible and pulled us out of tight corners – like the time a jeep did not turn up and Dorje walked 35 km twice in two days to bring it in; like the time the jeep sank through surface ice into freezing mud below and Nima worked for an hour with his hands up to the elbows in the subzero slush. It could not have been easy keeping a bunch of obsessed naturalists happy but they did a great job! Both are from the Monpa community of Jang village in Tawang but have settled down in the Singchung area. Dorje has had a varied employment history including working with several other wildlife biologists (Aparajita Datta and Suresh Kumar) and is very knowledgeable about the areas between Eaglenest and Tawang. Nima encountered wildlife biologists only a few years ago but has quickly become an indispensable part of our project, contributing even in the matter of finding snakes!



Indi Glow (left), Nima Tsering and Dorjee Raptan

Ramana Athreya

Dhananjai Mohan

Shashank Dalvi (right)

Pratap Singh

Ishan Agarwal awaits his turn as Ramana Athreya peers through the camera lens at the Short-nosed Vinesnake on the twig. This rather prosaic setting yielded the dramatic coils in Biodiversity Portfolio #17 (page 138). Location: patio outside the living quarters at Sessni. Photographer: Viral Mistry.

Ishan Agarwal, presenting his best face to Shashank Dalvi

Viral Mistry charming a *Rhacophorus htunwini*

Ramana Athreya / Eaglenest Biodiversity Project / Kaati (funded by The Rufford-Maurice-Laing Foundation, UK)

Rhacophorus htunwini ?

Amphibians have been, unexpectedly, the biggest success story of the Eaglenest project, even though they have been the least amenable to specific identification. The 30 odd varieties include some truly spectacular ones.

This was perhaps the first study of amphibians there. It has been said of the Amazon that chancing upon a new species is easier than making sure that it has not been described before. Frogs in Eaglenest have been a bit like that. Intensive surveys there will likely yield distinct races of widespread species, Chinese-Myanmarese species hitherto unrecorded from India and at least a few species new to science ... if only one can figure out which is which!

Pending a systematic effort all identifications must be considered tentative. Determining the species composition, habitat requirements and the status of frogs in Eaglenest should be a top priority for any conservation effort in there.

Appendix A-1

Checklist of Birds of Western Arunachal Pradesh

with

Seasonal and altitudinal distribution of birds within Eaglenest.

The following table presents a consolidated checklist of the birds of western Arunachal Pradesh. The sources include the records obtained during the current project and those from Athreya & Kartikeyan (1995), Singh (1994, 1999), Datta et al (1998), Kumar & Singh (1999), Choudhury (2003), Kumar & Singh (1999) and Pawar & Birand (2001).

The columns of the checklist are as follows:

Col 1	English name according to Manakadan & Pittie (2001), followed by the Oriental Bird Club name if significantly different, and then the scientific name
Col 2-5	Eaglenest winter records from this project (November-January) **col 2** 1000-1500m **col 3** 1500-2000m **col 4** 2000-2500m **col 5** above 2500m
Col 6-9	Eaglenest spring records from this project (March-April) **col 6** 1000-1500m **col 7** 1500-2000m **col 8** 2000-2500m **col 9** above 2500m
Col 10-13	Eaglenest summer records from this project (May-June) **col 10** 1000-1500m **col 11** 1500-2000m **col 12** 2000-2500m **col 13** above 2500m
Col 14	Eaglenest records from other sources – all seasons, all altitudes
Col 15-16	Pakke records – all seasons **col 15** from this project **col 16** other sources
Col 17-18	Dirang records – all seasons **col 17** from this project **col 18** other sources
Col 19-20	Tawang records – all seasons **col 19** from this project **col 20** other sources

In all columns "**–**" indicates absence and any number indicates presence of the species. The different numbers do not indicate the status of the species. Instead using binary representation they are a compact code for conflating data from multiple visits. Furthermore data from subsequent visits can be easily incorporated without complication, confusion or re-working of the code. This system is based on the fact that any number can be uniquely represented as the sum of the integral powers of 2 which are 2^0, 2^1, 2^2, 2^3, 2^4, 2^5 and so on, and equal to 1, 2, 4, 8, 16, 32 and so on.

Suppose we have data from 3 birding trips – **A**, **B** and **C.** Assign the above numbers (1, 2, and 4) to them sequentially. One can construct the following truth table in a simple manner:

Code	A=1	B=2	C=4		Status of species
0	–	–	–		Not recorded at all
1	1	–	–		Recorded only in A = 1
2	–	2	–		Recorded only in B = 2
3	1	2	–		Recorded only in A+B = 3
4	–	–	4		Recorded only in C = 4
5	1	–	4		Recorded only in A+C = 5
6	–	2	4		Recorded only in B+C = 6
7	1	2	4		Recorded in A+B+C = 7

Thus every possible combination of records during A, B and C can be represented by a single number (0-7) in one column.

A 4th visit, D=8, indeed any number of subsequent visits, can be easily incorporated without disrupting the previous arrangement.

Code	A=1	B=2	C=4	D=8	Status of species
8	–	–	–	8	Recorded only in D = 8
9	1	–	–	8	Recorded only in A+D = 9
10	–	2	–	8	Recorded only in B+D = 10
11	1	2	–	8	Recorded only in A+B+D = 11
12	–	–	4	8	Recorded only in C+D = 12
13	1	–	4	8	Recorded only in A+C+D = 13
14	–	2	4	8	Recorded only in B+C+D = 14
15	1	2	4	8	Recorded in A+B+C+D = 15

Those visitation and presence/absence codes are given below:

EAGLENEST Nov - Jan	Dates of the winter visits	Presence code
Col 2-5	A: 2003-11-01 to 2003-11-15 B: 2004-12-22 to 2005-01-04 C: 1995-01-03 to 1995-01-12	A: 1, 3, 5, 7 B: 2, 3, 6, 7 C: 4, 5, 6, 7
A: Ramana Athreya B: Ramana Athreya & Dhananjai Mohan C: Ramana Athreya		

i.e. Any one of the numbers 1, 3, 5, or 7 found in columns 2-5 (which represent 4 different altitudes within the season) indicates that the species was recorded in visit A; numbers 2, 3, 6, or 7 indicates a record in visit B, etc. Thus the Crested Serpent Eagle was only observed in visit C at 1000-1500m altitude. The Black Eagle was observed only during visit B at 1000-1500m altitude and at 2000-2500m altitude but it was observed at 1500-2000m altitude during all 3 visits. On the other hand the Rufous-bellied Hawk-Eagle was recorded at 1000-1500m during visits A and B and at 2000-2500m during visit B. Similarly

Eaglenest Mar-Apr	Dates of the spring visits	Presence code
Col 6-9	A: 2004-03-24 to 2004-04-14	A: 1, 3
A: Ramana Athreya leading the 1st bird tour (Mike Waite, Claudio Koller, Ray Ziarno)		

Eaglenest May - Jun	Dates of the summer visits	Presence code
Col 10-13	A: 2004-05-20 to 2004-06-10 B: 2005-05-01 to 2005-05-10	A: 1, 3 B: 2, 3
A: Pratap Singh & Shashank Dalvi B: Ramana Athreya & Shashank Dalvi		

Eaglenest all seasons/alt	Two sources of data	Presence code
Col 14	A: AC03 and S99 B: 2006-03-15 to 2006-03-24 & 2006-04-02 to 2006-04-10	A: 1, 3 B: 2, 3
A: Other published sources Choudhury (2003) and Singh (1999) B: Ramana Athreya leading the 2nd (Fredrik Ellin, Peter Schmidt, Hakan Soderberg, Duncan Himes) and 3rd tours (Simon Allen, Mike Catsis, Margaret & Bud Widdowsons)		

Pakke-Nameri all seasons	Dates of the visits	Presence code
Col 15	A: 2004-04-15 to 2004-04-18 B: 2006-03-13 to 2006-03-15 & 2006-04-15 to 2006-04-17	A: 1, 3 B: 2, 3
A: Ramana Athreya with the 1st bird tour party B: Ramana Athreya with 2nd and 3rd tour parties		

Pakke all seasons	Sources of data	Presence code
Col 16	A: AK95, D98, S94, S99, PB01	A: 1
Other published sources Athreya & Kartikeyan (1995), Datta et al (1998), Singh (1994, 1999), Pawar & Birand (2001)		

Dirang all seasons/alt	Dates of the visits	Presence code
Col 17	A: 2003-11-17 B: 2004-12-18, 2004-12-21 C: 2006-03-24 to 2006-03-26 & 2006-04-10 to 2006-04-14	A: 1, 3, 5, 7 B: 2, 3, 6, 7 C: 4, 5, 6, 7
A: Ramana Athreya B: Ramana Athreya & Dhananjai Mohan C: Ramana Athreya with the 2nd and 3rd tour parties		

Dirang all seasons/alt	Sources of data	Presence code
Col 18	A: S94, S99, KS99	A: 1
Other published sources Singh (1994, 1999), Kumar & Singh (1999)		

Tawang all seasons/alt	Dates of the visits	Presence code
Col 19	A: 2004-10-09 to 2004-10-10 B: 2005-12-18 to 2005-12-19 C: 2004-12-19 to 2004-12-20	A: 1, 3, 5, 7 B: 2, 3, 6, 7 C: 4, 5, 6, 7
A: Ramana Athreya B: Ramana Athreya C: Ramana Athreya & Dhananjai Mohan		

Tawang all seasons/alt	Sources of data	Presence code
Col 20	A: S94, S99, KS99	A: 1
Other published sources Singh (1994, 1999), Kumar & Singh (1999)		

Orange-flanked Bush-Robin ***Tarsiger cyanurus***
Photographed in Eaglenest in December 2004

	Eaglenest				Pak	Dir	Taw	Rem
	Nov-Jan	Mar-Apr	May-Jun	O	P O	P O	P O	
Family : Phalacrocoracidae								
Little Cormorant *Phalacrocorax niger*	– – – –	– – – –	– – – –	1	3 –	– –	– –	
Indian Shag/Cormorant *Phalacrocorax fuscicollis*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
Great Cormorant *Phalacrocorax carbo*	1 – – –	– – – –	– – – –	3	3 1	– –	– –	
Darter *Anhinga melanogaster*	– – – –	– – – –	– – – –	–	2 1	– –	– –	
Family : Ardeidae								
Little Egret *Egretta garzetta*	– – – –	– – – –	– – – –	1	3 1	– –	– –	
Large (Great) Egret *Casmerodius albus*	– – – –	– – – –	– – – –	–	3 –	– –	– –	
Median Egret *Mesophoyx intermedia*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
Cattle Egret *Bubulcus ibis*	– – – –	– – – –	– – – –	–	3 –	– –	– –	
Indian Pond-Heron *Ardeola grayii*	– – – –	– – – –	– – – –	3	3 1	– –	– –	
Yellow Bittern *Ixobrychus sinensis*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
Chestnut Bittern *Ixobrychus cinnamomeus*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
Little Green (striated) Heron *Butorides striatus*	– – – –	– – – –	– – – –	1	3 1	– –	– –	
Family Ciconiidae								
Asian Openbill-Stork *Anastomus oscitans*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
Black Stork *Ciconia nigra*	2 – – –	– – – –	– – – –	2	1 1	– –	– –	
Lesser Adjutant Stork *Leptoptilos javanicus*	– – – –	– – – –	– – – –	–	2 1	– –	– –	
Family Threskiornithidae								
Oriental White (Black-headed) Ibis *Threskiornis melanocephalus*	– – – –	– – – –	– – – –	–	– 1	– –	– –	
Family Anatidae								
Lesser Whistling-Teal *Dendrocygna javanica*	– – – –	– – – –	– – – –	–	3 –	– –	– –	
Bar-headed Goose *Anser indicus*	– – – –	– – – –	– – – –	2	– 1	– –	1 1	
Brahminy Shelduck *Tadorna ferruginea*	– – – –	– – – –	– – – –	–	2 1	– –	1 1	
Common Shelduck *Tadorna tadorna*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
White-winged Duck *Cairina scutulata*	– – – –	– – – –	– – – –	–	2 1	– –	– –	
Eurasian Wigeon *Anas penelope*	– – – –	– – – –	– – – –	–	– –	– –	4 1	
Mallard *Anas platyrhynchos*	– – – –	– – – –	– – – –	–	– –	2 –	4 1	
Red-crested Pochard *Rhodonessa caryophyllacea*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
Common Merganser *Mergus merganser*	– – – –	– – – –	– – – –	–	2 1	– –	– –	
Family Accipitridae								
Jerdon's Baza *Aviceda jerdoni*	– – 2 –	– – – –	– – – –	–	2 1	– –	– –	
Oriental Honey-Buzzard *Pernis ptilorhynchus*	– 1 – –	– – – –	– – – –	2	1 1	4 –	– –	
Black Kite *Milvus migrans*	4 – – –	– – – –	– – – –	1	3 1	– 1	– –	
Pallas' Fish-Eagle *Haliaeetus leucoryphus*	– – – –	– – – –	– – – –	–	2 1	– –	– –	
Greater Grey-headed Fish-Eagle *Ichthyophaga ichthyaetus*	– – – –	– – – –	– – – –	–	3? –	– –	– –	
Bearded (lammergeier) Vulture *Gypaetus barbatus*	– – – –	– – – –	– – – –	1	– –	– –	– –	
Indian White-backed (-rumped) Vulture *Gyps bengalensis*	– – – –	– – – –	– – – –	–	– 1	– –	– –	
Slender-billed Vulture *Gyps tenuirostris*	– – – –	– – – –	– – – –	–	1 –	– –	– –	
Himalayan Griffon *Gyps himalayensis*	– – – 2	– – – –	– – – –	1	– –	4 –	– 1	
Crested Serpent-Eagle *Spilornis cheela*	4 – – –	– – – –	1 – – –	3	3 1	4 1	– –	
Short-toed Snake-Eagle *Circaetus gallicus*	– – – –	– – – –	– – – –	–	2 1	– –	– –	
Hen Harrier (Northern) *Circus cyaneus*	– – – –	– – – –	– – – –	–	2 1	– –	– –	
Pied Harrier *Circus melanoleucos*	– – – –	– – – –	– – – –	–	2 1	– –	– –	
Besra Sparrowhawk *Accipiter virgatus*	– – – –	– – – –	– – – –	1	– –	– –	– –	
Northern Goshawk *Accipiter gentilis*	– – 1 –	– – – –	– – – –	2	– –	4 1	– 1	
Crested Goshawk *Accipiter trivirgatus*	– 2 2 2	– – – –	1 – – –	2	1 –	– –	– 1	
Shikra *Accipiter badius*	– – – –	– – – –	– – – –	–	2 –	– 1	– –	
Eurasian Sparrowhawk *Accipiter nisus*	1 – – –	– – 1 –	– – – –	2	– 1	5 1	– –	
Common Buzzard *Buteo buteo*	1 – – –	1 – – –	– 2 – –	2	1 –	7 –	– 1	
Long-legged Buzzard *Buteo rufinus*	– – – –	– – – –	– – – –	–	– –	– –	– 1	
Upland Buzzard *Buteo hemilasius*	– – 2 2	– – – –	– – – –	–	– –	– –	– 1	
Golden Eagle *Aquila chrysaetos*	– – – –	– – – –	– – – –	–	– –	? –	– –	
Steppe Eagle *Aquila nipalensis*	– – – –	– – – –	– – – –	2?	2 –	? –	– –	
Black Eagle *Ictinaetus malayensis*	2 7 2 –	– – 1 –	1 1 1 –	3	1 1	4 1	– –	
Rufous-bellied Hawk-Eagle *Hieraaetus kienerii*	3 – 2 –	– – – –	– – – –	1	– –	– –	– –	
Changeable Hawk-Eagle *Spizaetus cirrhatus*	– – – –	– – – –	– – – –	–	– 1	– –	– –	
Mountain Hawk-Eagle *Spizaetus nipalensis*	– – 3 –	– – 1 –	– – ? –	3	– 1	– 1	– –	
Family Pandionidae								
Osprey *Pandion haliaetus*	– – – –	– – – –	– – – –	–	2 1	– –	– –	

	Eaglenest				Pak	Dir	Taw	Rem
	Nov-Jan	Mar-Apr	May-Jun	O	P O	P O	P O	
Family Falconidae								
Pied Falconet *Microhierax melanoleucos*	2 – – –	– – – –	– – – –	1	– 1	– –	– –	
Common Kestrel *Falco tinnunculus*	1 – – –	1 – – –	– – – –	3	2 1	6 1	2 1	
Amur Falcon *Falco amurensis*	– – – –	– – – –	– – – –	–	– 1	– –	– –	
Peregrine Falcon*Falco peregrinus*	– – – –	– – – –	– – – –	–	2 –	– –	– 1	
Oriental Hobby *Falco severus*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
Family Phasianidae								
Common Hill-Partridge *Arborophila torqueola*	2 – 6 –	– 1 1 1	1 1 3 1	3	– –	4 1	– 1	
Rufous-throated Hill-Partridge	– – – –	– – – –	? ? ? –	3	– –	– –	– –	
Arborophila rufogularis								
Chestnut-breasted Hill-Partridge	– – – –	– – – –	– – – –	2	– –	– –	– –	
Arborophila mandelli								
White-cheeked Hill-Partridge	– – – –	– – – –	– – – –	–	2 1	– –	– –	
Arborophila atrogularis								
Blood Pheasant *Ithaginis cruentus*	– – – –	– – – –	– – – –	–	– –	2 1	– –	
Temminck's Tragopan *Tragopan temminckii*	– – – ?	– – – 1	– – – –	2	– –	– 1	– –	
Satyr Tragopan *Tragopan satyra*	– – – –	– – – –	– – – –	–	– –	– ?	– 1	
Blyth's Tragopan *Tragopan blythii*	– – – –	– – – –	– – – –	1	– –	– –	– –	
Impeyan (Himalayan) Monal	– – – –	– – – –	– – – –	–	– –	4 –	– 1	
Lophophorus impejanus								
Red Junglefowl *Gallus gallus*	– – – –	– – – –	– – – –	3	3 1	– –	– –	
Kaleej Pheasant *Lophura leucomelanos*	6 – 4 –	1 – – –	– – – –	3	– 1	– –	– –	
Grey Peacock-Pheasant *Polyplectron bicalcaratum*	– – – –	– – – –	1 1 – –	3	?1 1	– –	– –	
Family Gruidae								
Black-necked Crane *Grus nigricollis*	– – – –	– – – –	– – – –	–	– –	2 –	– –	
Family Rallidae								
Elwes's (Black-tailed) Crake *Porzana bicolor*	– – – –	– – – –	– – – –	–	– 1	4 –	– –	
Ruddy-breasted Crake *Porzana fusca*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
White-breasted Waterhen *Amaurornis phoenicurus*	– – – –	– – – –	– – – –	1	3 –	– –	– –	
Common Moorhen *Gallinula chloropus*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
Purple Moorhen (Swamphen) *Porphyrio porphyrio*	– – – –	– – – –	– – – –	–	– 1	– –	– –	
Family Charadriidae								
Long-billed Plover *Charadrius placidus*	– – – –	– – – –	– – – –	–	– –	6 –	– 1	
Little Ringed Plover *Charadrius dubius*	– – – –	– – – –	– – – –	–	3 1	– –	– –	
Kentish Plover *Charadrius alexandrinus*	– – – –	– – – –	– – – –	–	1 –	– –	– –	
Northern Lapwing *Vanellus vanellus*	– – – –	– – – –	– – – –	–	– –	2 –	– –	
Red-wattled Lapwing *Vanellus indicus*	– – – –	– – – –	– – – –	–	– 1	6 –	– –	
River Lapwing *Vanellus duvaucelii*	– – – –	– – – –	– – – –	1	3 1	– –	– 1	
Family Scolopacidae								
Eurasian Woodcock *Scolopax rusticola*	– 1 – –	– – – –	– – – –	–	– –	– –	– –	
Swinhoe's Snipe *Gallinago megala*	– – – –	– – – –	– – – –	–	?1 –	– –	– –	
Pintail Snipe *Gallinago stenura*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
Black-tailed Godwit *Limosa limosa*	– – – –	– – – –	– – – –	–	– 1	– –	– –	
Marsh Sandpiper *Tringa stagnatilis*	– – – –	– – – –	– – – –	–	1 –	– –	– –	
Common Greenshank *Tringa nebularia*	– – – –	– – – –	– – – –	–	3 1	– –	– –	
Green Sandpiper *Tringa ochropus*	– – – –	– – – –	– – – –	–	3 1	– –	– –	
Common Sandpiper *Actitis hypoleucos*	– – – –	– – – –	– – – –	–	3 1	4 –	– 1	
Family Recurvirostridae								
Ibisbill *Ibidorhyncha struthersii*	– – – –	– – – –	– – – –	–	2 1	6 –	– 1	
Family Burhinidae								
Stone-curlew (Eurasian Thick-knee)	– – – –	– – – –	– – – –	–	2 1	– –	– –	
Burhinus oedicnemus								
Great Stone-Plover (Great Thick-knee)	– – – –	– – – –	– – – –	–	2 –	– –	– –	
Esacus recurvirostris								
Family Glareolidae								
Small Pratincole *Glareola lactea*	– – – –	– – – –	– – – –	–	3 1	– –	– –	
Family Laridae								
River Tern *Sterna aurantia*	– – – –	– – – –	– – – –	–	3 1	– –	– –	
Brown-headed Gull *Larus brunnicephalus*	– – – –	– – – –	– – – –	2	2 1	– –	– –	
Family Columbidae								
Blue Rock Pigeon *Columba livia*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
Snow Pigeon *Columba leuconota*	– – – –	– – – –	– – – –	–	– –	4 1	– 1	
Ashy Wood-Pigeon *Columba pulchricollis*	– – – –	– – 1 1	– – 3 1	1	– –	– 1	– –	
Speckled Wood-Pigeon *Columba hodgsonii*	– – – –	– – 1 –	– – – –	2	– –	– –	– 1	

	Eaglenest				Pak	Dir	Taw	Rem
	Nov-Jan	Mar-Apr	May-Jun	O	P O	P O	P O	
Oriental Turtle-Dove *Streptopelia orientalis*	– 4 4 –	– – – –	– – – –	1	3 1	6 1	– 1	
Spotted Dove *Streptopelia chinensis*	– – – –	1 – – –	2 – – –	1	3 1	– 1	– 1	
Red Collared-Dove *Streptopelia tranquebarica*	– – – –	– – – –	– – – –	1	2 –	– –	– –	
Eurasian Collared-Dove *Streptopelia decaocto*	– – – –	– – – –	– – – –	1	2 –	– –	– –	
Barred Cuckoo-Dove *Macropygia unchall*	2 1 6 –	– – – –	– 1 1 1	3	1 1	– –	– –	
Emerald Dove *Chalcophaps indica*	6 – – –	– – – –	– – – –	1	3 1	– –	– –	
Thick-billed Green-Pigeon *Treron curvirostra*	– – – –	– – – –	– – – –	3	1 1	– –	– –	
Yellow-legged Green-Pigeon *Treron phoenicoptera*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
Orange-breasted Green-Pigeon *Treron bicincta*	– – – –	– – – –	– – – –	1	2 –	– –	– –	
Pompadour Green-Pigeon *Treron pompadora*	– – – –	– – – –	– – – –	1	2 1	– –	– –	
Pin-tailed Green-Pigeon *Treron apicauda*	2 – – –	– – – –	– – – –	3	2 1	– –	– –	
Wedge-tailed Green-Pigeon *Treron sphenura*	2 – 3 –	– – – –	? 1 1 3	1	1 1	– –	– 1	
Green Imperial-Pigeon *Ducula aenea*	– – – –	– – – –	– – – –	1	3 1	– –	– –	
Mountain Imperial-Pigeon *Ducula badia*	– – 3 –	– 1 1 –	1 1 1 –	3	1 1	– –	– –	
Family Psittacidae								
Indian (Vernal) Hanging-Parrot *Loriculus vernalis*	– – – –	– – – –	– – – –	–	3 1	– –	– –	
Rose-ringed Parakeet *Psittacula krameri*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
Alexandrine Parakeet *Psittacula eupatria*	– – – –	– – – –	– – – –	–	3 1	– –	– –	
Red-breasted Parakeet *Psittacula alexandri*	– – – –	– – – –	– – – –	1	3 1	– –	– –	
Family Cuculidae								
Red-winged Crested-Cuckoo *Clamator coromandus*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
Asian Emerald Cuckoo *Chrysococcyx maculatus*	– – – –	– – – –	1 – – –	–	1 –	– –	– –	
Violet Cuckoo *Chrysococcyx xanthorhynchus*	– – – –	– – – –	– – – –	–	– –	– –	– 1	
Large Hawk-Cuckoo *Hierococcyx sparverioides*	– – 2 –	– – 1 –	1 1 3 1	3	– –	4 1	– 1	
Hodgson's Hawk-Cuckoo *Hierococcyx fugax*	– – – –	– – – –	1 1 1 –	3	– –	– –	– –	
Indian Cuckoo *Cuculus micropterus*	– – – –	– – – –	1 1 3 1	1	3 1	– –	– –	
Eurasian Cuckoo *Cuculus canorus*	– – – –	– 1 – –	– – 1 –	1	– –	4 1	– –	
Oriental Cuckoo *Cuculus saturatus*	– – – –	– 1 1 –	1 – 3 1	3	– –	4 1	– –	
Lesser Cuckoo *Cuculus poliocephalus*	– – – –	– – – –	– 1 1 1	1	1 1	– 1	– 1	
Banded Bay Cuckoo *Cacomantis sonneratii*	– – – –	– – – –	– – – –	1	2 –	– –	– –	
Rufous-bellied Plaintive-Cuckoo *Cacomantis merulinus*	– – – –	– – – –	2 – – –	1	3 1	– –	– –	
Drongo Cuckoo *Surniculus lugubris*	– – – –	1 – – –	– – – –	2	3 1	– –	– –	
Asian Koel *Eudynamys scolopacea*	– – – –	– – – –	– – – –	1	2 –	– –	– –	
Large Green-billed Malkoha *Phaenicophaeus tristis*	– – – –	– – – –	– – – –	1	3 1	– –	– –	
Greater Coucal *Centropus sinensis*	– – – –	– – – –	– – – –	1	2 –	– –	– –	
Lesser Coucal *Centropus bengalensis*	– – – –	– – – –	– – – –	1	3 1	– –	– –	
Family Strigidae								
Oriental Bay-Owl *Phodilus badius*	– – – –	– – – –	– – – –	–	– 1	– –	– –	
Spotted (Mountain) Scops-Owl *Otus spilocephalus*	1 – – –	– 1 – –	– – – –	3	– 1	– –	– –	
Oriental Scops-Owl *Otus sunia*	– – – –	– – – –	– – – –	–	– 1	– –	– –	
Collared Scops-Owl *Otus bakkamoena*	– 1 1 –	– – – –	– – – –	3	2 1	– 1	– –	
Forest (Spot-bellied) Eagle-Owl *Bubo nipalensis*	– – – –	– – – –	– – – –	–	– 1	– –	– –	
Tawny Wood-Owl *Strix aluco*	– – – –	– – – 1	– – – –	3	– –	– 1	– –	
Collared Owlet *Glaucidium brodiei*	6 5 6 –	1 1 1 –	1 1 – –	3	– –	– –	– –	
Asian Barred Owlet *Glaucidium cuculoides*	4 – – –	– – – –	– – – –	3	3 1	– –	– –	
Spotted Owlet *Athene brama*	– – – –	– – – –	– – – –	–	– 1	– –	– –	
Brown Hawk-Owl *Ninox scutulata*	– – – –	– – – –	– – – –	–	3 –	– –	– –	
Family Podargidae								
Indian Jungle (Grey) Nightjar *Caprimulgus indicus*	– – 1 –	– 1 1 –	– – – –	3	– –	4 –	– –	
Franklin's (Savannah) Nightjar *Caprimulgus affinis*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
Large-tailed Nightjar *Caprimulgus macrurus*	– – – –	– – – –	– – – –	1	1 1	– –	– –	
Family Apodidae								
Himalayan Swiftlet *Collocalia brevirostris*	– – 2 –	– 1 – –	– – – –	3	3 1	– 1	– 1	
Silver-backed Needletail-Swift *Hirundapus cochinchinensis*	– – – –	– – – –	– – – –	3	3 1	– –	– –	
Brown-backed Needletail-Swift *Hirundapus giganteus*	– – – –	– – – –	– – – –	–	– –	?4 –	– –	
Pacific (Fork-tailed) Swift *Apus pacificus*	– – – –	– – – –	– – – 1	3	– 1	– 1	– 1	
House (Little) Swift *Apus affinis*	– – – –	– – – –	– – – –	–	2 1	– –	– –	
Asian Palm Swift *Cypsiurus balasiensis*	– – – –	– – – –	– – – –	–	2 1	– –	– –	
Family Trogonidae								
Red-headed Trogon *Harpactes erythrocephalus*	7 – – –	1 1 – –	1 – – –	3	1 1	– –	– –	
Ward's Trogon *Harpactes wardi*	– – 3 –	– – 1 –	– 2 1 –	3	– –	6 –	– –	

	Eaglenest				Pak	Dir	Taw	Rem
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Family Alcedinidae								
Blue-eared Kingfisher *Alcedo meninting*	– – – –	– – – –	– – – –	–	– 1	– –	– –	
Small Blue (Common) Kingfisher *Alcedo atthis*	1 – – –	– – – –	– – – –	1	3 1	4 –	– –	
Oriental Dwarf Kingfisher *Ceyx erithacus*	– – – –	– – – –	– – – –	–	3 –	– –	– –	
White-breasted (-throated) Kingfisher *Halcyon smyrnensis*	– – – –	– – – –	– – – –	3	3 1	– –	– –	
Black-capped Kingfisher *Halcyon pileata*	– – – –	– – – –	– – – –	1	– –	– –	– –	
Ruddy Kingfisher *Halcyon coromanda*	– – – –	– – – –	– – – –	–	– 1	– –	– –	
Greater Pied (Crested) Kingfisher *Megaceryle lugubris*	5 – – –	– – – –	– – – –	–	3 1	4 –	– –	
Lesser Pied Kingfisher *Ceryle rudis*	– – – –	– – – –	– – – –	1	3 1	– –	– –	
Family Meropidae								
Blue-bearded Bee-eater *Nyctyornis athertoni*	– – – –	– – – –	– – – –	1	2 1	– –	– –	
Chestnut-headed Bee-eater *Merops leschenaulti*	– – – –	– – – –	– – – –	1	3 1	– –	– –	
Blue-tailed Bee-eater *Merops philippinus*	– – – –	– – – –	– – – –	–	– 1	– –	– –	
Family Coraciidae								
Indian Roller *Coracias benghalensis*	– – – –	– – – –	– – – –	1	3 1	– –	– –	
Oriental Broad-billed Roller (Dollarbird) *Eurystomus orientalis*	– – – –	– – – –	– – – –	1	3 1	– –	– –	
Family Upupidae								
Common (Eurasian) Hoopoe *Upupa epops*	– – – –	– – – –	– – – –	3	3 1	4 1	– 1	
Family Bucerotidae								
Oriental Pied-Hornbill *Anthracoceros albirostris*	– – – –	– – – –	– – – –	3	1 1	– –	– –	
Great Hornbill *Buceros bicornis*	1 – – –	– – – –	– – – –	3	3 1	– –	– –	
Rufous-necked Hornbill *Aceros nipalensis*	3 2 – –	1 1 – –	1 1 – –	3	2 –	– –	– –	
Wreathed Hornbill *Aceros undulatus*	– – – –	– – – –	– – – –	3	3 1	– –	– –	
Family Capitonidae								
Great Barbet *Megalaima virens*	6 5 7 6	1 1 1 –	1 1 3 1	3	– 1	6 1	– 1	
Lineated Barbet *Megalaima lineata*	– – – –	– – – –	– – – –	1	3 1	– –	– –	
Golden-throated Barbet *Megalaima franklinii*	2 7 6 6	– 1 – –	1 1 – –	3	– –	4 –	– 1	
Blue-throated Barbet *Megalaima asiatica*	6 4 6 –	– – – –	– – – –	3	3 1	– –	– –	
Blue-eared Barbet *Megalaima australis*	– – – –	– – – –	– – – –	3	2 1	– –	– –	
Coppersmith Barbet *Megalaima haemacephala*	– – – –	– – – –	– – – –	1	– 1	– –	– –	
Family Indicatoridae								
Yellow-rumped Honeyguide *Indicator xanthonotus*	– – – –	– – – –	– – – –	2	– –	– –	– –	
Family Picidae								
Rufous (white-browed) Piculet *Sasia ochracea*	2 – – –	– – – –	– – – –	3	3 1	– –	– –	
Speckled Piculet *Picumnus innominatus*	– – – –	– – – –	– – – –	3	– 1	– –	– –	
Grey-capped Pygmy Woodpecker *Dendrocopos canicapillus*	– – – –	– – – –	– – – –	1	3 1	– –	– –	
Rufous-bellied Pied-Woodpecker *Dendrocopos hyperythrus*	– – 7 4	– – 1 1	– – – –	3	– –	4 1	– –	
Crimson-breasted Pied-Woodpecker *Dendrocopos cathpharius*	– – 3 7	– 1 1 –	– 1 – –	3	– –	– –	– –	
Fulvous-breasted Pied-Woodpecker *Dendrocopos macei*	– – – –	– – – –	– – – –	3	2 1	– –	– –	
Darjeeling Pied-Woodpecker *Dendrocopos darjellensis*	– – 3 4	– – 1 1	– – 1 1	3	– –	– 1	2 1	
Rufous Woodpecker *Celeus brachyurus*	– – – –	– – – –	– – – –	1	3 1	– –	– –	
Small Yellow-naped Woodpecker *Picus chlorolophus*	– – – –	1 – – –	– – – –	3	3 1	– –	– –	
Large Yellow-naped Woodpecker *Picus flavinucha*	2 2 ? –	1 – – –	– 1 – –	3	2 1	– –	– –	
Black-naped Green (Grey-headed) Woodpecker *Picus canus*	– – – –	– – – –	– – – –	3	3 1	– –	– –	
Lesser Golden-backed Woodpecker (black-rumped Flameback) *Chrysocolaptes benghalense*	– – – –	– – – –	– – – –	–	– 1	– –	– –	
Greater Golden-backed Woodpecker *Chrysocolaptes lucidus*	– – – –	– – – –	– – – –	1	3 1	– –	– –	
Pale-headed Woodpecker *Gecinulus grantia*	– – – –	1 – – –	– – – –	3	– 1	– –	– –	
Bay Woodpecker *Blythipicus pyrrhotis*	2 – 7 5	1 1 – –	1 1 3 –	3	– 1	– –	– –	
Great Slaty Woodpecker *Mulleripicus pulverulentus*	– – – –	– – – –	– – – –	–	– 1	– –	– –	
Family Eurylaimidae								
Hodgson's (Silver-breasted) Broadbill *Serilophus lunatus*	– – – –	– – – –	– – – –	–	1 1	– –	– –	
Long-tailed Broadbill *Psarisomus dalhousiae*	– – – –	– – – –	– – – –	3	2 1	– –	– –	

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Family Pittidae								
Blue-naped Pitta *Pitta nipalensis*	– – – –	– – – –	– – – –	3	2 1	– –	– –	
Hooded Pitta *Pitta sordida*	– – – –	– – – –	– – – –	–	– 1	– –	– –	
Family Alaudidae								
Indian Short-toed Lark *Calandrella raytal*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
Bengal Bush-Lark *Mirafra assamica*	– – – –	– – – –	– – – –	–	2 1	– –	– –	
Oriental Skylark *Alauda gulgula*	– – – –	– – – –	– – – –	–	– 1	– 1	– –	
Horned Lark *Eremophila alpestris*	– – – –	– – – –	– – – –	–	– 1	– –	1 –	
Family Hirundinidae								
Sand Martin *Riparia riparia*	– – – –	– – – –	– – – –	–	2 1	– –	– –	
Nepal House-Martin *Delichon nipalensis*	4 – 3 1	– – – –	– – – –	1	– –	– –	– 1	
Asian House-Martin *Delichon dasypus*	– – 2 –	– – 1 –	– – – –	–	1 1	– 1	– 1	
Dusky Crag-Martin *Hirundo concolor*	4 – – –	– – – –	– – – –	3	– –	– –	– –	
Red-rumped Swallow *Hirundo daurica*	– – – –	– – – –	– – – –	1	1 –	– –	– –	
Common (Barn) Swallow *Hirundo rustica*	– – – –	– – – –	– – – –	1	2 1	– –	– –	
Family Motacillidae								
Forest Wagtail *Dendronanthus indicus*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
Large Pied (White-browed) Wagtail *Motacilla maderaspatensis*	– – – –	– – – –	– – – –	1	2 –	– –	– –	
White Wagtail *Motacilla alba*	– 2 – –	– – – –	– – – –	1	3 1	6 1	2 1	
Grey Wagtail *Motacilla cinerea*	5 – – –	– 1 – –	– – – –	1	1 1	6 1	– 1	
Yellow Wagtail *Motacilla flava*	– – – –	– – – –	– – – –	1	2 –	– –	– –	
Eurasian Tree Pipit *Anthus trivialis*	– – 1 1	1 – – –	– – – –	–	– –	– –	– –	
Oriental Tree (Olive-backed) Pipit *Anthus hodgsoni*	6 7 7 7	1 1 1 1	– – – –	3	3 1	6 1	2 1	
Paddyfield Pipit *Anthus rufulus*	– – – –	– – – –	– – – –	–	2 1	– –	– –	
Richard's Pipit *Anthus richardi*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
Rosy Pipit *Anthus roseatus*	– – – –	– – – –	– – – –	–	– –	5 1	– 1	
Family Campephagidae								
Large Cuckoo-shrike *Coracina macei*	– – – –	– – – –	– – – –	3	3 1	– –	– –	
Black-winged Cuckoo-shrike *Coracina melaschistos*	6 – – –	– 1 – –	– – 2 –	3	3 1	4 –	– –	
Grey-chinned Minivet *Pericrocotus solaris*	6 2 – –	1 1 – –	1 1 2 –	3	– 1	– –	– –	
Long-tailed Minivet *Pericrocotus ethologus*	4 4 4 –	– – 1 1	– – 1 –	3	– 1	4 1	– 1	
Short-billed Minivet *Pericrocotus brevirostris*	4 4 4 –	– 1 1 –	– – ? –	3	– 1	4 –	– –	
Scarlet Minivet *Pericrocotus flammeus*	– – – –	1 – – –	– – – –	3	3 1	4 –	– –	
Pied (Bar-winged) Flycatcher-Shrike *Hemipus picatus*	– – – –	1 – – –	– – – –	2	– –	– 1	– 1	
Large Woodshrike *Tephrodornis gularis*	– – – –	– – – –	– – – –	3	3 1	– –	– –	
Common Woodshrike *Tephrodornis pondicerianus*	– – – –	– – – –	– – – –	1	– 1	– –	– –	
Family Pycnonotidae								
Striated Bulbul *Pycnonotus striatus*	2 7 6 2	1 1 1 –	1 1 3 –	3	– –	4 –	– –	
Black-crested Bulbul *Pycnonotus melanicterus*	4 – – –	– – – –	– – – –	3	– 1	– –	– –	
Red-whiskered Bulbul *Pycnonotus jocosus*	– – – –	– – – –	– – – –	1	2 1	– –	– –	
Red-vented Bulbul *Pycnonotus cafer*	7 2 – –	1 – – –	– 2 – –	3	2 1	6 1	– –	
Himalayan Bulbul *Pycnonotus leucogenys*	– – – –	– – – –	– – – –	–	– 1	– –	– 1	
White-throated Bulbul *Alophoixus flaveolus*	6 – – –	– – – –	– – – –	3	2 1	– –	– –	
Brown-eared (Ashy) Bulbul *Hemixos flavala*	6 – 2 2	– – – –	– – – –	3	2 1	– –	– –	
Rufous-bellied (Mountain) Bulbul *Hypsipetes mcclellandii*	4 – 2 –	1 – – –	1 – – –	3	2 1	2 –	– –	
Black Bulbul *Hypsipetes leucocephalus*	– 7 7 4	– – – –	– 2 – –	3	2 1	6 1	– 1	
Family Irenidae								
Common Iora *Aegithina tiphia*	– – – –	– – – –	– – – –	1	3 1	– –	– –	
Gold-fronted Chloropsis (Leafbird) *Chloropsis aurifrons*	– – – –	1 – – –	– – – –	1	3 1	– –	– –	
Orange-bellied Chloropsis (Leafbird) *Chloropsis hardwickii*	7 7 6 7	– – – –	– – – –	3	3 1	– –	– –	
Asian Fairy-Bluebird *Irena puella*	4 – – –	– – – –	– – – –	3	3 1	– –	– –	
Family Laniidae								
Brown Shrike *Lanius cristatus*	– – – –	– – – –	– – – –	1	3 1	– 1	– 1	
Rufous-backed (Long-tailed) Shrike *Lanius schach*	1 – – –	– – – –	1 – – –	3	3 –	6 1	– –	
Grey-backed Shrike *Lanius tephronotus*	5 4 – –	– – – –	– – – –	3	3 1	4 1	– 1	
Family Cinclidae								
Brown Dipper *Cinclus pallasii*	1 – – –	1 – – –	– – – –	1	– 1	4 1	6 1	
White-throated Dipper *Cinclus cinclus*	– – – –	– – – –	– – – –	–	– –	– –	6 1	

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Family Troglodytidae								
Winter Wren *Cinclus pallasii*	– – 3 –	– – 1 –	– – – –	–	– –	6 1	2 1	
Family Prunellidae								
Rufous-breasted Accentor *Prunella strophiata*	– 4 7 5	– 1 – 1	– – – –	3	– –	7 1	3 1	
Maroon-backed Accentor *Prunella immaculata*	– – 1 4	– 1 1 1	– – – –	3	– –	– 1	2 1	
Alpine Accentor *Prunella collaris*	– – – 4	– – – –	– – – –	2	– –	6 1	2 –	
Family Muscicapidae : subfamily Turdinae								
Blue-headed (-capped) Rock-Thrush *Monticola cinclorhynchus*	– – – –	1 – – –	– – – –	3	– –	4 1	– 1	
Chestnut-bellied Rock-Thrush *Monticola rufiventris*	2 3 2 –	1 1 1 –	– – 3 1	3	– 1	6 1	2 1	
Blue Rock-Thrush *Monticola solitarius*	5 – – –	– – – –	– – – –	1	3 1	2 –	– –	
Blue Whistling-Thrush *Myiophonus caeruleus*	6 2 2 2	1 1 – –	– – 3 1	3	3 1	7 1	3 1	
Orange-headed Thrush *Zoothera citrina*	– – – –	– – – –	– – – –	1	– 1	– –	– –	
Plain-backed Thrush *Zoothera mollissima*	– – 2 1	– – – –	– – – –	3	– –	6 1	2 1	
Long-tailed Thrush *Zoothera dixoni*	– – – –	– – – –	– – – –	3	– –	– –	– –	
Scaly Thrush *Zoothera dauma*	– – 2 –	– – – –	– – – –	2	– –	– –	– –	
Long-billed Thrush *Zoothera monticola*	– – – –	– – – –	– – ? –	–	– –	– –	– –	
Black-breasted Thrush *Turdus dissimilis*	– – – –	– – – –	– – – –	–	– 1	– –	– –	
White-collared Blackbird *Turdus albocinctus*	– – – 1	– – – –	– – – –	1	– –	4 1	1 1	
Eurasian Blackbird *Turdus merula*	– – – –	– – – –	– – – –	2?	– –	– 1	– 1	
Grey-winged Blackbird *Turdus boulboul*	– – 2 2	– 1 – –	– – – –	3	1 1	4 1	2 1	
Eyebrowed Thrush *Turdus obscurus*	– ? – –	– – – –	– – – –	–	– –	– –	– –	
Dark-throated Thrush *Turdus ruficollis*	– – – –	– – – –	– – – –	3	2 1	– 1	– –	
Fea's (Grey-sided) Thrush *Turdus feae*	– – 2 –	– – – –	– – – –	–	– –	– –	– –	
Dusky Thrush *Turdus naumanni*	– – – –	– – – –	– – – –	1	– –	– –	– –	
Gould's Shortwing *Brachypteryx stellata*	– – 2 –	– – – ?	– – – –	1	– –	– –	– –	
Rusty-bellied Shortwing *Brachypteryx hyperythra*	– – – –	– – – –	– – – –	1	– –	– –	– –	
Lesser Shortwing *Brachypteryx leucophrys*	– – – –	– – – –	– 3 1 –	2	– 1	– 1	– –	
White-browed Shortwing *Brachypteryx montana*	2 – – –	1 – 1 –	– – ? 2	3	– 1	– 1	– –	
Siberian Rubythroat *Luscinia calliope*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
Bluethroat *Luscinia svecica*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
Himalayan (White-tailed) Rubythroat *Luscinia pectoralis*	– – – –	– – – –	– – – –	–	2 1	– –	– –	
Siberian Blue Robin *Luscinia cyane*	– – – –	– – – –	– – – –	1	– –	– –	– –	
Orange-flanked Bush-Robin *Tarsiger cyanurus*	2 6 6 6	– – 1 1	– – – –	3	– –	2 1	– 1	
Golden Bush-Robin *Tarsiger chrysaeus*	2 5 7 5	– – 1 1	– – – –	3	– –	4 1	– 1	
White-browed Bush-Robin *Tarsiger indicus*	– – 6 6	– – – –	– – – –	3	– –	2 1	– –	
Rufous-breasted Bush-Robin *Tarsiger hyperythrus*	– – – 6	– – 1 –	– – – –	3	– –	4 1	– 1	
Oriental Magpie-Robin *Copsychus saularis*	– – – –	1 – – –	– – – –	1	3 1	– –	– –	
White-rumped Shama *Copsychus malabaricus*	– – – –	– – – –	– – – –	3	3 1	– –	– –	
Black Redstart *Phoenicurus ochruros*	– 2 – –	– – – –	– – – –	3	2 1	2 –	– 1	
Hodgson's Redstart *Phoenicurus hodgsoni*	– 4 – –	– 1 – –	– – – –	3	2 1	6 1	2 –	
Daurian Redstart *Phoenicurus auroreus*	– – – –	– – – –	– – – –	1	2 1	– –	– –	
Guldenstadt's Redstart *Phoenicurus erythrogaster*	– – – –	– – – –	– – – –	1	– 1	– –	– –	
Blue-fronted Redstart *Phoenicurus frontalis*	6 3 3 7	– 1 1 1	– – – –	3	– 1	7 1	1 1	
White-throated Redstart *Phoenicurus schisticeps*	– – – 2	– – – –	– – – –	–	– –	6 –	4 –	
White-capped Redstart (Water-Redstart) *Chaimarrornis leucocephalus*	4 – 3 1	1 1 1 –	– – – –	1	2 1	4 1	1 1	
Plumbeous Redstart (Water-Redstart) *Rhyacornis fuliginosus*	5 – – –	1 – – –	– – – –	1	– 1	6 1	– 1	
Blue-fronted Robin *Cinclidium frontale*	– – – –	– – – –	– – 3 4	2	– –	– –	– –	
White-tailed Robin *Myiomela leucura*	– – – –	– – – –	– – – –	3	– –	– –	– –	
Grandala *Grandala coelicolor*	– – – –	– – – –	– – – –	–	– –	4 –	– –	
Little Forktail *Enicurus scouleri*	5 – – –	– – – 1	– – 1 1	1	– 1	– 1	2 1	
Black-backed Forktail *Enicurus immaculatus*	– – – –	– – – –	– – – –	3	1 1	– –	– –	
Slaty-backed Forktail *Enicurus schistaceus*	6 – – –	– 1 – –	– – – –	3	– 1	– –	– –	
Spotted Forktail *Enicurus maculatus*	2 1 6 1	– – 1 –	– – 1 –	1	– –	4 –	– –	
Leschenault's (White-crowned) Forktail *Enicurus leschenaulti*	– – – –	– – – –	– – – –	1	– 1	– –	– –	
Green Cochoa *Cochoa viridis*	– – – –	– – – –	– 1 – –	–	– –	– –	– –	
Purple Cochoa *Cochoa purpurea*	– – – –	– – – –	– 1 1 –	2	– –	– –	– –	
Common (Siberian/Asian) Stonechat *Saxicola torquata*	4 – – –	1 – – –	– – – –	1	3 1	6 1	– 1	
Grey Bushchat *Saxicola ferrea*	4 4 – –	– 1 – –	– – – –	3	2 –	4 1	– 1	

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Family Muscicapidae : subfamily Timaliinae								
White-throated Laughingthrush *Garrulax albogularis*	– – – –	– – – 1	– – – –	3	– –	4 1	– 1	
White-crested Laughingthrush *Garrulax leucolophus*	6 1 – –	1 1 – –	1 – – –	3	1 1	4 –	– –	
Greater Necklaced Laughingthrush *Garrulax pectoralis*	– – – –	1 – – –	– – – –	3	– 1	– –	– –	
Lesser Necklaced Laughingthrush *Garrulax monileger*	2 – – –	– – – –	– – – –	–	– 1	– –	– –	
Striated Laughingthrush *Garrulax striatus*	6 7 7 5	1 1 1 –	1 1 3 1	3	– –	4 –	– 1	
Rufous-necked Laughingthrush *Garrulax ruficollis*	4 – – –	– – – –	– – – –	1	– –	– –	– –	
Rufous-chinned Laughingthrush *Garrulax rufogularis*	– – – –	– – – –	2 – – –	–	– –	4 –	– –	
Spotted Laughingthrush *Garrulax ocellatus*	– – – 2	– – – –	– – – 1	3	– –	4 1	– –	
Grey-sided Laughingthrush *Garrulax caerulatus*	2 1 7 –	– – – –	– 1 1 –	3	– –	– 1	– –	
Streaked Laughingthrush *Garrulax lineatus*	– – 2 3	– – – –	– – 2 –	3	– –	6 1	– 1	
Blue-winged Laughingthrush *Garrulax squamatus*	4 – 2 –	1 1 – –	1 1 1 1	3	– –	– –	– –	
Scaly Laughingthrush *Garrulax subunicolor*	– – 2 –	– – – –	– – 3 1	3	– –	– –	– –	
Black-faced Laughingthrush *Garrulax affinis*	– 1 3 7	– – 1 1	– – – 1	3	– –	4 1	3 1	
Red-headed (Chestnut-crowned) Laughingthrush *Garrulax erythrocephalus*	6 3 3 3	1 1 1 1	– 2 2 –	3	– –	6 1	3 1	
Red-faced Liocichla *Liocichla phoenicea*	6 – – –	– – – –	1 – – –	3	– –	– –	– –	
Bugun Liocichla *Liocichla bugunorum*	– – 6 –	– – – –	– – – –	2	– –	– –	– –	
Abbott's Babbler *Malacocincla abbotti*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
Buff-breasted Babbler *Pellorneum tickelli*	– – – –	– – – –	– – – –	1	– –	– –	– –	
Spot-throated Babbler *Pellorneum albiventre*	– – – –	– – – –	– – – –	–	– 1	– –	– –	
Marsh Babbler *Pellorneum palustre*	– – – –	– – – –	– – – –	–	– 1	– –	– –	
Spotted (Puff-throated) Babbler *Pellorneum ruficeps*	– – – –	– – – –	– – – –	1	– 1	– –	– –	
Hodgson's (White-browed) Scimitar-Babbler *Pomatorhinus schisticeps*	– – – –	– – – –	– – – –	1	1 –	– –	– –	
Rufous-necked (Streak-breasted) Scimitar-Babbler *Pomatorhinus ruficollis*	– 4 6 4	– 1 – –	– 1 3 1	3	– –	6 1	– –	
Coral-billed Scimitar-Babbler *Pomatorhinus ferruginosus*	6 – – –	1 1 – –	1 – – –	3	– –	– –	– –	
Slender-billed Scimitar-Babbler *Xiphirhynchus superciliaris*	– – 2 –	– – – 1	– – – 1	3	– –	4 –	1 –	
Long-billed Wren-Babbler *Rimator malacoptilus*	– – – –	– – – –	– – – –	2	– –	– –	– –	
Eyebrowed Wren-Babbler *Napothera epilepidota*	– – – –	– – – –	– – – –	2	– –	– –	– –	
Scaly-breasted Wren-Babbler *Pnoepyga albiventer*	6 1 – 2	– – 1 1	– – – 3	3	– –	4 –	– 1	
Pygmy Wren-Babbler *Pnoepyga pusilla*	2 – – –	– 1 1 1	– 1 3 1	3	– –	4 1	– –	
Rufous-throated Wren-Babbler *Spelaeornis caudatus*	– 3 2 –	– – 1 –	– 1 3 –	3	– –	– –	– –	
Bar-winged Wren-Babbler *Spelaeornis troglodytoides*	– – 4 2	– – – 1	– – – 1	3	– –	– 1	– –	
Wedge-billed Wren-Babbler *Sphenocichla humei*	3 – – –	1 1 – –	– – – –	2	– –	– –	– –	
Spotted Wren-Babbler *Spelaeornis formosus*	2 – – –	– – – –	1 2 – –	2	– –	– –	– –	
Rufous-fronted Babbler *Stachyris rufifrons*	– – – –	– – – –	– – – –	1	1 1	– –	– –	
Rufous-capped Babbler *Stachyris ruficeps*	2 7 7 5	1 1 1 1	1 1 1 3	3	– –	6 1	– –	
Gold-headed (Golden) Babbler *Stachyris chrysaea*	6 2 3 –	1 1 – –	1 1 1 –	3	– 1	4 –	– –	
Grey-throated Babbler *Stachyris nigriceps*	6 – – –	1 – – –	– – – –	3	– 1	– –	– –	
Yellow-breasted Babbler (Striped Tit-Babbler) *Macronous gularis*	4 – – –	– – – –	– – – –	1	3 1	– –	– –	
Silver-eared Leiothrix (Mesia) *Leiothrix argentauris*	4 – – –	1 – – –	1 1 – –	3	2 1	– –	– –	
Red-billed Leiothrix *Leiothrix lutea*	– – 1 –	1 – – –	– – 2 –	1	– –	4 1	– 1	
Cutia *Cutia nipalensis*	2 2 6 –	1 – – –	1 1 1 –	3	– –	– –	– –	
Red-winged (white-browed) Shrike-Babbler *Pteruthius flaviscapis*	2 – – –	– 1 1 –	– 3 1 –	3	– –	4 –	– 1	
Rufous-bellied/Black-headed Shrike-Babbler *Pteruthius rufiventer*	– – 6 –	– – – –	– – – –	3	– –	– –	– –	
Green Shrike-Babbler *Pteruthius xanthochlorus*	– – – 6	– – – 1	– – – –	3	– –	2 –	– –	
Chestnut-throated/Black-eared Shrike-Babbler *Pteruthius melanotis*	2 3 4 4	– 1 1 –	1 1 1 –	3	– –	2 –	– –	
White-hooded Babbler *Gampsorhynchus rufulus*	2 – – –	– – – –	– – – –	3	– 1	– –	– –	
Hoary-throated Barwing *Actinodura nipalensis*	– – 4? –	– – – –	– – – –	3?	– –	– 1?	– –	

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Rusty-fronted Barwing *Actinodura egertoni*	6 7 7 ?	1 1 – –	1 1 1 –	3	– 1	– –	– –	
Austen's (streak-throated) Barwing *Actinodura waldeni*	– 7 3 2	– – 1 1	– – 1 1	3	– –	– –	– –	
Blue-winged Minla *Minla cyanouroptera*	2 – – –	1 1 – –	1 1 3 –	3	– 1	– 1	– 1	
Bar-throated (Chestnut-tailed) Minla *Minla strigula*	– 7 7 7	1 1 1 1	– – 1 3	3	– –	6 1	– –	
Red-tailed Minla *Minla ignotincta*	6 2 6 –	1 1 1 1	– – 3 3	3	– –	6 1	– 1	
Gold-breasted Tit-Babbler (Fulvetta) *Alcippe chrysotis*	4 3 7 7	– 1 – 1	– 1 1 2	3	– –	6 1	– 1	
Yellow-throated Tit-Babbler (Fulvetta) *Alcippe cinerea*	6 3 6 3	1 1 – –	1 1 3 –	3	– –	– –	– –	
Rufous-winged Tit-Babbler (Fulvetta) *Alcippe castaneceps*	2 3 2 5	1 1 1 1	– 1 3 3	3	– –	4 1	– 1	
Brown-throated Tit-Babbler (Fulvetta) *Alcippe ludlowi*	– – 3 7	– – – 1	– – – 1	3	– –	5 1	– 1	
Rusty-capped Tit-Babbler (Fulvetta) *Alcippe dubia*	– – – –	– – – –	– – – –	1	– –	– –	– –	
Nepal Tit-Babbler (Fulvetta) *Alcippe nipalensis*	2 4 – –	1 – – –	– – – –	3	2 1	– 1	– –	
Rufous Sibia *Heterophasia capistrata*	– – – –	– – – –	– – – –	–	– –	– –	2 1	
Rufous-backed Sibia *Heterophasia annectans*	6 1 4 –	1 1 – –	1 1 – 1	3	– –	– –	– –	
Beautiful Sibia *Heterophasia pulchella*	3 7 7 7	1 1 1 1	1 1 3 1	3	– –	6 1	– –	
Long-tailed Sibia *Heterophasia picaoides*	7 6 – –	1 1 – –	1 – – –	3	2 1	– –	– –	
White-naped Yuhina *Yuhina bakeri*	6 3 2 –	1 1 – –	1 1 1 –	3	– –	– –	– –	
Yellow-naped (Whiskered) Yuhina *Yuhina flavicollis*	6 7 7 2	1 1 – –	1 1 1 3	3	– 1	6 1	– 1	
Stripe-throated Yuhina *Yuhina gularis*	– – 3 7	– – 1 1	– 1 3 1	3	– –	5 1	3 1	
Rufous-vented Yuhina *Yuhina occipitalis*	– – 7 7	– – 1 1	– – 3 1	3	– –	4 1	1 1	
Black-chinned Yuhina *Yuhina nigrimenta*	6 6 – –	1 – – –	1 1 – –	3	– –	– –	– –	
White-bellied Yuhina *Yuhina zantholeuca*	2 – – –	– – – –	1 – – –	3	3 1	– –	– –	
Striated Yuhina *Yuhina castaniceps*	– – – –	– – – –	– – – ?	2	– –	– –	– –	
Fire-tailed Myzornis *Myzornis pyrrhoura*	– – 7 –	– – – –	– – – –	3	– –	4 1	– 1	
Family Muscicapidae : subfamily Panurinae								
Grey-headed Parrotbill *Paradoxornis gularis*	– – – –	1 – – –	– – – –	3	– –	– –	– –	
Fulvous-fronted Parrotbill *Paradoxornis fulvifrons*	– – – 1	– – – –	– – – –	–	– –	6 –	– –	
Black-throated Parrotbill *Paradoxornis nipalensis*	– 1 6 –	– 1 – 1	– 1 1 2	3	– –	– 1	– 1	
Lesser Rufous-headed Parrotbill *Paradoxornis atrosuperciliaris*	– – – –	– – – –	– – – –	1	– –	– –	– –	
Greater Rufous-headed Parrotbill *Paradoxornis ruficeps*	6 5 – –	– 1 – –	1 1 – –	3	– –	– –	– –	
Brown Parrotbill *Paradoxornis unicolor*	– – – 2	– – – 1	– – – –	2	– –	– 1	– 1	
Family Muscicapidae : subfamily Sylviinae								
Goldcrest *Regulus regulus*	– – – –	– – – –	– – – –	2	– –	– –	– –	
Black-throated (Hill) Prinia *Prinia atrogularis*	6 7 6 –	1 – 1 –	1 1 3 –	3	– –	6 –	– 1	
Chestnut-headed Tesia *Tesia castaneocoronata*	6 2 1 1	– – 1 –	– – 3 1	3	2 1	4 –	– 1	
Slaty-bellied Tesia *Tesia olivea*	6 – – –	1 1 – –	1 1 1 –	3	2 1	– –	– –	
Grey-bellied Tesia *Tesia cyaniventer*	– 3 3 –	– – 1 –	– 1 3 –	3	2 1	– –	– –	
Brown-flanked Bush-Warbler *Cettia fortipes*	4 3 – –	1 1 – –	– 1 3 –	3	– –	4 1	– 1	
Aberrant Bush-Warbler *Cettia flavolivacea*	– – – –	– – – –	– – – –	–	– –	– –	– 1	
Yellow-bellied Bush-Warbler *Cettia acanthizoides*	– – 6 2	– – – 1	– – – 2	3	– –	4 –	– –	
Grey-sided Bush-Warbler *Cettia brunnifrons*	2 – – –	– 1 – –	– – – –	3	– –	4 1	– 1	
Russet Bush-Warbler *Bradypterus mandelli*	– – – –	– – – –	– – – –	1	– –	4 1	– 1	
Brown Bush-Warbler *Bradypterus luteoventris*	– – – –	– – – –	– – – –	–	– –	– 1	– –	
Blunt-winged Warbler *Acrocephalus concinens*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
Blythe's Reed-Warbler *Acrocephalus dumetorum*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
Thick-billed Warbler *Acrocephalus aedon*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
Mountain Tailorbird *Orthotomus cuculatus*	– – – –	1 1 1 –	1 1 – –	3	– –	– –	– –	
Common Tailorbird *Orthotomus sutorius*	4 – – –	– – – –	– – – –	1	3 1	– –	– –	
Stoliczka's (white-browed) Tit-Warbler *Leptopoecile sophiae*	– – – –	– – – –	– – – –	–	– –	– –	– 1	
Smoky Leaf-Warbler *Phylloscopus fuligiventer*	– – – –	– – – –	– – – –	–	?2 –	– –	– –	
Dusky Leaf-Warbler *Phylloscopus fuscatus*	– – – –	– – – –	– – – –	1	2 –	– –	– –	
Tickell's Leaf-Warbler *Phylloscopus affinis*	– 1 3 –	– – – –	– – – –	3	1 1	4 1	– 1	
Orange-barred (Buff-barred) Leaf-Warbler *Phylloscopus pulcher*	2 2 3 1	– – 1 1	– – – –	3	– –	4 1	6 1	

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	Nov-Jan	Mar-Apr	May-Jun	O	P O	P O	P O	
Grey-faced (Ashy-throated) Leaf-Warbler *Phylloscopus maculipennis*	6 7 7 7	– 1 1 1	– – 1 1	3	– –	6 1	7 1	
Lemon-rumped Leaf-Warbler *Phylloscopus chloronotus*	2 2 1 1	1 – 1 –	– – – –	3	– –	4 1	1 1	
Hume's Leaf-Warbler *Phylloscopus humei*	– – – –	? – – –	– – – –	–	– –	– –	– –	
Yellow-browed (Inornate) Leaf-Warbler *Phylloscopus inornatus*	– – – –	1 – – –	– – – –	2	2 1	– 1	– –	
Greenish Leaf-Warbler *Phylloscopus trochiloides*	– – – –	– – – –	– – – –	–	2 1	4 1	– 1	
Large-billed Leaf-Warbler *Phylloscopus magnirostris*	– – – –	– – – –	– – 3 1	–	– –	– –	– 1	
Eastern Crowned Leaf-Warbler *Phylloscopus coronatus*	– – – –	– – – –	– – – –	1	– –	– –	– –	
Blyth's Crowned Leaf-Warbler *Phylloscopus reguloides*	– – 3 –	– 1 1 –	– 1 3 1	3	2 1	4 1	– 1	
Black-browed (Yellow-vented) Leaf-Warbler *Phylloscopus cantator*	– – – –	– – – –	– – – –	3	2 1	– –	– –	
Gold-spectacled/Whistler's Flycatcher-Warbler *Seicercus burkii*	– 1 1 1	1 1 – –	– – 1 3	3	– 1	4 1	– 1	
Grey-headed Flycatcher-Warbler (Warbler) *Seicercus xanthoschistos*	6 7 – –	1 1 – –	1 1 – –	3	– 1	4 1	– 1	
White-spectacled Flycatcher-Warbler *Seicercus affinis*	– – – –	– 1 – –	– – ? –	3	– 1	– –	– –	
Grey-cheeked Flycatcher-Warbler *Seicercus poliogenys*	6 7 – –	1 1 1 –	1 1 3 –	3	– 1	– –	– –	
Chestnut-crowned Flycatcher-Warbler *Seicercus castaniceps*	2 3 2 –	1 1 1 1	1 1 1 1	3	– 1	6 –	– 1	
Broad-billed Flycatcher-Warbler *Tickellia hodgsoni*	– – – –	– – 1 1	– – 1 3	3	– 1	– 1	– –	
Rufous-faced Flycatcher-Warbler *Abroscopus albogularis*	– – – –	– – – –	– – – –	2	– –	– –	– –	
Black-faced Flycatcher-Warbler *Abroscopus schisticeps*	– 7 7 6	– – 1 –	– 1 3 –	3	– –	6 –	– –	
Yellow-bellied Flycatcher-Warbler *Abroscopus superciliaris*	– – – –	– – – –	– – – –	1	3 1	– –	– –	
Striated Marsh Warbler (Grassbird) *Megalurus palustris*	– – – –	– – – –	– – – –	–	3 –	– –	– –	
Family Muscicapidae : subfamily Muscicapinae								
Sooty (Dark-sided) Flycatcher *Muscicapa sibirica*	– – – –	1 – – –	– 1 3 1	3	1 –	4 1	– 1	
Asian Brown Flycatcher *Muscicapa daurica*	– – – –	– – – –	– – – –	–	– 1	– –	– –	
Brown-breasted Flycatcher *Muscicapa ferruginea*	– – – –	– – – –	– – – –	–	– –	4 –	– –	
Ferruginous Flycatcher *Muscicapa ferruginea*	– – – –	– – – –	– – 3 –	1	– –	4 –	– 1	
Slaty-backed Flycatcher *Ficedula hodgsonii*	2 – ? 4	– – – –	– – – –	1	– –	– –	– –	
Orange-gorgeted Flycatcher *Ficedula strophiata*	6 7 7 5	1 1 1 –	– – 3 3	3	– 1	5 1	– 1	
Red-throated (Red-breasted) Flycatcher *Ficedula parva*	4 – – –	1 – – –	– – – –	1	3 1	– –	– –	
White-gorgeted Flycatcher *Ficedula monileger*	4 3 – –	– 1 – –	– 1 – –	3	– –	– –	– –	
Rufous-breasted Blue (Snowy-browed) Flycatcher *Ficedula hyperythra*	– – – –	1 – 1 1	– – 1 –	3	– 1	– –	– –	
Little Pied Flycatcher *Ficedula westermanni*	– – – –	– – – –	– 1 – –	1	2 1	4 –	– –	
Ultramarine Flycatcher *Ficedula superciliaris*	– – – –	– – – –	– – 2 –	3	– –	– 1	– 1	
Slaty-blue Flycatcher *Ficedula tricolor*	1 1 1 1	– – 1 –	– – – –	3	– –	4 1	– 1	
Sapphire Flycatcher *Ficedula sapphira*	– – – –	– – 1 –	– – 3 –	1	– –	– –	– –	
Verditer Flycatcher *Eumyias thalassina*	– 1 1 –	1 1 1 1	1 1 3 1	3	2 1	4 1	– 1	
Large Niltava *Niltava grandis*	6 – 6 –	– 1 – –	1 1 1 –	3	– 1	– –	– –	
Small Niltava *Niltava macgrigoriae*	2 – – –	1 – – –	1 1 1 –	3	– 1	4 –	– –	
Rufous-bellied Niltava *Niltava sundara*	– – – –	– – – –	– 1 3 –	3	– 1	4 –	– 1	
Vivid Niltava *Niltava vivida*	– – 6 2	– – – –	– – – –	–	– –	– –	– 1	
Brooks's (Pale-chinned) Flycatcher *Cyornis poliogenys*	– – – –	– – – –	– – – –	1	3 1	– –	– –	
Pale Blue-Flycatcher *Cyornis unicolor*	– – – –	– – – –	1 1 1 –	3	2 1	– –	– –	
Blue-throated Flycatcher *Cyornis rubeculoides*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
Large-billed (Hill) Blue-Flycatcher *Cyornis banyumas*	– – – –	– – – –	– – – –	2	– –	– –	– –	
Pygmy Blue-Flycatcher *Muscicapella hodgsoni*	– – – –	– – – –	– – – –	2	– 1	– –	– –	
Grey-headed (Canary)-Flycatcher *Culicicapa ceylonensis*	6 3 – –	1 1 1 –	1 1 3 1	3	2 1	4 –	– 1	

	Eaglenest				Pak	Dir	Taw	Rem
	Nov-Jan	Mar-Apr	May-Jun	O	P O	P O	P O	
Family Muscicapidae : subfamily Monarchinae								
Asian Paradise-Flycatcher *Terpsiphone paradisi*	– – – –	– – – –	– – – –	2	3 1	– –	– –	
Black-naped Monarch-Flycatcher *Hypothymis azurea*	– – – –	– – – –	– – – –	3	3 1	– –	– –	
Family Muscicapidae : subfamily Rhipidurinae								
Yellow-bellied Fantail-Flycatcher *Rhipidura hypoxantha*	6 7 – –	1 1 1 –	– – 1 3	3	– 1	6 1	– 1	
White-throated Fantail-Flycatcher *Rhipidura albicollis*	2 2 – –	1 – – –	1 1 3 –	3	2 1	6 1	– 1	
Family Aegithalidae								
Red-headed (Black-throated) Tit *Aegithalos concinnus*	6 4 6 4	1 – – –	– – 3 –	3	– –	4 –	– –	
Rufous-fronted Tit *Aegithalos iouschistos*	– – – 4	1 – – –	– – – –	3	– –	6 –	4 1	
Family Paridae								
Coal Tit *Parus ater*	– – 1 1	– – – 1	– – – –	–	– –	6 1	7 1	
Rufous-bellied (Rufous-vented) Tit *Parus rubidiventris*	– – – –	– – – –	– – – –	–	– –	6 1	7 1	
Great Tit *Parus major*	5 – – –	1 – – –	– – – –	1	2 1	– –	– –	
Green-backed Tit *Parus monticolus*	6 4 6 –	– – 1 –	– – 2 –	3	– –	6 1	– 1	
Black-spotted Yellow Tit *Parus spilonotus*	– – 7 –	– – 1 –	1 1 1 –	3	– 1	2 –	– –	
Yellow-browed Tit *Sylviparus modestus*	– – 7 7	– – 1 1	– – 1 1	3	– –	2 1	3 1	
Fire-capped Tit *Cephalopyrus flammiceps*	– – – –	– – – –	– – – –	–	– –	– 1	– –	
Sultan Tit *Melanochlora sultanea*	6 – – –	1 – – –	1 – – –	3	3 1	– –	– –	
Brown Crested (Grey-crested) Tit *Parus dichrous*	– – – 1	– – – –	– – – –	1	– –	4 1	6 1	
Family Sittidae								
Chestnut-bellied Nuthatch *Sitta castanea*	– – – –	– – – –	– – – –	3	3 1	– –	– –	
White-tailed Nuthatch *Sitta himalayensis*	– 2 7 7	– – 1 –	– – 3 –	3	– –	6 1	– 1	
Velvet-fronted Nuthatch *Sitta frontalis*	– – – –	– – – –	– – – –	–	3 1	– –	– –	
Beautiful Nuthatch *Sitta formosa*	6 2 – –	1 1 – –	1 – – –	3	– –	– –	– –	
Wallcreeper *Tichodroma muraria*	1 – – –	– – – –	– – – –	1	– –	– –	– –	
Family Certhiidae								
Eurasian Treecreeper *Certhia familiaris*	– – – –	– – – –	– – – –	–	– –	6 –	– 1	
Rusty-flanked Treecreeper *Certhia nipalensis*	– 2 1 1	– – – –	– – – –	3	– –	4 1	– –	
Brown-throated Treecreeper *Certhia discolor*	– 1 – –	– – 1 –	– – 1 –	3	– –	– –	– 1	
Family Dicaeidae								
Yellow-vented Flowerpecker *Dicaeum chrysorrheum*	– – – –	– – – –	– – – –	–	3 1	– –	– –	
Yellow-bellied Flowerpecker *Dicaeum melanoxanthum*	– – 5 –	– – 1 –	– – – –	1	– –	4 1	– –	
Scarlet-backed Flowerpecker *Dicaeum cruentatum*	– – – –	– – – –	– – – –	1	– 1	– –	– –	
Tickell's (Pale-billed) Flowerpecker *Dicaeum erythrorhynchos*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
Plain Flowerpecker *Dicaeum concolor*	– – – –	– – – –	– – – –	1	3 1	– –	– –	
Fire-breasted Flowerpecker *Dicaeum ignipectus*	– 3 3 –	– 1 – –	1 – 1 1	3	– 1	4 –	– 1	
Family Nectariniidae								
Ruby-cheeked Sunbird *Anthreptes singalensis*	– – – –	– – – –	– – – –	2	– 1	– –	– –	
Mrs Gould's Sunbird *Aethopyga gouldiae*	– – – –	– – – 1	– – 1 3	3	– –	4 1	– 1	
Green-tailed Sunbird *Aethopyga nipalensis*	6 7 7 7	– 1 1 1	– 1 3 1	3	– 1	6 1	– 1	
Black-throated Sunbird *Aethopyga saturata*	6 3 – –	1 – – –	1 1 1 –	3	– 1	– –	– –	
Crimson Sunbird *Aethopyga siparaja*	– – – –	– – – –	– – – –	1	1 1	– –	– –	
Fire-tailed Sunbird *Aethopyga ignicauda*	– – – –	– – – 1	– – – –	3	– –	4 1	– 1	
Little Spiderhunter *Arachnothera longirostra*	– – – –	– – – –	– – – –	3	1 1	– –	– –	
Streaked Spiderhunter *Arachnothera magna*	6 – – –	1 – – –	1 3 – –	3	1 1	– –	– –	
Family Zosteropidae								
Oriental White-eye *Zosterops palpebrosus*	2 2 – –	– – – –	– – – –	3	2 1	4 1	– 1	
Family Fringillidae : subfamily Emberizinae								
Crested Bunting *Melophus lathami*	– – – –	– – – –	– 2 – –	–	– –	4 1	– –	
Little Bunting *Emberiza pusilla*	2 5 1 –	– 1 – –	– – – –	3	– 1	2 1	– –	
Yellow-breasted Bunting *Emberiza aureola*	– 1 – –	– – – –	– – – –	1	– –	– –	– –	
Black-faced Bunting *Emberiza spodocephala*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
Chestnut Bunting *Emberiza rutila*	– – – –	– – – –	– – – –	2?	– –	– –	– –	
Family Fringillidae : subfamily Fringillinae								
Yellow-breasted Greenfinch *Carduelis spinoides*	– – – –	– 1 – –	1 – – –	3	– –	4 1	– 1	
Tibetan Siskin *Carduelis thibetana*	– – – –	– – – –	– – – –	–	– –	4 –	– –	
Hodgson's (Plain) Mountain-Finch *Leucosticte nemoricola*	– – 1 –	– 1 – –	– – – –	–	– –	– 1	4 –	

	Eaglenest				Pak	Dir	Taw	Rem
	Nov-Jan	Mar-Apr	May-Jun	O	P O	P O	P O	
Pink-browed Rosefinch *Carpodacus rodochrous*	– – – –	– – – –	– – – –	1	– –	– –	2 –	
Dark-rumped Rosefinch *Carpodacus edwardsii*	– – – –	– – – –	– – – –	1	– –	2 1	– –	
Dark-breasted Rosefinch *Carpodacus nipalensis*	– 1 1 1	– – 1 –	– – – –	3	– –	– 1	– 1	
Common Rosefinch *Carpodacus erythrinus*	– – – –	– 1 – –	– – – –	2	3 –	4 –	– 1	
Spot-winged Rosefinch *Carpodacus rhodopeplus*	– – – –	– – – –	– – – –	–	– –	– 1	– 1	
White-browed Rosefinch *Carpodacus thura*	– – – –	– – – –	– – – –	–	– –	6 1	6 1	
Streaked Great-Rosefinch *Carpodacus rubicilloides*	– – – –	– – – –	– – – –	–	– –	– 1	– 1	
Beautiful Rosefinch *Carpodacus pulcherrimus*	– – – –	– – – –	– – – –	–	– –	– –	2 1	
Crimson-browed Finch *Propyrrhula subhimachala*	– – 2 6	– – – –	– – – –	3	– –	– 1	– –	
Scarlet Finch *Haematospiza sipahi*	– – – –	– – – –	– 1 2 –	3	– –	– –	– 1	
Brown Bullfinch *Pyrrhula nipalensis*	– – ?2 –	– – ?1 ?1	– – – ?1	?1	– –	2 –	– –	
Red-headed Bullfinch *Pyrrhula erythrocephala*	– – – 4	– – – 1	– – – –	3	– –	4 1	– 1	
Beavan's (Grey-headed) Bullfinch *Pyrrhula erythaca*	– – 2 2	– – 1 1	– – 2 –	3	– –	4 1	– 1	
Gold-naped Black Finch *Pyrrhoplectes epauletta*	– – – 4	– 1 1 1	– – – 1	3	– –	– 1	– 1	
Collared Grosbeak *Mycerobas affinis*	– – – –	– 1 – 1	– – – –	–	– –	1 1	– –	
Spot-winged Grosbeak *Mycerobas melanoxanthos*	– – – –	– – – –	– – – –	–	– –	– 1	– –	
White-winged Grosbeak *Mycerobas carnipes*	– – – –	– – – –	– – – –	–	– –	– 1	2 1	
Family Estrildidae								
White-rumped Munia *Lonchura striata*	– – – –	– – – –	– – – –	1	1 1	– –	– –	
Spotted (Scaly-breasted) Munia *Lonchura punctulata*	– – – –	– – – –	– – – –	1	– 1	– –	– –	
Family Passeridae : subfamily Passerinae								
Eurasian Tree Sparrow *Passer montanus*	4 4 – –	1 – – –	2 2 – –	1	3 1	6 1	2 1	
House Sparrow *Passer domesticus*	– – – –	– – – –	– – – –	–	– 1	2 –	– –	
Cinnamon Tree (Russet) Sparrow *Passer rutilans*	– – – –	– – – –	– 2 – –	3	– –	6 1	– 1	
Family Sturnidae								
Spot-winged Starling *Saroglossa spiloptera*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
Grey-headed (Chestnut-tailed) Starling *Sturnus malabaricus*	– – – –	– – – –	– – – –	–	3 1	– –	– –	
Asian Pied Starling *Sturnus contra*	– – – –	– – – –	– – – –	–	3 –	– –	– –	
Common Myna *Acridotheres tristis*	4 4 – –	1 – – –	– – 2 –	1	3 1	– –	– –	
Jungle Myna *Acridotheres fuscus*	– – – –	– – – –	– – – –	1	2 –	– –	– –	
Common Hill-Myna *Gracula religiosa*	4 4 – –	– – – –	– – – –	1	3 1	– –	– –	
Family Oriolidae								
Black-headed (Black-hooded) Oriole *Oriolus xanthornus*	– – – –	– – – –	– – – –	1	3 1	– –	– –	
Slender-billed Oriole *Oriolus tenuirostris*	– – – –	– – – –	– – – –	–	2 –	– –	– –	
Maroon Oriole *Oriolus traillii*	6 – – 4	1 – – –	1 1 3 1	3	2 1	4 –	– 1	
Family Dicruridae								
Black Drongo *Dicrurus macrocercus*	– – – –	– – – –	– – – –	1	2 1	– –	– –	
Ashy Drongo *Dicrurus leucophaeus*	6 7 – 2	1 1 – –	1 1 3 1	3	3 1	4 1	– 1	
Crow-billed Drongo *Dicrurus annectans*	– – – –	– – – –	– – – –	1	1 –	– –	– –	
Bronzed Drongo *Dicrurus aeneus*	6 5 – –	1 1 – –	1 1 – –	3	2 1	– –	– –	
Lesser Racket-tailed Drongo *Dicrurus remifer*	2 – – –	1 – – –	1 1 – –	3	1 1	– –	– –	
Spangled (Hair-crested) Drongo *Dicrurus hottentottus*	4 – – –	– – – –	– – – –	3	3 1	– –	– –	
Greater Racket-tailed Drongo *Dicrurus paradiseus*	2 – – –	– – – –	– – – –	3	3 1	– –	– –	
Family Artamidae								
Ashy Woodswallow *Artamus fuscus*	– – – –	– – – –	– – – –	1	2 –	– –	– –	
Family Corvidae								
Eurasian Jay *Garrulus glandarius*	– – – –	– – – –	– – – –	1	– –	4 1	– 1	
Yellow-billed Blue-Magpie *Urocissa flavirostris*	– – 3 7	– – 1 –	– – 1 1	3	– –	4 1	2 –	
Common Green Magpie *Cissa chinensis*	2 – – –	1 – – –	– – – –	1	– 1	– –	– –	
Indian (Rufous) Treepie *Dendrocitta vagabunda*	– – – –	– – – –	– – – –	–	2 1	– –	– –	
Grey Treepie *Dendrocitta formosae*	2 – – –	– – – –	– – – –	3	3 1	– 1	– 1	
Black-browed (Collared) Treepie *Dendrocitta frontalis*	– – – –	– – – –	– – – –	3	– –	– –	– –	
Spotted Nutcracker *Nucifraga caryocatactes*	– 4 – 6	– – – 1	– – – 3	3	– –	4 1	2 1	
Jungle (Large-billed) Crow *Corvus macrorhynchos*	6 7 1 –	– 1 – –	– – 2 –	3	2 1	4 1	– 1	
House Crow *Corvus splendens*	– – – –	– – – –	– – – –	–	2 1	– –	– –	
Red-billed Chough *Pyrrhocorax pyrrhocorax*	– – – –	– – – –	– – – –	–	– –	4 –	2 1	
Yellow-billed Chough *Pyrrhocorax graculus*	– – – –	– – – –	– – – –	–	– –	– –	– 1	

Black-necked Cranes on the paddies outside the Sangti village, Dirang.

The broad floor of the Sangti valley seen in the distance
from a view point on the Mandala ridge above Dirang.

Small flocks of 1-9 Black-necked Cranes regularly visit Sangti valley every winter between December and February to feed on the fallow rice paddies outside the village. This is the only known wintering ground of the species inside India.

Biodiversity Portfolio – 12

? *Megophrys major* ?

? *Xenophrys boettgeri* ?

? *Xenophrys* sp

? *Rhacophorus taroensis* ?

Rhacophorid sp

Philautus sp

Philautus sp

Philautus sp

? *Paa* sp ? may be a new species

(funded by The Rufford-Maurice-Laing Foundation, UK)

Ramana Athreya / Eaglenest Biodiversity Project / Kaati

Appendix A-2

Range Extensions and Records of Uncommon Birds[1]

Arunachal Pradesh has a mountainous terrain with tall peaks and steep gradients (from 100m to 7000m altidue over just 150 km) and is riven by deep river valleys resulting in geographical and ecological barriers to range extension of species. For instance the River Brahmaputra is a barrier for many species. Similarly, the extreme north-western district of Tawang is isolated from the rest of Arunachal Pradesh by the 4500m high Sela ridge and the bird assemblage of that region retains some W. Himalayan elements (Black-capped Sibia for instance). So, the terrain is to some extent responsible for the fragmented nature of the distribution of species. However I feel that a more important reason for the gaps in distribution is simply lack of surveys.

Kazmierczak & van Perlo (2000; hereafter KV00) carry the bird distribution maps with the latest information. They have also endeavoured to provide additional information in their maps through colour and pattern coding. The maps in G98 (see footnote) are similar but lack the additional information and are only complete to 1997. Rasmussen & Anderton (2006) is the latest field guide for the region but is not yet available in India and reviews of the book suggest that they have opted for rigour over completeness. They have restricted their distribution maps to information available from museum specimens only and ignored the vast majority of information collected visually in the last few decades. Thus for all practical purposes the KV00 provides the latest status of sight records, and the records presented here are all visual records (supplemented by audio recordings). However Grimmett et al (1998; hereafter G98) and Ali & Ripley (1987; hereafter AR87) have more detailed information on locally deviant distributions and altitudes. For instance, while KV00 provide a single number for the maximum altitude of a species within the subcontinent the other two may specify different values for Bhutan and India or even for the mountains north and south of the Brahmaputra. These three principal sources were supplemented by books dealing with specific families of birds worldwide (e.g. Ferguson-Lees et al 2001) though the utility of such sources is vitiated to some extent by the broad brush they (unavoidably) use.

The maps in KV00 show a prominent hole around Eaglenest. The work of Inskipps in Bhutan (e.g. Inskipp, Inskipp & Grimmett 2004) has provided a large body of data to the west. The areas of Arunachal to the east of Eaglenest are less well known than Bhutan bird-wise but many species have been shown ranging on either side with a gap in western Arunachal. Given this patchiness inclusion of species in this list is in some sense subjective. I have opted for a liberal definition in an area which can do with more information – any species whose range does not cover Eaglenest (e.g. Honeyguide or whose distribution extends only on one side of Eaglenest (i.e. Eaglenest is the edge) or a species which is known only from scattered records (e.g. Vivid Niltava) is included here.

In this work the english and scientific names (from Manakadan & Pittie 2000) of each species is followed by the known information for the species from AR87, G98 and KV00 in parantheses. This is then followed by observations obtained during the Eaglenest project and finally those from S94 (Singh 1994), AK95 (Athreya & Kartikeyan 1995), S99 (Singh 1999), KS99 (Kumar & Singh 1999) and AC03 (Choudhuhry 2003). AK95, S99 and KS99 never found their way into ornithological journals. So, most of this information on birds of western Arunachal, obtained during the last decade, has not been used in the latest field guides and hence the prevalence of gaps in the distribution maps in the region of western Arunachal … which this report and the journal paper being prepared will hopefully rectify. Some of the other acronyms and shorthand used are:

[1] While this Appendix, in common with the report, is written in the first person many observers have contributed to this report. See sec. 4.1.2 on page 51 for the full list.

WW	West of Bhutan (Sikkim or Nepal)
BH	Bhutan
AP	Arunachal Pradesh
WAP	Western Arunachal; East Kameng, West Kameng and Tawang
CAP	Central Arunachal Pradesh; from Papumpare to Brahmaputra river (Dihang)
EAP	Eastern Arunachal Pradesh; east and south of Brahmaputra (includes SAP)
NAP	All Arunachal Pradesh excluding SAP
SAP	South-eastern Arunachal Pradesh in Tirap and Changlang (Namdapha) districts
TW	Tawang in extreme north-western Arunachal wedged in between Bhutan and Tibet
BV	Brahmaputra valley (Assam)
EN	Eaglenest

The mention of a region indicates a previous record there while an accompanying negative "–" negates it (e.g. WAP– : not found in W. Arunachal). Altitudinal limits are shown in standard notation with <1000m meaning "below 1000m" and >3000m meaning "above 3000m". Other symbols include "=1" (eg. TW=1, known only from one locality in Tawang; may include more than 1 record in that locality), "=f" (e.g. AP=f, known only from a few localities in Arunachal Pradesh) and "=e" (e.g. TW=e, edge of the distribution in Tawang).

A-2.1 Species Distribution:

Black Stork (AP–, <1000m in Nepal; G98, AR87 2925m on passage): A solitary bird observed on 2005-12-24 from 1300m at New Khellong soaring above the Hathi Nala valley. This was more likely a wintering bird than one on passage. Only a few records from AP (only Pakke in WAP: S94, D98 and this project on 2004-04-15 at 130m soaring over the river; only D'Ering in EAP: S94).

Brahminy Shelduck (AP–): A pair on 2004-10-8 (probably on passage) on the ice-edged lake at Sela Pass at 4200m. Common winter visitor to Assam. Previously reported from Sela only by S99 and KS99 (in early November).

Jerdon's Baza (AP–; <1800m): A solitary bird on an exposed perch in the evening at 2100m on 2005-12-28. The white-tipped vertical crest makes this raptor quite distinctive and it can only be confused with the much larger mountain hawk-eagle on a very casual/careless glance. Generally uncommon. Also reported from Pakke (S94, AK95) and Nameri (Barua & Sharma 2005); several records, including our own in March and April 2006)

Himalayan Griffon (TW, AP–): A pair of birds flying over the Eaglenest ridge at 3200m on 2004-12-25. Also reported from Eaglenest by AC03. Only one other record south of Sela, from Dirang (S99)

Crested Goshawk (<2100m): Many sightings all the way up to 2500m in November 2003 and during late December 2005 – early January 2006. Prominent, white puffed-out undertail coverts make it an easy identification in overhead flight. In January 2005 a bird was seen displaying (?) - in the midst of a glide it would hunch up the wings and flutter them briefly while splaying out the tail coverts.

Northern Goshawk (AP=1; AR87: rare winter visitor to lower Himalayas of Assam (=Arunachal Pradesh)**):** A single bird seen on several occasions in the Chakoo meadow at 2400m around 2003-11-09 usually perched on top of a tall tree. One in Sangti valley in Dirang on 2006-04-11. Previously reported from below Eaglenest (S94) and Dirang and Tawang (S99).

Upland Buzzard (TW=1, AP–): Seen twice near Sunderview: from 2500m on 2004-12-31 in overhead flight, the bird flew away over the ridge at 3200m; from 2400m on 2005-01-2 the bird climbed up from below in the valley. A rather pale, predominantly whitish buzzard with a much heavier build than the more frequently seen Common Buzzard (in the same area). The second bird afforded closer views of the upper and lower surfaces. The diagnostic(?) large white patch on the base of the primaries was obvious. The underside of the flying bird very closely matched the illustration on Plate 13.2 in Krys, including the pale tail (appearing unmarked), darkened flanks and dark bar on upper breast. S99 has reported possible sighting of this species from Tawang.

Common Buzzard (WAP–, AP=2): Many sightings during the project of a compact buzzard with faintly barred sandy- or grey-brown tail and many with the diagnostic "V" shaped breast band. Chander village in Dirang at 3000m on 2003-11-17, several sightings in 4th week of March 2004 at 1500m in Singchung village, outside Seijusa in E. Kameng at 150m on 2004-04-15, regularly seen in the Sangti valley in Dirang at 1500m on 18-12-2004 (photographed), on 2006-03-25, and 2006-04-11. All the birds were in very open, mostly treeless, drier-than-average terrain.

Rufous-bellied Hawk-Eagle (<1500m): An juvenile at 2200m on 2004-12-29, involved in a spectacular chase of pigeons under the canopy through bamboo and dense broad-leaved forest. Also reported at 2750m in Eaglenest by AC03.

Blyth's Tragopan (all BH and NAP records apart from the type specimens very tentative): The presence of this species from Eaglenest was hitherto based on a partial preserved skin seen in Sessa (AC03). Many of us observed (photographed by Peter Schmidt) a female of this species on 2006-03-18 at 1950m near Bompu. I saw a male at about 1800m in that area late in the afternoon on 2006-04-22. Dalvi (pers. comm.) saw a male with chicks at the first site in late May.

The species is split into the *blythii* subspecies south of the Brahmaputra and *moleworthi* in the Eastern Himalayas north of the Brahmaputra. The latter is only known from 3 specimens and most of the other records are rather tentative[2]. We are still not sure of the Eaglenest subspecies.

Himalayan Monal (TW=e): A male-female pair was seen at 3800m south of Sela on 2006-04-12

Black-necked Crane (WAP–, AP?): Observed a family party of 3 cranes in Sangti valley in Dirang on fallow paddies just outside the village at 1500m on 2004-12-18. According to the villagers a flock of 1-10 birds have been visiting their area every year "… since we were kids." According to them the birds appear in late November and depart in late February when work begins on the paddy fields. The Sangti birds have been known to Indian birders for at least a decade and yet neither KV00 nor G98 refer to it nor is it listed in any of the other references. They, as well as the AR87 only mention the birds of the Apatani valley in CAP, from where it has not been reported in recent years.

Elwe's/Black-tailed Crake (WAP–; AP=2): On a tip from Peter Lobo who had seen it there the previous winter I called out this species from rushes on the Sangti paddies in Dirang on 2006-04-11. There have been only two other records from Arunachal (Ludlow & Kinnear 1944 and S94; same as AP=2)

Long-billed Plover (TW=2): Several regularly seen on all visits to Sangti valley in Dirang on the shingle banks of the river at 1500m. On 2004-12-2004 (photographed), mid-December 2005,

[2] See the Blyth's Tragopan species account under Red Data Book threatened birds of Asia maintained by Birdlife International at http://www.rdb.or.id/view_html.php?id=299&op=tragblyt

2006-03-24, 2006-04-11 and 2006-04-13. Similar to the Little Ringed-Plover but larger and the white forehead edged with dark, long buff supercilium is diagnostic (see also Hayman, Marchant & Prater 1986). Only two previous AP (Tawang) records (Ludlow & Kinnear 1944; S99).

Northern Lapwing (WAP–): A single bird outside Sangti village in Dirang on the nearby fallow paddies at 1500m on 2004-12-18. Previous records only from CAP (S99) and EAP (P94).

Red-wattled Lapwing: A single bird in Dirang (Sangti village) on fallow paddies just outside the village at 1500m on 2004-12-18. Also seen on 2004-03-24 and 2006-04-13 in the same place. This species is abundant in Assam and all previous Arunachal records are from the foothills and plains immediately adjacent to Assam. This is perhaps the first record from an inner valley (beyond the first major ridge) in Arunachal Pradesh.

Snow Pigeon (TW=e): Regularly seen in the Sela area on both sides of the pass.

Hodgson's Hawk-Cuckoo (AP–): The bird has been recorded on 5 occasions in Eaglenest : at 1500m on 2004-05-28 and 2004-06-03 below Bompu, at 2450m above Chakoo on 2004-06-04, at 1950m at Bompu on 2006-03-16 and the next day. It has also been reported from Eaglenest between 1200m and 1800m by AC03.

Emerald Cuckoo (WAP–, CAP=1; KV03 <1000m(1830m); G98 <2200m India, 2745m Bhutan): Many, and vocal, birds in Pakke (Khari camp) at 150m on 2004-04-16 and one in Seijusa on 2004-04-15. Two sightings at 12750m around Sessni in Eaglenest on 28th May and 3rd June 2004. A male photographed at 2300m at Lama Camp on 2005-05-09. Only previous record from CAP (S94).

Spotted/Mountain Scops-Owl (WAP-, AP=2): Regularly heard in Eaglenest between 1500m and 2400m. Previously reported from Eaglenest by S99 and AC03.

Tawny Wood-Owl (WAP–): A bird seen after nightfall at 2770m at Eaglenest Pass on 2004-04-05. Only 3 other sightings from WAP (S99).

Silver-backed Needletail-Swift (WAP–; CAP=2): We observed this over Pakke at 150m on 2005-04-16 and also at below 900m on 2006-04-06 in Eaglenest. Previously reported from Pakke (S94 and S99) and by AC03 from Eaglenest at 2500m. The latter record is the highest in India where the sympatric White-throated Needletail seems to keep this species restricted to altitudes below 1500m.

Pacific Swift (WAP=2, AP–): Not numerous but a few are regularly encountered above 2600m below Eaglenest Pass (10-05-2005 and in March and April 2006). AC03 reported it from 2400m. Other records from 2900-3300m in Dirang and Tawang (S94, S99) and from Pakke at 150m (S94).

Ward's Trogon (AP=f): Eaglenest seems to host a substantial population as evidenced by our records over a year though a quantitative estimate has yet to be taken up - 7 separate sightings of 2-4 birds and 1 flock of 16 birds (!) following one another across a clearing during 4 days in mid November 2003; a pair on 2004-04-06 and a single female on 2004-04-09. A male on 2004-05-24 and two records of a male-female in the same place in early June 2005. These birds were seen going into and out of a hole in a dead tree stump. If that was indeed a nest it would be the first breeding record for the species anywhere. 4 separate groups of birds (once 2 females, once 1F, twice M+F) were whistled out on 2005-01-01. One female at 1500m around 2005-05-10. Three seen and two others heard calling on 2006-03-19 and a pair were seen in the same area on 2006-04-03. All our Eaglenest records, except the May 2005 female, are from a narrow band between 2300m and 2500m altitude. Very surprisingly we also saw a male and 2 females on 2004-12-21

in degraded forest at 2700m above Dirang enroute to Mandala. We saw another male there flying across the road and perching on a garden fence on 2006-04-13. Three other sightings of this species have been reported from Eaglenest (S94, AC03). Eaglenest is the eastern limit of its regular range extending across southern Bhutan. There is a record of this bird from EAP (S94). The several calls we have heard include a Bay Woodpecker-like chatter; a soft fluty pu-pu-pu-pu-pu-pu -- pew -- pew -- pew -- pew -- pew -pu-pu-pu-pu, with the sections variable in length. On many occasions that this call was whistled we have obtained a very Giant Squirrel-ish (*Ratufa* sp.) chatter in response from a source unseen which may well be a agonistic response of the trogon to playback.

Red-headed Trogon (<1800m (2400m)): a male at 1950m on 2004-04-13.

Rufous-necked Hornbill (<1800 Arunachal, <2090m Bhutan): This species has been seen at 2000m near Bompu every now and then (12-04-2004, 28-12-2005 and March and April 2006). Common in the forests between Bompu and Khellong (800-1500m), especially around Sessni (1300m)

Golden-throated Barbet (<2400m): a bird at 2500m on 2005-01-02 and the next day. A common bird below 1900m in all seasons I have only seen this bird between 1900m and 2500m, on several occasions, in winter.

Blue-throated Barbet (<1500m (2000m) India; <1445m Bhutan): Many sightings at 2400m in end December 2004. AK95 also reported this species at 2000-2400m in January 1995. We did not note any birds in summer and AC03 lists this bird below 1500m. All other Arunachal records (S94, S99) have been below 1100m

Yellow-rumped Honeyguide (CAP=1?): Only one record during this project at 2300m at Lama Camp on 2006-04-24 when Frederik Ellin and Peter Schmidt who were part of my bird tour group photographed this bird on a tree in an area with no known bee hives. This is the first record from western Arunachal

Yellow-rumped Honeyguide photographed by Peter Schmidt in March 2006

Bay Woodpecker (<2000 India, <2400m Bhutan): Two sightings between 2500 and 2700m in the 1st week of January, in 1995 and 2005.

Blue-naped Pitta (WAP–; CAP–): AK95 record from Pakke was the first for WAP. We also saw it in Nameri on 2006-03-14 (first record?) and heard it above Khellong at 1200m 5 days later.

Horned Lark (AP–): A female was photographed at 3600m along the Jang-Rama Spur road in Tawang on 2004-10-11. AR87 reported this bird from AP but both KV00 and G98 have removed this bird from the state list; indeed one could find no published basis for the AR87 record.

Dusky Crag Martin (WAP=1): The only record for Arunachal Pradesh, indeed for the eastern part of the Subcontinent (!) are the Eaglenest records – first by AK95, then AC03 and a flock of 10+ we saw at 1000m above Khellong on 2004-04-06.

Striated Bulbul (<2400m (3000m)): Several flocks were seen in late December 2004 and early January 2005 at 2500m and once even at 2700m at Eaglenest Pass. This species is quite common but all previous sightings, except one at 2400m), were below 2000m in summer.

Brown-eared Bulbul (<1600m): Flocks at 2400m and 2500m around Sunderview in late December 2004 and early January 2005. We did not record this bird from Eaglenest at all in summer (ie. in areas above 700m) and AC03 reports it only below 1500m (season not indicated).

Orange-bellied Chloropsis (<2400m India, <2465m Bhutan): A sighting at 2600m above Lama Camp on 2005-12-23.

Maroon-backed Accentor (TW, WAP–): Several sightings in Eaglenest at 1900-2500m in March-April 2004 and 1600m in March 2006. Previously reported from Eaglenest at 2700m (AK95), 2200-2700m (AC03, S99) and also from Dirang at 2750-3000m (S99).

Alpine Accentor (WAP–; AP=1): Quite common above 3500m on both sides of the Sela ridge along the Tawang highway near Sela Pass and along the Mandala ridge in Dirang. Only two previous records from the state, at Eaglenest (AK95) and EAP (S94);

Feae's Thrush (AP–): A large flock of this species was seen at 2450m above Chakoo on 2004-12-23 at the edge of thick forest. There was another brief, distant sighting of birds perched on a distant tall tree in a clearing in November 2003 at 1950m which was insufficient for a definite identification (Eye-browed Thrush was the other possibility). The 2004 sighting included close views of many males and females affording a good comparison between the grey and buff tones on the flanks and breast of the two sexes. This appears to be the first record for the state. Prasad (2005) has summarised the (few) Indian records of this species till date.

Lesser Shortwing (NAP– in KV00, but AR87 lists AP): The first recent record is by S99 from Dirang at 2775m in July 1998. Several singing birds were recorded at 1950m at Bompu in mid May 2005 and at 1300m around Sessni in early April 2006

White-throated redstart (NAP–): A male-female pair were seen in trees sprinkled in and around a soggy meadow on the Mandala ridge in Dirang at 3700m on 2004-12-20 and also north of Sela Pass at about 3500m on 2006-04-12, a flock of about 6 inside temperate forest in the Mandala area at 3500m on 2005-12-22 and a pair of males in Eaglenest at 2650m in late December 2005. KV00 have marked one location in SAP. Ours are perhaps the first record for many decades.

Blue-fronted Robin (NAP–; <2250m (3000m)): The song of this bird was recorded in Eaglenest in May-June 2004. The identity was confirmed by calling in the bird on 2005-05-05 at 2400m near Lama Camp. Going by the song it may not be an uncommon bird in that area. We saw a bird at 2100m on 2006-04-07 and another at 2400m on 2006-04-08.

Grandala (AP-): A female grandala was spotted soaring in a characteristic manner high above at 3800m south of the Sela Pass on 2006-04-12. Manoj Nair and Suresh Kumar (pers. comm.) had seen the species on the other side of Sela the previous year in July. These are among the first records for the state.

Green Cochoa (AP=f): A solitary bird was seen on 2004-06-04 at 1700m. The only other WAP record is by Datta et al (1998) from Pakke at 200m alt. Generally a rare bird, there are only a handful of records from Arunachal - at 300m near Itanagar (S94), and in Namdapha at 450m (Athreya et al 1997) and 1015m (S99).

Purple cochoa (AP=1): Four sightings in late May-June 2004 of 1-2 birds between 1950 and 2300m. We saw a pair of birds (1 female) at 2050m above Bompu on 2006-04-07 and heard another at the same place the next day. Only one other previous record from AP (S94, same as AP=1).

Spotted Laughing-thrush (TW; EN=e): During the project this species was recorded in Eaglenest at 2650m above Sunderview on 2005-01-01 and 2006-04-09, and at 2600m above Lama Camp on 2006-03-24. In Dirang it was seen on the Mandala ridge on 2005-12-20 and 2006-03-25, and at 3800m below Sela on 2006-04-12. It has also been reported from Eaglenest by S94, S99 and AC03 and from Dirang by S99.

Streaked Laughing-thrush (WAP=2; <1800m (2750m)): There are now many records of this species from Tawang and Dirang (S99) and from Eaglenest at 2100m in April 1997 (S99). It was recorded during this project in Eaglenest at 2700m on 2003-11-04, and on many occasions at 2200-2600m around Lama Camp on 2005-01-03, the next day, during 5-8th May 2005, and 8th-10th April 2006. We also recorded them in Bomdila and Dirang on most visits.

Eyebrowed Wren-Babbler (WAP-): A bird was taped out at 1300m in the same location (same bird?) south of Sessni in Eaglenest on 2006-03-19 and 2006-04-05.

Scaly-breasted Wren-Babbler (AP=1; WAP-): A rather common species which is found all the way into the foothills in winter (but possibly at higher zones than Pygmy Wren-Babbler) moves down in winter but is found above 2500 in spring and even higher in summer. We saw this bird quite often during this project in Eaglenest. It has been previously reported from Eaglenest by AK95, AC03 and from Dirang and Tawang by S99.

Rufous-throated Wren-Babbler (>1800m India, >1500m Bhutan): Moderately common bird at Eaglenest at 1500-2400m, the lower record being a record low. Readily pops out of the roadside shrubbery, unlike other wren-babblers, especially on playback.

Wedge-billed Wren-babbler (AP=f): Pairs of birds seen twice (likely same pair) at 1275m on 2003-11-13; another pair was seen with song playback in the same locality on 2004-04-10; another bird was seen at 1925m on 2004-10-11 (Waite, pers. comm), and on 2005-12-25 at 1100m. On the first occasion they were following a flock of necklaced laughing-thrushes. AR87 maintained two subspecies within India one from northern Arunachal westwards to Sikkim and the other from south of the Lohit river. The only published records of the western subspecies are from Sikkim (prior to 1875, in AR87), from Balipara Frontier Tract (old name of WAP+CAP prior to 1946, in AR87), from CAP (Baker 1922, S94), and from EAP (before 1879, and recently Katti et al 1992, S94). G98 mentions a record from N. Bengal without a date (possibly ancient). It has been proposed to elevate the subspecies to specific rank. We also saw these birds at 1300m on 2004-03-18 (2 birds) and 2004-04-04 (4 birds). Several other bird tour parties have seen this species in the same area. These birds have also been regularly encountered on professional birdtours in neighbouring Bhutan. It would perhaps be appropriate to claim that more individuals of this species have been seen in Eaglenest and Bhutan over the last 5 years than during the rest of time that science has known of it.

Bar-winged Wren-Babbler (WAP=f): Moderately common at Eaglenest, especially in winter; possibly moves higher up to less accessible areas in summer. Song playback will elicit a response from the roadside scrub anywhere along the road above 2500m. 2005-01-02 was rather memorable with many individuals (6+) seen at regular intervals (and one photographed) even without song playback. Surprisingly none were encountered along the same stretch the next day. Apart from a few records from CAP and EAP this species is mostly known from eastern Bhutan. Has been reported from Eaglenest by S94, AK95, S99 and AC03.

Red-billed Leiothrix (<2100 in winter): A flock was at 2430m above Chakoo on 2004-03-26

Cutia (<2100 in winter): A flock was observed at 2300m above Bompu on 2004-05-26 and near Lama Camp on 2005-01-03 and the next day and again towards the end of the month.

Bar-throated Siva (>1300 (1030m)): The species was noted at 1250m near Sessni on 2004-04-10.

Yellow-throated Tit-Babbler (900-2100m): Flocks were routinely observed up to 2500m during all seasons and occasions even at 2780m near the Eaglenest Pass.

Long-tailed Sibia (winter <900m): A flock was observed at 1550m on 2004-12-26 and another between 1600m and 1900m in January 1995 (AK95)

Yellow-throated Tit-Babbler. Photographed by Fredrik Ellin in March 2006

Fire-tailed Myzornis (TW=e, EN=e): This species is regularly seen in winter between Bompu and Chakoo (2200-2450m) and around Lama Camp (2300-2500m). They seem to vanish in summer, possibly to higher stretches away from the road. A few birds were seen on several occasions in April 2006 at 2400-2700m (Simon Allen; Mathias Ritschard). Eaglenest is on the eastern edge of its range. Further east it is only found in a few pockets in EAP and Myanmar.

Brown Parrotbill (TW, WAP–, AP=2): Flocks were observed in Eaglenest on 2004-04-06 and 2006-04-09 at 2750m and at 2600m on 2005-01-03, and in bamboo clumps on all occasions. Only previous records are from EAP and CAP (S94, same as AP=2) and Dirang (S99).

Fulvous Parrotbill (WAP–): A large flock was seen in dense bamboo at 3100m close to the ridge on 2003-11-08. Possibly the first record from Arunachal during the last few decades. I also observed them at 3000m on 2005-12-20 on the Mandala ridge above Dirang and again at about 3200m a little further beyond on 2006-04-13. It has been reported previously from CAP (Ludlow & Kinnear 1944; in AR87 but without a reference) and from WAP (AR87) but not since.

Greater Rufous-headed Parrotbill (<1800): Large flocks have been regularly seen at Eaglenest up to 1950m in all seasons, usually in the company of Rusty-fronted Barwing. AC03 has recorded them from 2800m.

Chestnut-headed Tesia (<1800m in winter): A common species throughout the year. Recorded up to 2400m in late December 2004 and 2600m in mid November 2003.

Yellowish-bellied Bush-Warbler (AP=f, only in WAP): Quite common at Eaglenest. Many sightings in winter in roadside scrub at 2400-2600m. Spring and summer sightings in April-May have all been in bamboo at 2700m-3000m. AC03 reported records <1300m.

Grey-sided Bush-Warbler (AP=f): Only summer records from Tawang for Arunachal. During the project this species was seen on several occasions at 2000m on 2004-03-26; at 1300m above Sessni around 2004-12-24 and 2006-03-17; at 1250m at Sessni on 2006-04-04 and at several localities in Dirang on 11th and 13th April. Recorded by AC03 and S99 as well.

Russet Bush-Warbler (WAP=f): We encountered many singing birds in the roadside scrub on the way to Mandala in Dirang between 1800m and 2500m on 13th and 14th April 2006. It has been reported from several localities in Dirang and Tawang by S99.

Mountain Tailorbird (WAP–; <1800m): Recorded in Eaglenest at 1950m on 2004-03-26 and again on 2004-04-09. Previously reported from 2100 in April 1997 from above Bompu (S99).

Orange-barred Leaf-Warbler (AP–): We encountered this bird in Eaglenest from 1200m-2800m many times in winter and also on a few occasions in April 2005, but not in summer. Evidently moves off to higher (less accessible) locations in Eaglenest or on to the higher ridges north of Eaglenest during summer. S99 has reported many sightings of this species from the Tawang mountains during summer.

Large-billed Leaf-Warbler (EAP=f, only in winter): This species (by the distinctive song) was quite common in the last week of May 2004 at 2300m-2800m and also at 2300-2400m near Lama Camp on 2005-05-05. The only other record from WAP is from Tawang at 3300m (S99).

Broad-billed Flycatcher-Warbler (AP=f; <2700m in India; <2360m Bhutan): This turned out to be quite common between 1950m and 2800m between March and May once the call was identified. The first sighting was of a pair which responded agitatedly to the song of Pygmy Wren-Babbler. AC03 also reports a sighting from 2850m. Has been reported from 3025m in Dirang (S99).

Rufous-faced Flycatcher-Warbler (WAP–): A pair of birds was seen in the roadside shrubbery at about 900m on 2006-04-06.

Brown-breasted Flycatcher (BH–, AP–): Simon Allen spotted a bird in Sangti on 2006-04-11 at the same location where other tour parties (Mathias Ritschard, Andy Mears) had seen the species. We all had good views through a scope to confirm the identification

Slaty-backed Flycatcher (WAP–, AP=f): A female was seen at 1300m at New Khellong on 2004-12-24. It has been reported previously at 2600m above Lama Camp (AK95) and at <2700 (AC03)

White-gorgeted Flycatcher (NAP=f): Possibly more numerous than previously suspected. Till March 2006 1-2 birds were regularly seen in the slope between Sessni and Bompu between 1400 and 1650m (once at 1850m). In March and April 2006 I located many individuals down to 1200m once the song became familiar. Also reported from neighbouring Sessa at 1200m (S94) and 1300m (AK95), from Eaglenest <2000m (AC03) and at 2100m (S99).

Ultramarine Flycatcher (NAP–): A couple of sightings at 2400m at Lama Camp on 2005-05-05 and the next day; on 2006-04-10 at 1600m above Singchung; and several times above Dirang. Also reported from 2500m by AC03.

Sapphire Flycatcher (NAP–): A male was seen on 2005-04-06 at Sunderview at 2450 (Waite, pers.comm). Many were recorded at 2050-2450m between Chakoo and Bompu during 25th-27th May 2004. Another was seen on 2005-05-06 at 2400m at Lama Camp. Has also been reported at 2300-2400m (AC03).

Vivid Niltava (AP=f): AK95 reported a possible sighting at 2400m, of a "large Beautiful Niltava-like bird high up in the canopy" but the foliage and height of the tree precluded a definite identification (though the canopy habit is itself a very strong pointer vis-a-vis the very similarly plumaged Beautiful Niltava). However between 2004-12-28 and 2005-01-02 we saw one bird at 2000m above Bompu, four different sightings of 1-3 birds at 2450m above Chakoo; a flock of 5 birds (3 males, 2 females) on two different days at the same tree at 2550m above Sunderview (photographed). So far all sightings have been in late December-early January. The only other sighting of this bird from WAP is from Dirang, further to the north (S94).

Blue-throated Flycatcher (WAP–): Several singing males were observed (and recorded) at 300m between Bhalukpong and Tippi on 15th and 16th April 2006.

Large-billed Blue-Flycatcher (WAP–, NAP=2, SAP=f): We saw and taped a singing bird above Doimara at 500m on 2006-04-02. Historically there have only been 2 records north of the Brahmaputra (in AR87) prior to another record in CAP by S94.

Rufous-vented Crested-Tit (EAP=1): We observed this species at more or less the same localities as the previous species and often in association with it. Interestingly, just as in the last species S94 and S99 report this species only from Tawang and the same locality in extreme EAP.

Grey Crested-Tit (EAP=1): A flock was observed at 3000m above Chakoo 2003-11-08. We also recorded this bird at 3500m in Tawang, above Jang on 2004-12-20 and just north of Sela on 2005-12-21 and 2006-04-12, and on the Mandala ridge on 2006-03-26 and 2006-04-13. They have been previously reported from Tawang by S94 and S99. Apart from this cluster of records in WAP there is only a single record for the state from EAP (S94).

Coal Tit : This is essentially a conifer bird and found mostly north of Eaglenest (see KV00) but I once saw a very large flock of this species along with several Phylloscopii (incl. Orange-barred) swarming about on the ground just above Chakoo at 2450m

Beautiful Nuthatch (AP=f; VU): Not an uncommon bird at Eaglenest. Flocks were observed in Eaglenest at 1300m near Sessni on 2004-04-09 (with Long-tailed Sibias), at 1600m below Bompu on 2004-04-10 (with Rufous-backed Sibias and red-winged shrike-babbler), thrice at 1450-1570m around 2004-05-28, at 1250m at Sessni on 2005-12-23, at 1700m below Bompu on 2005-12-26 (with Cutias), and on half a dozen occasions in March and April 2006. It has been previously reported from Eaglenest by AK95 and S94. Flocks of 4-10 are usually found exploring tall, moss-laden tree-trunks, usually in the company of another species.

Eurasian Treecreeper (AP=2): A bird was observed on near Mandala at 3700m on 2004-21-12, 2006-03-16 and 2006-04-13. It has also been reported in WAP by S94 and S99.

Yellow-bellied Flowerpecker (WAP=1): Several seen at 2465m at Sunderview campsite in early November 2003, one on 2004-04-07 at 2400m at Chakoo, one at 2500m between Chakoo and Sunderview in December 2005 and one (photographed) below the Mandala ridge at 2800m on 2006-04-14. Also reported from Eaglenest by AC03 and from Bomdila by S99.

Fire-tailed Sunbird (TW=e; AP-): Not common but seen in Eaglenest every now and then. Recorded at 2700m in and around the Eaglenest Pass in March 2004, 2006-01-01, at 2300m and 2500m near Bompu on 2006-03-07, and several sightings between 2600 and 2800 in March and early April 2006. More common on the Sela slopes at 3600m and several were seen on 2006-04-12. S99 has recorded this bird on many occasions from Eaglenest, Dirang and Tawang.

Streaked Spiderhunter (India <1500m (2200m); Bhutan 1930m): A bird was seen at 1850m below Bompu on 2004-05-28, at 1950m above Ramalingam on 2005-05-07 and again on 2005-05-11 at Bompu. There is also a record at 2100m above Bompu in April 1997 (S99).

Yellow-breasted Bunting (WAP=1) I observed three birds of very likely this species on 2003-11-11 in the Bompu clearing at 1950m. It had been previously reported at 2100m near Chakoo (S94) and from below 1500m (AC03).

Yellow-breasted Greenfinch (AP=1 in WAP): Several sightings above Tenga at 1400-1900m around 2004-03-20, 2005-05-03 and March and April 2006. Also reported in the same locality by AC03. This bird has also been reported from many places in WAP by Singh (1994, 1999).

Hodgson's Mountain-Finch (TW=1): Observed in the Bompu clearing at 1950m in mid November 2003.Many flocks were seen at Sela at 4100m on 2006-04-12.

Dark-breasted Rosefinch (WAP–; NAP=2): We saw this species on several occasions in Eaglenest in November 2003 and April 2004, December 2005 and March 2006 from 1900m-2700m. It has been previously reported in the area at 2500m (AC03) and at 2500m-2600m (S99). It has also been sighted on several occasions in Dirang and tawang at 2750-3600m (S99)

Common Rosefinch (EAP=2): A flock was seen at 1950m in the Bompu clearing on 2004-04-09 and again in March 2006, in Dirang at about 2500m. Previously reported from Tawang by S99.

Pink-browed Rosefinch (WAP=1): We recorded it above 3000m near Jang in Tawang on 2004-12-20. It has also been reported from Eaglenest at 2500m (S99).

Scarlet Finch (WAP=ε; EAP=2): A couple of sightings at 1800-1900m below Bompu on 2004-06-04 and the next day. A couple of birds were also observed at 2200m below Lama Camp on 2005-05-07 and below Bompu on 2004-12-29. Flocks of 4 and 12 were observed on 2006-03-19 at about 1275m between Sessni and New Khellong. Some more birds were seen in that area in early April 2005 as well. Also reported at 2800 (AC03) and at 2100m in April 1997 (S99).

Red-headed Bullfinch (TW-e, WAP–): Seen above Sunderview at 2550m on 2005-04-06. Previously reported in Eaglenest and Dirang-Tawang by AK95, SeA99 and AC03.

Beavan's Bullfinch (WAP=f): Many sightings at Eaglenest above 2400m in all seasons, during this project as well as previously (S99, AC03)

Collared Grosbeak (WAP–; AP=1): A pair at 3000m in Dirang (Chander) on 2003-11-17. Several sightings in early April 2004 in Eaglenest at 1950m around Bompu, in fairly dense broad-leaved forest at 2200m and in scrubby forest at 2600m above Lama Camp. Only 3 other records from AP, at 2750-3685m in Dirang (S99) and at 2600m in EAP.

White-winged Grosbeak (TW-e, WAP–): A pair seen in tall conifer forest at 3700m above Jang in Tawang. Several records from Tawang at 3500-3700m (S99) but only one other record from Dirang at 2950 (S99).

Red-billed Chough (AP-, TW=e): This bird is quite regularly seen, in numbers, both north and south of the Sela Pass above 3700m (around 2004-12-19, 2005-10-10, 2005-12-20, 2006-04-12)

A.2.2 Species requiring status re-evaluation:

Satyr Tragopan: This species has been reported from Eaglenest by AC03 based on anecdotal reports and examination of feathers. Kumar & Singh (1999, 2000) also identified the Eaglenest tragopans as Satry. However all higher altitude (>2400m) Eaglenest records of this species must belong to Temminck's Tragopan which has now been seen on numerous occasions by several observers and even videographed at Eaglenest. In fact Suresh Kumar (pers. comm.) admitted that his identification of the Satyr Tragopan in Kumar & Singh (1999, 2000) were in error, a fact that he realized when he visited a tragopan breeding centre in Europe and sa w live birds.

In Eaglenest the tragopans below 2000m are Blyth's and those above are 2400m are Temminck's. S99 has reported many tragopan sightings around 3000m from Dirang and all of them are Temminck's. Satyr is probably only found north of Sela or perhaps only at elevations above 3500m in W. Kameng. As a corollary the low ridge-line in Eaglenest (only 3250m) probably precludes Satyr.

Himalayan Monal: AC03 listed this species for Eaglenest based on local reports but correctly opted for corroboration before confirmed inclusion. There are unlikely to be Monals here due to the lack of high altitude (as for Satyr). Interstingly, the Nepali word for Tragopan is *Monal* which may account for the confusion (Nepali is one of the major languages of the region given the large number of Nepali settlers there).

Common Hawk-Cuckoo: A notable absentee throughout our project though AC03 lists it between 1800 and 2600m. I diligently tracked down every hawk-cuckoo which sounded like the Common Hawk-Cuckoo but they all turned out to be the Large Hawk-Cuckoo which is very common in Eaglenest. Clearly, some calls of the Large H-C are very similar to that of its plains cousin. It would be best to keep this identification tentative pending further observations.

Streak-throated Tit-Babbler: AC03 listed this species for Eaglenest refering to AK95 as the source and correctly cast doubts on the record. Actually, in AK95 I had listed Brown-headed Tit-Babbler *Alcippe cinericeps*. This species was subsequently split into Brown-throated Tit-Babbler *A. ludlowi* which is quite common at Eaglenest and Streak-throated Tit-Babbler *A. cinericeps* which is not in Eaglenest. So *A. cinericeps* came into the checklist as a result of misreading the earlier list and should be removed.

Hoary-throated Barwing (AP–): I first reported this species from Arunachal at 2500m near Sunderview in Eaglenest in AK95. A single bird was observed giving its loud, distinctive "je-je-je-je-je-je" call. Subsequently it has been reported from Eaglenest from the same locality by AC03 and S99. We did not obtain any records during the current project. Little is known of the vocalizations of the very similar Austen's Barwing which is rather common in the area and so it would perhaps be best to keep this identification tentative until a photograph or a recording of its song are obtained. However, Hoary-throated Barwing is known from neighbouring Bhutan and there is no reason why it should not be found in Eaglenest.

Black-capped/Rufous Sibia: KV00 shows this bird extending into WAP from Bhutan in a prominent manner. During this last decade not one observer has reported this bird from Arunachal Pradesh except in Tawang, i.e. north of the Sela ridge (S99 and this project).

White-winged Redstart: AC03 has merely mentioned this species from the Tenga valley at 1300m. The white-winged redstart is a dry high-plateau bird of the Tibetan facies and the habitat is far removed from that in which this bird was seen. However birds do fly. On the other hand

several redstarts of the area show a combination of pale head and white wing patch. In the absence of any remark by the observer on this very unusual sighting I prefer to keep this identification tentative.

Tickell's Blue-Flycatcher: I reported this species from Pakke (AK95) based on the call of an unseen bird. Pale Blue-Flycatcher has a very similar call, is a common species and has not been included in that list. Tickell's Blue-Flycatcher was obviously a mistake.

Brown Bullfinch (WAP-; AP=1) I recorded a lot of observations of this species initially until I realized that Beavan Bullfinches move in all-female flocks which can look quite similar. Since then I have not seen any Brown Bullfinch in Eaglenest. I have also seen several other observers make this mistake. All records of this species, mine and others', must be viewed with suspicion until more definitive proof becomes available.

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? *Staurois viridimaculatus* ?

? *Fejervarya* sp

? *Fejervarya* sp

? *Amolops chunganensis* ?

? *Paa liebgii* ?

**
rediscovered in 2001 after 90 years

Rhacophorus translineatus

? *Occidozyga borealis* ? **

?*Theloderma asper* ? **

Polypedates leucomystax

(funded by The Rufford-Maurice-Laing Foundation, UK)
Ramana Athreya / Eaglenest Biodiversity Project / Kaati

Appendix A-3

Red Data Book, Endemic, and Rare Bird Species

This appendix describes the status in the study area[3] of species
1. In the IUCN Red data book (Birdlife International[4]), or
2. Whose global range is restricted to the Eastern Himalayan endemic bird area (IBA/BNHS[5]), or
3. Which used to be listed in the Red Data Book until recently (see Kazmierczak & van Perlo 2000), mostly on account of lack of data. The populations of such species have been revised upwards in the last few years but as most of these species are shy (hence the earlier underestimate) not much is known of their ecology and western Arunachal Pradesh may be a good place to study them.

See footnote of sec. 4.1.2 on page 51 for names of all those who contributed to the bird records presented in this project. The abbreviations for literature cited is the same as used in Appendix A-2

Only those species recorded during this project inside the study area treated here. All the birds that we have recorded from Nameri are also very likely to be present in the Doimara and Amartola reserved forest blocks in the buffer zome of Eaglenest wildlife sanctuary.

The status codes are: CR critically endangered, EN endangered, VU vulnerable, NT near threatened, RR range restricted and UC uncommon (those recently removed from the red list).

Lesser Adjutant Stork (VU): Occasionally seen around Nameri.

White-winged Duck (EN): Regular at Nameri and occasional at Pakke.

Slender-billed Vulture (CR): I observed a couple of vultures on 2003-10-31 at 100m outside Pakke.

Pallas' Fish-Eagle (VU): A few were regularly encountered along the Jia Bhoreli river in Nameri.

Greater Grey-headed Fish-Eagler (NT): Occasionally seen in Nameri.

Pied Falconet (UC): Only one sighting on 2004-12-24 at 1000m above Khellong

White-cheeked Partridge (NT): We heard several birds calling and flushed a pair in Nameri at 80m altitude.

Chestnut-breasted Hill-Partridge (RR): The species seems to be quite common at 1600-2000m around Bompu in Eaglenest.

Temminck's Tragopan (UC): Many sightings during the project, all inside Eaglenest. A covey of 4 females at 3000m above Chakoo on 2003-11-08; two separate coveys of both males and females on 2004-03-22 at 2550m above Sunderview; a spectacular show by a male 10m away (videographed) which was watched by a group at 2700m below Eaglenest Pass on 2006-03-25; a

[3] Kameng protected area complex in Assam-Arunachal (Nameri-Pakke-Doimara-Eaglenest-Sessa and surrounding areas) and further north in Dirang and Tawang in Arunachal Pradesh
[4] Red Data Book – Threatened Birds of Asia at http://www.rdb.or.id/index.html
[5] From the Indian Important Bird Area programme of Bombay Natural History Society and Birdlife International at http://www.bnhs.org

female at 2700m above Lama Camp on 2006-03-24; a male at 2700m above Lama Camp on 2006-04-10.

Blyth's Tragopan (VU-RR): Three records from Eaglenest, including that of a male with chicks, during the project **(see** Appendix A-2)

Black-necked Crane (VU): As per Birdlife International[6] the Arunachal Pradesh records of this species are as follow : Apatani valley only prior to 1946; Sangti valley: a pair in 1990 and 6 in 1991 but none subsequently. As per my information this species has been wintering in Sangti for the last 8 years (from a reliable Forest Officer, Mr. Umesh Kumar, who used to be posted there) and I have personally seen them in December 2004 (3 birds) and December 2005 (6 birds of which one died on a high tension cable). The local people insist that these birds have been visiting for decades though the birds do abscond occasionally. Unlike the wintering population in neighbouring Bhutan these birds return in late February when the Sangti village starts working on the paddies.

Curiously, Shashank Dalvi mentioned seeing black-necked cranes flying above Bompu (south of the ridge) in late March 2006 which I ascribed to the abundant supply of local beer. But the reports of this species from Buxa and Chapramari in W. Bengal in the early 1990s suggest that I may have been hasty in dismissing that report.

Ward's Trogon (NT-RR): Many records from Eaglenest and two from Dirang during this project (see Appendix A-2). No records from Vietnam and Myanmar in recent decades. Known only from a couple of localities in Arunachal outside W. Kameng district. Eaglenest and Dirang (both in W. Kameng) and Bhutan seem to hold the key to its long-term conservation though it is by no means abundant even in these regions.

Great Pied Hornbill (NT): Commonly encountered in the lower tracts of Pakke, Nameri and Doimara. We had a memorable day on 2006-04-02 when these birds seemed to be everywhere in the forest around Doimara. I have also recorded this species inside Eaglenest at 1300m near Sessni but the next species is more numerous there.

Rufous-necked Hornbill (VU): Pairs and small flocks are regularly encountered in Eaglenest in the Sessni stretch (1200-1500m); in fact impossible to miss this bird in that area.

Yellow-rumped Honeyguide (NT): The first western Arunachal Pradesh record of this species was obtained by Frederik Ellin and Peter Schmidt Only one record during this project at 2300m at Lama Camp on 2006-04-24 when Fredin Eaglenest in March 2006 (see Appendix A-2). There are very few records of this species even on Birdlife International site[7]

Rufous-breasted Bush-Robin (UC): Seems to be common in pockets in Eaglenest in winter as they move in flocks of 4-10 birds at in the precipitous scrubby hillsides between Lama Camp and Sunderview. No summer records from the area, one on 2004-04-13 being the last spring record.

Slender-billed Scimitar-Babbler (UC): This is not a numerous species but an effort with tape will be rewarded in many places. The bird has been seen or heard on many occasions at two localities near Bompu, at 2600m above Sunderview (April 2004), at 2780m at the Eaglenest Pass (April 2004), on several occasions around Lama Camp at 2200-22400m (January 2005, December 2005), several calling birds near Mandala at 3000m (December 2005), twice above Jang in Tawang at 3500m (October 2004).

[6] Black-necked Crane species account at http://www.rdb.or.id/view_html.php?id=55&op=grusnigr
[7] Yellow-rumped Honeyguide species account at http://www.rdb.or.id/view_html.php?id=357&op=indixant

Long-billed Wren-Babbler (UC): A bird was seen at the same place at 1275m near Sessni (same bird?) using song playback on 2003-03-20 and 2006-04-06.

Rufous-throated Wren-babbler (NT-RR): Quite common at Eaglenest (see Appendix A-2)

Wedge-billed Wren-Babbler (NT-RR): May be seen regularly in particular localities at Eaglenest though I have no feel for their abundance (see Appendix A-2)

Rufous-bellied Shrike-Babbler (UC): It was a rarely seen bird until March 2006 when I recorded the call. After that, the stretch from Bompu to Chakoo and around Lama Camp (2000-2450m) seem to be full of this species.

Long-billed Wren-babbler photographed in Sessni in April 2006

Austen's/Hoary-throated Barwing (RR): Reported from Eaglenest by several observers including me but better evidence is need (see Appendix A-2).

Streak-throated Barwing (RR): Common at Eaglenest above 2000m altitude.

Brown-throated Tit-Babbler (RR): Common in Eaglenest and Dirang in areas above 2500m

Beautiful Sibia (RR): Extremely common in Eaglenest at all altitudes above 1000m

White-naped Yuhina (RR): Large flocks of this species were regularly encountered between 1000m and 2000m (occasionally higher) in Eaglenest in all seasons.

Broad-billed Flycatcher-Warbler (RR): Not numerous but is regularly encountered (many times a day) from April onwards in areas above 2000m. The number of records has gone up substantially after we became familiar with its song. Unlike other flycatcher-warblers it neither moves in flocks nor does it move in the open for long and so the reasonably distinctive song is the best tool for estimating its numbers … which may also account for the paucity of winter records (when plausibly the birds do not sing)

Black-browed Leaf-Warbler (RR): Only S94 had reported this bird from Eaglenest until March and April 2006 when we had many sightings at 300-600m in Doimara below Eaglenest.

Beautiful Nuthatch (VU): S94 and AK95 had reported this species from Eaglenest (Sessni) and Sessa respectively. We have recorded this species on numerous occasions. While I cannot affirm that the species is numerous it would be safe to say that spending a day in the appropriate altitude is bound to yield one to several observations of this species (see Appendix A-2)

Yellow-breasted Bunting (NT): A few records from Eaglenest (see Appendix A-2)

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Japalura andersoniana **is a highly range-restricted species endemic to India and is reported only from W. Arunachal. It is known to herpetologists only from a few specimens but appears to be quite common in Eaglenest.**

Cyrtodactylus khasiensis **a gecko, is quite common in Eaglenest. However, it remains to be seen if the Eaglenest animals are actually part of a multiple species complex, as has turned out to be the case in nearby Myanmar**

? Asymblepharus sp. **Almost nothing is known of the skinks of Eaglenest**

Ramana Athreya / Eaglenest Biodiversity Project / Kaati (funded by The Rufford-Maurice-Laing Foundation, UK)

Appendix A-4

Reptiles of Eaglenest wildlife sanctuary

The reader may refer to sec. 4.2 for more details of the herpetofaunal survey. Images of many of these reptiles have been included in the Biodiversity portfolio. The locality codes in the table below are: Bompu B, Doimara D, Khellong K, Lama Camp L, Sessni Se, and Sunderview Su.

Snakes

	Scientific Name	**Common Name**	**Altitude**	**Localities**
Family Typhlopidae				
1.	*Typhlops diardii*	Diard's Wormsnake	450, 750	D, K
Family Boidae				
2.	*Python molurus*	Rock Python	450	D
Family Colubridae				
3.	*Ahaetulla prasina*	Short-nosed Vinesnake	300	D
4.	*Amphiesma sieboldii*	Siebold's Keelback	1950	B
5.	*Amphiesma sp.*		1950	B
6.	*Boiga ochracea*	Ochraceous Catsnake	1800	R
7.	*Chrysopelea ornate*	Ornate Flyingsnake	450	D
8.	*Dinodon gammiei*	Darjeeling False-wolfsnake	1950	B
9.	*Oligodon cf. albocinctus*	White-barred Kukri	450	D
10.	*Oligodon cinereus*	Cantor's Kukri	450	D
11.	*Orthriophis cantoris*	Eastern Trinket	700-2500	K, Se, B, Su
12.	*Orthriophis taeniura*	Striped trinket	750	K
13.	*Pareas monticola*	Assam Snaileater	1250	Se
14.	*Pareas ?monticola?*	Snaileater sp	1250	Se
15.	*Psammodynastes pulverulentus*	Mock-viper	750	K
16.	*Ptyas nigromarginata*	Green Ratsnake	1250, 1950	K, Se
17.	*Rhabdophis himalayanus*	Himalayan Keelback	750, 1800	K, R
18.	*Trachischium fuscum*	Darjeeling Slendersnake	1950	B
19.	*Trachischium monticola*	Assam Slendersnake	1250	Se
20.	*Trachischium tenuiceps*	Orange-bellied Slendersnake	2350	L
21.	*Xenocrophis piscator*	Checkered Keelback	450	D
Family Elapidae				
22.	*Bungarus fasciatus*	Banded Krait	450	D
23.	*Bungarus niger*	Black Krait	700	K
Family Viperidae				
24.	*Ovophis monticola*	Mountain Pit-Viper	2000	Bomdila

Lizards

Family Gekkonidae				
25.	*Cosymbotus platyurus*	Flat-tailed Gecko	450, 750	K, D
26.	*Cyrtodactylus khasiensis*	Khasi Bent-toed Gecko	450-1250	Se, K, D
27.	*Hemidactylus frenatus*	Asian House-Gecko	450	D
Family Agamidae				
28.	*Calotes versicolour*	Garden Lizard	450-700	K, D
29.	*Japalura andersoniana*	Dafla Mountain-Lizard	1250	Se
30.	*Mictopholis austeniana*		1800	B
Family Scinidae				
31.	*Asymblepharus sikkimensis*	Sikkim Rock-Skink	1900-2350	B, L
32.	*Mabuya cf. dissimilis*	Striped Olive Sunskink	450	D
33.	*Sphenomorphus indicum*	Indian Litter Skink	1250	Se
34.	*Sphenomorphus. sp.*	Litter Skink	1250	Se

Species Notes:

1. *Typhlops diardii* Diard's Wormsnake

Scale rows	24
Others	Incomplete nasal sutures

Locality: Khellong (750m), Doimara (450m). Oct04
Individuals encountered: 1 at Khellong, 2 at Doimara
Habits: One under a rotting log, others on road during the day in overcast conditions/after rain.

2. *Python molurus* Indian Python

Locality: Doimara (350m). Only a skinned specimen seen.

3. *Ahaetulla prasina* Short-nosed Vinesnake

Locality: Below Doimara (300m). Oct04.
Individuals encountered: one
Habit: Found active along the main road.
Image in BP #17

Scale rows	15:15:13 smooth
Belly count	v201 a2 s161
Supralabial	9 (E:4-6), 4th divided
Infralabial	9
Loreal	2
Preocular	1 (partially divided on one side)
Postocular	2
Temporal	3+3
Length	SVL 1170 T 170

4. & 5. *Amphiesma* species

We encountered 5 snakes, possibly belonging to two species. We could not confirm the identity as the dentition is an important taxonomic feature. One (possibly two) is most probably ***A. sieboldii*** (following Malnate ,1966, though the validity of this species is unclear) while the other three may be a long-repressed taxon ***A. clerkii*** which may need to be reinstated (Patrick David, pers. comm.)

Amphiesma sieboldii

Locality: Bompu (1950). Oct04
Individuals encountered: 1
Habits: active at 1500hr on road.
Colouration: body with 5 black lines, all broken into dashes. Tail with 5 solid lines. Dorsal line and line between subcaudals and 1st scale row darkest; lines between first and second scale rows indistinct. Preocular and postocular streaks not solid. Indistinct yellowish chevron on neck. Ventrals yellow with orangish-red edging along the sides. About half the ventrals have faint spots. Sc similar but with fewer spots and edged with black forming a stripe along tail. Image in BP #18 snake 3
Image in BP #18, snake 4 may also be this snake

Scale rows	19:19:17 bidentate, with apical pits, outer row weakly keeled
Belly count	v180 a2 s76
Supralabial	8 (E:3-5)
Infralabial	9/10
Loreal	1
Preocular	1
Postocular	3
Temporal	1+1
Length	svl1170 t170
Others	Apical pits fainter laterally

***Amphiesma* sp 2**

Scale rows	19:19:17 bidentate, strongly keeled	19:19:17 bidentate, strongly keeled	19:19:17 bidentate, strongly keeled
Belly count	v171 a2 s43 (cut)	v173 a2 s4undivided+90	v165 a2 s1undivided+92
Supralabial	8 (E:3-5)	8 (E:3-5)	8(E:3-5)
Infralabial	9	10	10
Loreal	1	1	1
Preocular	1	1	1/1 (with partial suture)
Postocular	3	3	3
Temporal	2+2	3+2/3+3	2+2/2+1
Length	svl 430 t1 80	Svl 435 tl 175	
Others			

Colouration:

Specimen 1,2: the basic pattern is made up of black-edged wine-red scales arranged on a greenish ground. The reddish scales form a lateral stripe, spots below the lateral stripe and irregular dorsal spots. The markings are less distinct and more broken up and blacker near the tail. Intestitial skin white. Head greenish-brown with an occipital streak. Prominent, solid, black preocular and postocular streak. Light chevron on the nape. Ventrals yellow with reddish lateral edging and a black spot on either side. Underside of tail similar but with white ground instead of yellow. Image on BP #18, 2nd snake

Specimen 3: The olive ground, black markings above and ocular streak are fainter giving a snake a redder tone. A black lateral line from vent to tail along the costals. White interstitial skin forms a series of double spots on the dorsum. Ventrals as for previous specimens but lacking black spots; some subcaudals have spots. Image in BP #18 1st snake

***6. Boiga ochracea* Ochraceous Catsnake**

Scale rows	20:21:15 smooth bidentate, with apical pits, outer row weakly keeled
Belly count	v232 a1 s114+2
Supralabial	8 (E:3-5)
Infralabial	11/12
Loreal	1
Preocular	1, reaching top, not touching Frontal
Postocular	2
Temporal	2+2
Length	sv1000 t220

Locality: Ramalingam (1800m). Oct04

Individuals encountered: one

Habits: Found moving on branches on road cutting in highly degraded area at 2000 hr.

Colouration: Back uniform ochre with faint black reticulations formed by black edged scales; no postocular streak or lines on top of head; throat and anterior ventrals yellow, changing to pinkish-brown before mid-body; spot on tip of alternate ventrals forming a lateral broken line between dorsals and ventrals, these spots being yellow anteriorly and whitish towards the tail and disappear before the vent.

Identification note: Smith (1943) lists “preocular reaching top of head” as a major key for separating Boiga sp which would make our snake *B. multifasciata*. However Frank Tillack (pers. comm.) reports many *B. ochracea* in Nepal with preocular reaching top of head and suggests that the colour and pattern makes ours *B. ochracea. B. multifasciata* is different with black-speckled greyish- to reddish-brown, with strong black bars

on body, 2 black lines on top of head, and belly greyish with heavy spotting of black (Whitaker & Captain 2004). Another image in BP #16

7. *Chrysopelea ornate* Ornate Flying-snake

Scale rows	17:17:13 smooth
Belly count	v210+1d a2 s116
Labials	s9 (e:4-6) i9
Loreal	absent; prefrontal came down side of head
Oculars	pr1 po2
Temporal	2+2
Length	sv280 t100

Locality: Doimara (450m). Oct04.
Individuals encountered: One juvenile.
Habits: Found under loose bark of a tree about 1.5m above ground at 2200 hrs.
Identification: The absence of loreal and the prefrontal coming down the side of the head (on both sides) may be an individual aberration. Possibly only the external suture was missing.
Image in BP #17

8. *Dinodon gammiei* Darjeeling False-wolfsnake

This species has been described in greater detail in Appendix A-6. Image in BP #16.

9. *Oligodon* cf. *albocinctus* White-barred Kukri

Locality: Doimara (450m). Oct04
Individuals encountered: one, battered to death and decomposing.
Identification: identification based on colour pattern discernible in patches only

10. *Oligodon cinereus* Cantor's Kukri

Scale rows	17:17:15 smooth
Belly count	v180 a1 s37
Labials	s8(e:4-5, 3rd excluded by preocular) i8
Loreal	1
Oculars	Pr2 po2
Temporal	1+2
Length	Sv560 t80

Locality: Doimara (450m). Oct04
Individuals encountered: one
Habits: found in a garden at 0800 hrs.
Colour: Matches the reticulated pattern in Wagner (1975).
Image in BP #16

11.* Orthriophis cantoris *Eastern Trinket

Scale rows	21:21:17 (19) faintly keeled
Belly count	v221-234 a1 s72-86
Labials	s8(e:4-5) 5 specimens s8(4) 1 specimen s8/9(3-5) 1 specimen i10 all
Loreal	1
Oculars	Pr 1large or 1+1presub po2
Temporal	2 + 2/3 separated by small scales
Length	sv+t: 430+90, 525+110, 730+200, 590+210, 870+205, 1200+300, 1310+310

Locality: Khellong (750m), Bompu (1950m), Sunderview (2450). Oct04, May05
Individuals encountered: 3 at Bompu, 1 Sunderview, 1 Khellong (Oct04); 1 adult and 1 juvenile (with umbilical scar) at Bompu (May05).
Habits: All seen actively moving around in the day, except the juvenile which was resting under a rock at 1100 hrs.
Umbilical scar from v195 to v199

12. *Orthriophis taeniura* Striped Trinket

Locality: Sessni (720m). Oct04
Individuals encountered: one
Habits: Active along the road at 10.00 hr.

Scale rows	23:23:19 mid 6 rows weekly keeled
Belly count	v266 a2 s99
Labials	s10(e:5-6) i10
Loreal	1
Oculars	Pr1+1presub po2
Temporal	2+2
Length	sv1300 t300

13. *Pareas monticola*
Assam Snail-eater

Locality: Sessni (1250m). Oct04, May05
Individuals encountered: Two.
Habits: Found on low bushes along the side of the road at about 2200 hrs.
Image on BP #16

Scale rows	15:15:15 dorsals keeled, all with apical pits	15:15:15 smooth, all with apical pits
Belly count	v188 a2 s78	v194 a1 s72
Labials	s7(e:4, 3rd excluded by suboc; last longest) i5/6	s6(e:3, 4th excluded by suboc; last longest) i5/6
Loreal	1	1
Oculars	pr0+1 large presub po2	pr0+1 large presub po2+1 large suboc
Temporal	2+3/4	2+3/4
Length	sv620 t150	
Cross-bars	body 53 tail 20, indistinct	Body 56 tail indistinct

14. *Pareas* cf *monticola* ?Assam Snail-eater ?

Locality: Khellong (750 m). Oct04
Individuals encountered: 1
Habits: Seen on roadside bush at 2115 hrs.

Scale rows	15:15:15 smooth, all with apical pits
Belly count	v190 a2 s87+1
Labials	s7(e:4-5 but both excluded by suboc; last longest) i8
Loreal	1/0 – fused with Preocular?
Oculars	pr2 po2 extending halfway beneath eye
Temporal	2+3
Length	Sv545 t135
Cross-bars	body 56 tail indistinct

15. Psammodynastes pulverulentus
Mock-viper
Locality: Doimara (450m)
Individuals encountered: 1.
Habits: Seen on road at 11.00 hr.
Image in BP #16

Scale rows	17:17:15 smooth
Belly count	v165 a2 s69
Labials	S8(e:3-5) i7
Loreal	1
Oculars	pr2 po2
Temporal	2+2
Length	Total <150 ?juvenile?

16. *Ptyas nigromarginata* Green Ratsnake
Locality: Sessni (1250m) Oct04. Bompu (1950m) May05
Individuals encountered: 3
Habits: All were active in the day, the 2 in May 2005 were obtained within a kilometre of each other at 0815 hrs, during a brief period of sunshine.

Scale rows	16:16:14 middle 4-6 scale rows strongly keeled	
Belly count	v191 a2 s121	v200 a2 s132
Labials	S8(e:4-5) i10	s9(e:4-5) i11
Loreal	1	1
Oculars	pr1+1presub po2	pr2+1presub po2
Temporal	2+2	2+2
Length	sv1120 t450	sv2150 t620

17. *Rhabdophis himalayanus* Himalayan Keelback
Locality: Bompu (1970m), Khellong (700m). Oct04
Individuals encountered: Two juveniles
Habits: Caught on road during day.
Image in BP #16

Scale rows	19:19:17 weakly keeled	17:17:15 weakly keeled
Belly count	v162 a1 s87	v170 a2 s91
Labials	s8(e:4-5) i10	s8(e:4-5) i10
Loreal	1	1
Oculars	pr 1 po 3	pr 1 po 4
Temporal	2+2	2+2
Length	sv210 t60	Sv260 t 90

18. *Trachischium fuscum* Darjeeling Slendersnake
Locality: Bompu (1950m). Oct04. May05
Individuals: 2 live specimens, 1 dead.
Habits: All 3 from within Bompu campsite, the live ones under stones in a meadow close to bamboo.

Scale rows	13:13:13 smooth	
Belly count	v146 a2 s45	v155 a2 s33
Labials	s6(e:3-4) i6	
Loreal	1	
Oculars	pr 1 po 2	
Temporal	2+2	
Length	Sv325 t70	Sv265 t 85

Identification: The very faint keels near the vent in the dead and one of the live specimens indicated female sex according to Smith (1943). The live female was larger and blacker than male (browner). Anterior section of the dead female was missing.

19. *Trachischium monticola* Assam Slendersnake

Locality: Sessni (1250m). May05.
Individuals encountered: 1
Habits: found during the day.
Image in BP #17

Scale rows	15:15:15 smooth
Belly count	V 133 A 2 S 25
Labials	S 6(e:3-4) I 6
Loreal	1
Oculars	Pr 1 Po 2
Temporal	1+1
Length	SV 245 T 30

20. *Trachischium tenuiceps*
Orange-bellied Slendersnake

Locality: Lama Camp (2350m).
Individuals encountered: 3.
Habits: All obtained from under rocks during the day. 2 juveniles with umbilical scars were found within 3m of each other.
Image in BP #17

Scale rows	13:13:13 smooth	
Belly count	V 139 A 2 S44	V 133 A 2 S43
Labials	S 6(e:3-4)	
Loreal	1	
Oculars	Pr 1 Po 2	
Temporal	1+2	
Length	SV 111 T 25	SV 122 T 22
Umbilical scar	V 124-126	V 119-121

21. *Xenocrophis piscator* Checkered Keelback

Locality: Doimara (450m). Oct04.
Individuals encountered: More than 10, 2 keyed out
Habits: Active in a shallow channels of the main river at 08.00 hr.

Scale rows	19:19:17 faintly keeled	
Belly count	V 138 A 2 S 89	V 141 A 2 S 94
Labials	S 9(e:4-5) I 10	
Loreal	1	
Oculars	Pr 1 Po 3	
Temporal	2+2	

22. *Bungarus fasciatus* Banded Krait

Locality: Doimara (450m). Oct04
Individuals encountered:1
Habits: Found swimming in a shallow roadside pool at 22. hr.
Image in BP #16

Scale rows	15:15:15 smooth, vertebrals greatly enlarged
Belly count	V 225 A 1 S 37 (entire)
Labials	S 7(E:3-4)
Loreal	0
Oculars	Pr 1 Po 2
Temporal	1+2
Length	SV 1155 T 135

23. *Bungarus niger* Black Krait

Locality: Khellong (750m) Oct04.
Individuals encountered: 1
Habits: Caught on road at 21.30 hr.
Identification: based on ventral counts and overall coloration.
Image in BP #16

Scale rows	15:15:15 smooth, vertebrals greatly enlarged
Belly count	V 224 A 1 S 34 (entire) Tail incomplete
Labials	S 7(E:3-4)
Loreal	0
Oculars	Pr 1 Po 2
Temporal	1+2
Length	

24. *Ovophis monticola* Mountain Pit-Viper

Locality: North of Bomdila (below 5th Mile Community) Oct04
Individuals encountered: 1
Habits: Found crossing the highway at 2200 hrs

Scale rows	23:23:19 keeled, vertebrals greatly enlarged
Belly count	V 145 A 1 S 34 Tail incomplete
Labials	S 9, (1st fused with nasal, Pit between 2nd and 3rd, 3 scale rows between eye and supralabial) I 10
Supraocular	1, separated by 6-7 scales
Suboculars	Many
Internasals	1, separated by 1 scale
Length	Total 680

The inset shows a magnified image of the remarkably cryptically patterned eye and the heat-sensing pit .

Family Gekkonidae:

25. *Cosymbotus platyurus*

Locality and Number: 20 in Khellong (750m) and Doimara (450m) in Oct04; 10 in Khellong and Doimara in May05;

Habits: All seen at night on trees, rocks, buildings and culverts. This species changes colour quite markedly, as many other geckos do, changing from a uniform yellow-green or gray on buildings to a dark with a strong pattern on trees etc.

Identification: 4 specimens were keyed out. Supralabial 11; infralabial 9; femoral pores 19-20, separated by 2-3 scales; Lamella under 4th toe 8.

26. Cyrtodactylus khasiensis

Locality and Number: 3 in Sessni (1250m), 20+ in Khellong (750m), 2 in Doimara (450m) in Oct04; 5 in Sessni and 5+ in Khellong in May05

Habits: active at night on trees, bushes, rock faces, culverts, and rock walls.

Identification: 5 specimens were keyed out. Body and limbs with granular scales interspersed with larger tubercles, tail without transversely enlarged subcaudal plates but subcaudals larger than rest of tail scales, a lateral fold of enlarged scales, well-developed lamellae. The specimens agreed with Smith (1935) and Bauer (2003) but had consistently fewer preanal pores 8 – 10.

27. *Hemidactylus frenatus*

Locality and Number: 20+ in Doimara (450m); Oct04

Biology: Active and calling calling at night on buildings, fences, and trees in a village. Changes colour in a similar manner to *C. platyurus* – yellowish-green or grey on buildings to dark with strong markings on trees.

Identification: 3 specimens were keyed out. Dorsum almost entirely smooth with only few small rounded tubercles, highly reduced inner toe, preano-femoral pores continuous, tail with whorls of spines, lamellae under 4th finger 4-5, lamella under 4th toe 9-10.

Family Agamidae:

28. *Calotes versicolour*

Locality and Number: 10+ in Khellong (750m), 10+ in Doimara (450m) in Oct04; 7 in Khellong and 6 in Doimara in May05.

Habits: This common diurnal agamid was seen moving around in the day in low bushes and on the ground, though most sightings were of individuals asleep on low (<1300 mm) bushes at night.

Identification: 5 specimens keyed out. Lateral body scales pointing backwards and upwards, no fold in front of shoulder, 2 separated spines above tympanum, 40-46 scales round the body, nuchal and dorsal crests continuous.

29. *Japalura andersoniana*

Locality and Number: 1 subadult in Sessni (1250m) in Oct04; 8 adults and 2 subadults in May05

Habits: The Oct04 specimen was seen in low grass on road at 0830 hrs. The other individuals were found sleeping on leaves of roadside shrubs at night.

Scalation: 7 specimens were keyed out.Tympanum concealed, heterogeneous and unequal dorsal scales. Dorsum with backward pointing chevrons of enlarged scales centred on the back. Subadult lacked gular pouch and nuchal crest. The other 6 specimens (adults) all had a gular pouch but only 3 had a nuchal crest. The nuchal crest was set upon a fold of skin.

This is endemic to western Arunachal Pradesh but seems to be not uncommon in Eaglenest.

Image in BP #15

30. *Mictopholis austeniana*

Described in greater detail in Appendix A-5

Family Scincidae:

31. *Asymblepharus sikkimensis*

Locality and Number: 10 in Bompu (1950m) in Oct04; 20+ in Bompu and 10 in Lama Camp (2350m) in May05

Habits: All were either active during periods of sunshine, or beneath rocks in overcast weather and at night.

Identification: lower eyelid with a transparent window, 26-29 scales round mid-body, dorsal scales half the size of laterals, 56-62 Gular+Ventrals, nuchals 2-4 pairs, 5th supralabial touching the eye, 7-8 Ciliars (not thickened), 6 Supraciliars, 4 postoculars and postsuboculars, lamellae under 4th finger 9, lamellae under 4th toe 11-13, single row of scales on dorsal surface of digits, Snout-vent length 50-53 mm.

32. *Mabuya* cf *dissimilis*

Locality and Number: 3 in Doimara (450m) in Oct04

Habits: 1 was basking, another moving in some grass in the day, and the third was seen moving about at dusk

Identification: lower eyelid with transparent palpebral disc, 35 scales round mid-body, 2 keels on dorsals, 3 keels on lateral body scales, nuchals absent, Loreal – 2 (Anterior>posterior), Supraocular – 5, prefrontal in contact with what?, supralabials 7 (5th, 6th below eye), infralabials 8, 3-4 lobules in ear.

33. *Sphenomorphus indicum*

Locality and Number: 1 in Sessni (1250m) in May05

Habits: Active in the day, others were seen basking and moving around at the same altitude in low grass near the road.

Scalation: lower eyelid scaly, 34 scales round mid-body, nuchals 1 pair, Supraocular – 6, Rostral convex, frontal > frontoparietal + interparietal.

34. *Sphenomorphus* sp

Locality and Number: 1 in Sessni at 1250 m in May05.

Habits: encountered during the day.

Scalation: lower eyelid scaly, 34 scales around mid-body, nuchals absent, supraocular – 6, Rostral with a depression, frontal = frontoparietal + interparietal

Ramana Athreya / Eaglenest Biodiversity Project / Kaati (funded by The Rufford-Maurice-Laing Foundation, UK)

Mictopholis austeniana

130 years after Col. Godwin-Austen collected the first and only specimen known to science this lizard was observed in Eaglenest in 2005. A highly arboreal creature, it has the ability to change its colour from bright green to deep chocolate, and all shades in between.

Appendix A-5

Rediscovery of the rare agamid *Mictopholis austeniana* (Annandale 1908)[8]

We report the rediscovery of the agamid *Mictopholis austeniana* in Eaglenest wildlife sanctuary, West Kameng district, Arunachal Pradesh. Since the collection of the type in 1874 and its description by Annandale (1908) no other specimens have been reported in literature. Here we present the first photographs of a live specimen, its morphometry and some notes on behaviour, along with morphometry of previously unreported and unidentified specimens that we encountered in the collection of the State Forest Research Institute, Itanagar, Arunachal Pradesh, India.

The type specimen of *Mictopholis austeniana* (specimen number 3976, Indian Museum; now in Zoological Survey of India, Kolkata) was collected by Colonel Godwin-Austen during the Dafla Expedition in 1874-75. Annandale (1905) initially identified it as *Salea horsfieldii* (not of Gray), and subsequently described it as a new species *Salea austeniana* (Annandale 1908). Subsequently, Smith (1935) erected the monotypic genus Mictopholis for this specimen. The type locality is listed as "near Harmatti, Dafla Hills, Assam" (Dafla Hills = The range east of the Kameng River and west of the Abor hills in Subansiri; Harmatti was (is?) a Tea Estate in the foothills below Itanagar).

Eaglenest Specimens

We encountered a total of 4 *Mictopholis* in Eaglenest in May 2005 and June 2006. All the lizards were photographed, measured and released in the same area. The first individual was caught at 1800m below Bompu Campsite (lat 27.07N long 92.47E) at 1130 hrs on 10-05-2005 in heavily overcast conditions. The animal was on low road-side shrubbery about 1m off the ground, and our attention was drawn to its movement while beating the bushes for butterflies. Other individuals were seen in Lama Camp at 8.00 hr on 05-06-2006 (27.16N 92.46E; alt. 2350m; on a log 1m off the ground), Alubari village below Lama Camp at 11.50 hr on 05-06-2006 (27.17N 92.46E; alt. 2000m; on the ground next to a concrete water canal), and Lama Camp at 16.30 hr on 06-06-2006 (on the road). The weather was warm and bright during these latter sightings. All the three individuals were gravid females in which the eggs could be discerned in the swollen abdomen.

Z.S.I. and S.F.R.I. Specimens

A total of 5 preserved specimens of *M. austeniana* including the type specimen were examined and morphometric details noted. Three of these are in SFRI, Itanagar, are unlabeled and no information pertaining to their collection is available. The second specimen at ZSI (i.e. not the type) was collected from Bomdila, West Kameng district, Arunachal Pradesh on 17-11-1990. All the (other) specimens matched the type and the generic key and detailed description in Smith (1935). The scales on the belly were not bi-dentate in some. Two SFRI specimens were gravid and contained nine eggs that seemed to be fully developed. The three eggs we measured averaged 160 x 90 mm in projected length and 220 x 120 mm along the circumference.

Identification

In the field we followed the key in Smith (1935), and later double-checked with Annandale (1908) to confirm the identification. Since we did not have permits to collect specimens we took measurements and detailed close-up photographs of the lizard before releasing them. These photographs are perhaps the first of a live specimen. All our specimens matched the generic key for Smith (1935) - no femoral pores; no wing like expansion; tympanum exposed; dorsal scales

[8] The photograph of the Bompu specimen is in BP #14 on page 118

unequal, irregular and heterogeneous; ventrals unequal. The admixture of scales of various sizes and shapes on the body is quite distinctive (which gives this species its generic name). In fact, this feature brought the SFRI specimens to our notice while casually browsing through the collection.

Description of the Bompu specimen

The lizard can vary its ground colour from bright green to chocolate brown which has on it an irregular, broken blackish pattern of variable thickness (Images 1-3, 9, 10). It can maintain different levels of saturation on either side (laterally and from front to back, with the posterior being darker). Mouth and tongue bright yellow (Image 3). Canthus rostralis and superciliary edge sharp; forehead strongly concave (Image 7). Upper head scales obtusely keeled with some arranged forming ridges (Image 4). Supra- and infra-labials with black spots (Image 1). Tympanum is dark brown in all colour phases, with a faint radial keel (Image 5). The orbit is patterned with a ring of black spots with a conical scale behind the posterior margin. A temporal ridge formed by 4-5 obtusely keeled scales between the orbit and tympanum (Image 5). A shoulder fold of small, bright, saffron-coloured granular scales (Image 1). Scales on the gular sac light green with saffron bases (Image 2). Throat bright yellowish-green with pits on the posterior edge of the scales (Image 6). The nuchal crest consists of slightly raised highly lanceolate spines while the dorsal crest is largely supine (Image 11). Dorsal body scales are a distinctive mixture of various sizes and shapes, the green scales being more variable than the black which tend to be more uniform and smaller (Image 13). Lower body scales point backward and downward while the upper ones point backward and upward. Posterior scales are larger than the anterior ones. Many of the largest green scales are fully or partially keeled and these remain green the longest while the ground colour changes from green to brown (Image 13). The underside is uniformly bright yellowish-green with the scales unequal in size, notched and with a bi-dentate nipple-shaped protuberance posteriorly. Tail banded green and brown on the basal third and dark brown distally.

Behaviour and Natural History

The lizard was generally non-aggressive when handled but occasionally threatened by opening its mouth, displaying the bright yellow colour inside. It also bit a hand on a couple of occasions but did not draw blood. All the gravid females were aggressive while being measured.. The very long tail and long digits of the hind limb suggested arboreal habits as also its rather slow and laboured movement on the ground. In particular the long toes seemed to get in the way. In contrast the lizard seemed very comfortable on twigs and was adept at jumping from one branch to another, and using its tail to balance. Interestingly, the lizard was first seen sitting on a leaf and not clinging to the stem or branch. The keeled soles of its hind limb may also be of help in its arboreal habits. On two occasions while being photographed, the lizard caught passing insects (a bee and a fly).

References

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Table 1: Morphometry of Mictopholis austeniana specimens

	Sp1	Sp2	Sp3	Sp4	Sp5	Sp6	Sp7	Sp8	Sp9
Snout-Vent length	90	98.5	86	85	90	90	117	112	113
Head length snout tip to rear edge of skull			30	30	30	28	32	34	31
Head width	14		16	17	15	17	19	24	24
Tail length	230		190	170	135	210	257	237	240
Supralabials L/R	6/6	7/8	8/7	8/8	7/7	6/7	7/7	6/7	6/6
Infralabials L/R	7/8	9/9	6/7	7/7	7/8	6/6	6/6	7/7	7/7
Scales from eye to tympanum	4/4	4/3	4/4	4/3	4/4	4/4	4/4	4/4	4/4

Sp1: ZSI Specimen no. 3976 – (type)
Sp2: ZSI Specimen No: 24841
Sp3: Unlabeled SFRI specimen, female
Sp4: Unlabeled SFRI specimen
Sp5: Unlabeled SFRI specimen, female
Sp6: Eaglenest, at Bompu on10-05-2005
Sp7: Eaglenest, female at Lama Camp on 05-06-2006
Sp8: Eaglenest, female at Alubari on 05-06-2006
Sp9: Eaglenest, female at Lama Camp on 06-06-2006

All lengths in mm

Head Length measured from snout tip to rear edge of bone behind tympanum

Sp1: orbit diameter 8, snout length 10

Sp5: tail incomplete

Sp6: snout tip to gape 20, orbit diameter 7.5mm, snout length 10, eye diameter 3, tympanum 3

Image 1: Green phase

Image 2: Intermediate phase with gular sac extended

Image 3: Brown phase with yellow insides of mouth

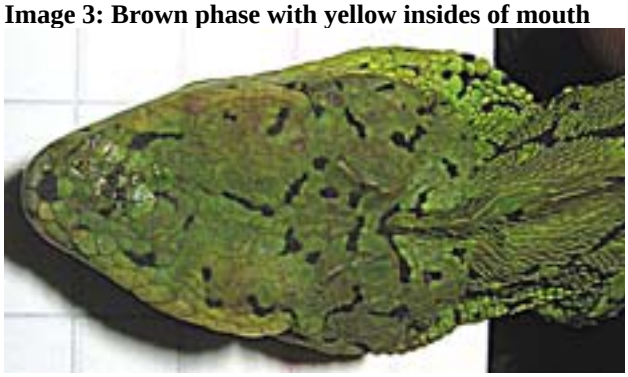

Image 4: Top of head; ridges are delineated in red

Image 5: Temporal area; ridge is marked by red dots

Image 6: Throat

Image 7: Front view of head

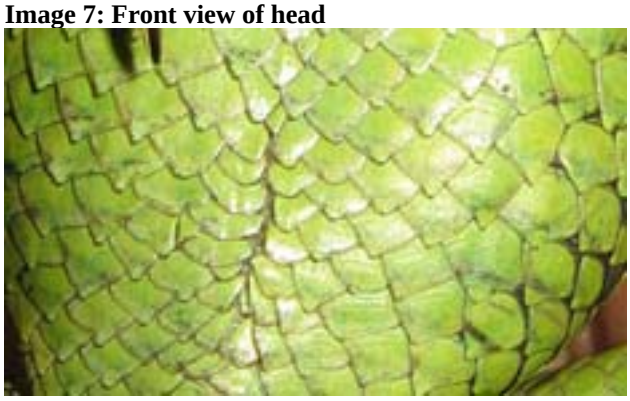

Image 8: Belly

Image 9: Brown phase

Image 10: Green phase

Image 11: Nuchal and dorsal crests

Image 12: Tail

Image 13: The enlarged and keeled body scaled have been marked with red dots in this image

Image 14: Fore foot

Image 15: Hind foot

Image 16: Hind sole

Biodiversity Portfolio – 16

Dinodon gammiei

This snake was only known from five museum specimens prior to this. This is the first photograph of a live snake

Himalayan Keelback

Eastern Trinket

Assam Snaileater

Ochraceous Catsnake

Black-barred Kukri

Mock-viper

Black Krait

Banded Krait

Appendix A-6

Range Extension of the Darjeeling False-wolfsnake *Dinodon gammiei* (Blanford 1878)[9]

A live specimen of this *Dinodon gammiei* was obtained by Viral Mistry at 1950m in Bompu in Eaglenest wildlife sanctuary on 2004-09-23. This species was only known from 5 specimens before this all collected from Darjeeling, West Bengal. Eaglenest is separated from Darjeeling by 400 km of Bhutan.

The taxonomic status of this species has had a checquered history. After the discovery in 1878 it was synomised with Lycodon fasciatus as an aberrant form of the latter in by Wall (1911). However Wall (1923) accepted this as a valid species and transferred it to the *Dinodon* genus. Smith (1943) reiterated the validity of this species and considered *Dinodon gammiei* and *Lycodon fasciatus* as the links between the two genera. Mahendra (1984) synonimised the taxon with *Dinodon septentrionale* but this has not been followed by later authors.

Mistry, Vogel & Tillack (2006) provide the following description of the live Eaglenest specimen:

Head: Black with irregular dirty yellow markings on nasal, internasal, prefrontal, frontal, loreal, preocular, postocular and temporal scales. Supralabials yellow with thick black markings along the sutures. Patch of dirty yellow scales posterior to the angle of jaw. An 'X' shaped dirty yellow marking covering the parietal scales and the scales posterior to it may or may not be present. Infralabials yellow with black along the sutures of the first few.

Body: Covered with alternate black and dirty yellow rings with irregular margins from the neck onwards to the tail (52 light rings in all). First few black rings are incomplete at the level of the ventrals, which are yellow in that portion. Dorsal and dorsolateral portion of the black rings, except for the first few, speckled with bright yellow markings. Dorsal and dorsolateral portion of the dirty yellow rings, at the exception of the first few ones, have many scales with black sutures. Ventrally the black rings retain the same colour covering 2 to 3 ventrals. The dirty yellow rings are of a paler as dorsal, covering 2 to 4 ventrals. Total length 880mm, tail 225mm

Pholidosis: Scale rows 17:17:15, ventrals 220, anal 1, subcaudals 112, supralabial 8 with 3-5 touching eye, loreal not touching eye, preocular 1, postocular 2, temporal 2+2

The authors conclude that the differences in colouration, pholidosis, number of cranterian teeth, maxillary bone, and hemipenes are sufficient to separate Dinodon gammiei and Lycodon fasciatus as distinct species.

Very little is known of the ecology of this species other than the locations of collecton (elevation 1220m and 1660m; holotype from a Cinchona plantation. The Eaglenest specimen was seen at 1940m in a stone house in a large clearing within Bompu campsite on 2004-09-23 at 1820 Hr. It was trying to enter a hole above the window about 2.5m off the ground. It tried to bite when handled. When posed for photographs it showed no aggression and tried to escape. Nothing else is known of the natural history of Dinodon gammiei.

More details on this specimen may be obtained from Mistry, Vogel & Tillack (2003). There is an image of this species in BP #16 on page 136.

[9] This appendix is a brief summary of the material in Mistry, Vogel & Tillack (2003). That paper originated with the discovery of this species in Eaglenest during this project.

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Ramana Athreya / Eaglenest Biodiversity Project / Kaati (funded by The Rufford-Maurice-Laing Foundation, UK)

Short-nosed Vinesnake

Ornate Flyingsnake

Trachischium tenuiceps

Trachischium monticola

The only survey in Eaglenest for snakes has yielded an astonishing 24 species in less than a month of field work. They include several rare and little-known snakes. More than 10 species had not been previously documented photographically in India – images of live snakes are important because the method of preservation destroys the colours of specimens.

Appendix A-7

Amphibians of Eaglenest wildlife sanctuary

I would like to emphasise (again – see sec. 4.2) that all the amphibian identifications are tentative. Locality codes in the table below are: Bompu B, Doimara D, Khellong K, Lama Camp L, Sessni Se and Sunderview Su.
All the image montages in this appendix and the data were the work of Viral Mistry and Ishan Agarwal

	Scientific Name	**Common Name**	**Altitude**	**Localities**
Family Bufonidae				
1.	*Bufo melanostictus*	Common Toad	750, 2000	K, R
2.	*Bufo* cf *himalayanus*	Himalayan Toad	2000	R
3.	*Bufo stuartii*		1250-1950	Se, B
4.	*Bufo* cf *burmanus*		1920?	B
Family Megophryidae				
5.	*Megophrys cf. major*		1250-1950	Se, B
6.	*Xenophrys cf boettgeri*	Boettger's Xenophrys	1250	Se
7.	*Xenophrys sp*		1250	Se
Family Microhylidae				
8.	*Microhyla sp.*		450	D
Family Ranidae				
9.	*Staurois cf viridimaculatus*		1950	B
10.	*Amolops sp*		1250	Se
11.	*Amolops ?chunganensis?*		1250	Se
12.	*Amolops sp*		1250	Se
13.	*Amolops or Sylvirana* sp		1250	Se
14.	*Paa cf leibegii*		1250-2350	Se, B, Su
15.	*Paa* sp *(blanfordi / polunini* group*)*		2350	Su
16.	*Occidozyga cf borealis*		450-750	D, K
17.	*Fejervarya sp.*	Cricket Frogs	750	K
18.	*Fejervarya sp.*	Cricket Frogs	750	K
19.	*Fejervarya sp.*	Cricket Frogs	750	K
20.	*Fejervarya sp.*	Cricket Frogs	750	K
21.	*Euphlyctis cyanophlyctis ?*	Skittering Frog	500	K
22.	*Sylvirana?*		450, 1250	D, Se
Family Rhacophoridae				
23.	*Chirixalus* sp.		750	K
24.	*Philautus* sp. 1	Bush frog		
25.	*Philautus* sp. 2	Bush frog		
26.	*Philautus* sp. 3	Bush frog		
27.	*Philautus* sp. 4	Bush frog		
28.	*Theloderma* cf *asper*	Pied Theloderma	1250	Se juv
29.	**Polypedates *cf* leucomystax**	Lineated Polypedates	***450***	D
30.	*Polypedates* cf. *naso*		450	D
31.	*Rhacophorus cf htunwini*		1250	Se
32.	*Rhacophorus maximus*		450-1250?	D, K, Se
33.	*Rhacophorus taroensis*		1250	Se
34.	*Rhacophorus cf translineatus*		1250	Se
35.	*Rhacophorus sp.*		1250	Se

Species Notes:

1. *Bufo melanostictus* (Schneider 1799)
Localities: Ramalingam (1920m), Khellong (750m), Doimara (450m??). Oct04 and May05
Individuals observed: 10+
Habits: Active along the road during evening and night trails. Seen inside holes in road cuttings in the day and at the opening at night.

2. *Bufo* cf. *burmanus*
With indistinct tympanum, similar to *B. himalayanus*
Localities: Sessni (1250 m). October 2004.

3. *Bufo stuartii* Smith 1929
Localities: Bompu (1900m), Sessni (1200m) and New Khellong (1250 m). Oct04 and May05.
Individuals encountered: Many, 5+ were identified using key in Wogan et al (2003)
Habits: Active along the road during evening and night trails. During day seen in holes in road cuttings, and under rocks.
Miscellaneous: Two individuals seen were yellow in color (probably breeding males)

	Specimen 1 : Light brown, less red	Specimen 2 More red
Snout-Vent length	78	83
Head width	27.8	
Head length	18	20
Eye-Snout distance	R10.6 L10.3	R10.9 L 10.7
Eye-Nostril distance	6.6	6.2
Nostril-Snout distance		
Eye diameter		
Tympanum diameter	R 2.7 L 1.9	R3.7 L3.2
Parotid length	21.7, triangular	23.8
Canthus Rostralis	Distinct	Distinct
Inter Narial distance		
Inter Orbital	Slightly concave	More concave
Others	Finger tip rounded, Subarticular tubercle present, inner metatarsal tubercle longer, outer metatarsal tubercle rounded, prepollex persent and rounded	

5. ***Megophrys*** **cf.** ***major***

Medium sized, body robust, with smooth dorsal surface; superficially similar to others of the genus

Localities: Bompu (1950 m), Sessni (1250 m). May 2005.

Individuals encountered: 3; 2 observed in detail

Habits: Bompu frogs observed crossing the road. Seen calling from a nettle clump along a stream at Sessni. Other similar calls were heard in the area.

	Specimen 1 redder markings	Specimen 2 – blacker markings
Snout-Vent length	61.4	66
Head width	22.2	25.1
Head length	18.6	19.9
Eye-Snout distance	8.2	9.3
Eye-Nostril distance	3.9	4.4
Nostril-Snout distance	4.3	4.9
Eye diameter	5.9	5.8
Tympanum diameter	2.2, indistinct	2.4, indistinct
Tarsal length	29.7	31.7
Tibio-Tarsal articulation	Reaching snout	Reaching snout
Webbing	None	None
Others	Finger 1st = 2nd	

6. *Xenophrys* cf. *boettgeri*

Localities: Sessni (1250m). Oct 2004 and May 2005.
Individuals encountered: several; one studied in detail.
Habits : Calling from leaves above and near flowing water and calling.

	Specimen 1
Snout-Vent length	27.6
Head width	8.6
Head length	6.0
Eye-Snout distance	3.8
Eye-Nostril distance	2.0
Nostril-Snout distance	-
Eye diameter	3.0
Tympanum diameter	1.4 distinct, covered
Inter Narial distance	-
Inter Orbital	-
Tarsal length	12.1
Tibio-Tarsal articulation	Reaching posterior corner of eye
Webbing	Nil

7. *Xenophrys* sp.

Greyer in shade, more compact and significantly more granular than previous species

Localities : Sessni (1250m). May 2005.

Individuals encountered: Many, two studied in detail (12th and 13th May).

Habits: All individual observed were calling from within vegetation near flowing water, a single repeated note trick-trick-trick, similar to a cricket. Heard late in the evening and night, calling from shrubs, often nettles (one under a culvert, others by the road)

	Specimen 1	Specimen 2
Snout-Vent length	38.6	33.5
Head width	14.7	13.8
Head length	12.4	12.0
Eye-Snout distance	4.8	4.8
Eye-Nostril distance	1.9	2.0
Nostril-Snout distance		
Eye diameter	4.3	4.0
Tympanum diameter	2.2, distinct, covered	2.4, distinct, covered
Inter Narial distance	4.4	4.4
Inter Orbital	A 7.3 P	A 7.4 P 11.3
Tarsal length	17.4	16.1
Tibio-Tarsal articulation	Reaching beyond eye	Reaching snout tip
Webbing	nil	nil
Others	A supra-typanic ridge/fold; Fingers 1st = 2nd	

9. *Staurois cf viridimaculatus*

Localities: Bompu (2200m) to New Khellong (1250m). Oct 2004 and May 2005.

Individuals encountered: Many, 2 studied in detail.

Habits: Seen mostly on culvert walls, rock faces and in crevices in road cuttings. In October a rain shower in the evening or night would result in an obvious surge in activity and visibility.

	Specimen 1	Specimen 2
Snout-Vent length	81.4	74.1
Head width	28.9	27.9
Head length	24.4	21.8
Eye-Snout distance	10.6	10.4
Eye-Nostril distance	4.6	5.4
Nostril-Snout distance		
Eye diameter	8.4	7.9
Tympanum diameter	3.4, visible	2.5, visible
Tarsal length	40.7	39.7
Tibio-Tarsal articulation	Reaching beyond snout	
Webbing	Toes I 0-0 II 0-0.5 III 0-0.5 IV 0.5-0 V Fingers nil	

10. *Amolops* sp.
Approx size 25-30 mm
Localities: Sessni (1250m). Oct 2004

11. *Amolops ?chunganensis?*
Localities: Sessni (1250m).

12. *Amolops* sp.
Approx. size 30-35mm
Localities: Sessni Oct 2004.

13. *Amolops/Sylvirana* sp.

Newly metamorphosed froglet – hence identification highly tentative.

Localities: Doimara (450m). October 2004.

14. *Paa* cf. *liebigii*

Localities: Sunderview (2450m), Bompu (1950m) and Sessni (1250m). Oct 2004

Habits: In roadside puddles and streams.

	Specimen 1	Specimen 2 (green)
Snout-Vent length	32.2	24.1
Head width	11.5	10.4
Head length	8.7	7.7
Eye-Snout distance	3.6	3.2
Eye-Nostril distance	1.8	1.5
Nostril-Snout distance	2.2	2.1
Eye diameter	4.2	3.5
Tympanum diameter	Not visible	Not visible
Inter Narial distance	3.7	3.0
Inter Orbital	A 5.0 P 8.8	A 4.2 P 7.7
Tarsal length	14.4	
Tibio-Tarsal articulation	Reaching anterior corner of eye	
Webbing	Toes I 0-0 II 0-0 III 1.5-0 IV 0-0 V Finger Rudimentary	Toes I 0-0 II 0-0.5 III 1.5-1 IV 0-0 V Finger rudimentary

15. *Paa* sp.

Perhaps belonging to the *blanfordi* - *polunini* group

Localities : Sunderview (2450-2500m). Oct 2004 and May 2005

Individuals encountered: Several, 3 adults (60 mm) – 1 male, the other two were not sexed – and 3 juveniles (30mm) were examined closely. The male had black nuptial spines on the first 3 fingers and on two patches on either side of the chest. The forearms were hypertrophied. The body pattern of all individuals were the same but some were green (ground colour) with brown markings, others were bronze with black markings while yet more sported a combination of green and bronze.

Habits: Under rocks beside and in stagnant water along the road. Active in the same pools at night even in very cold temperature.

Miscellaneous: Could be an undescribed species (Nikolai Orlov, pers comm)

	Specimen 1	Specimen 2 (green)	Specimen 3 (intermediate, with green on head)	Specimen 4 (male)
Snout-Vent length	60.2	28.5	51.4	57.3
Head width	21.5	11.4	17.0	19.5
Head length	13.3	8.4	13.7	14.7
Eye-Snout distance	7.1	3.6	7.4	7.9
Eye-Nostril distance	3.4	1.9	3.0/	3.6
Nostril-Snout distance				
Eye diameter	6.6	3.9	5.8	6.3
Tympanum diameter		Hidden	Hidden	Hidden
Inter Narial distance	7.1	4.4	6.0	7.0
Inter Orbital	A 10.9	A 6.5	A 8.0 P 13.4	A 10.9 P 14.4
Tarsal length				
Tibio-Tarsal articulation				
Webbing	I 0.5-1 II 1.5-0/1-0 III 0.5-0/0-0 IV 0-0/0-0 V Fingers very little	I 0-1/0 II 1/0-0 III 0-0/1 IV 0-0 V Fingers very little	I 0-0 II 0-0 III 0-0 IV 0-0 V Fingers very little	I 0-0 II 0-0 III 0/1-0/1 IV 0-0 V Fingers very little

16. *Occidozyga* cf. *borealis*

Localities: Khellong (750m) in Oct 2004; Doimara (450m) in May 2005.

Individuals recorded: Several, two studied in detail.

Habits: Found in roadside pools and seepage in Khellong and in a calling from a wide shallow stream in Doimara.

Miscellaneous : Pawar & Birand (2001) rediscovered it at Pakke, 90 years after the previous record from Mouling

17. *Fejervarya* sp.
Localities: Khellong (750m). Oct 2004 and May 2005
Habits: Seen in and around roadside pools

18. ***Fejervarya*** **sp.**
Localities: Khellong (750m). Oct 2004 and May 2005
Habits: Seen in and around roadside pools

19. *Fejervarya* sp.
Localities: Khellong (750m). Oct 2004 and May 2005
Habits: Seen in and around roadside pools

20. *Fejervarya* sp.
Localities: Khellong (750m). Oct 2004 and May 2005
Habits: Seen in and around roadside pools

24-27. *Philautus* sp.

It is not clear whether the many Philautus individuals we encountered are all the same species or different. We only know that there were at least 4 different types of calls from that bunch.

28. *Theloderma* cf. *asper*

Location: Sessni (1250m).

Individuals encountered: One

Habits: Found in shrubbery over a roadside runnel. Has the habit of playing dead. When we caught it went limp and immobile causing us to agonise for a while if we had inadvertently crushed it. On being kept unmolested it popped up into a sitting posture.

Miscellaneous: Pawar & Birand (2001) rediscovered *Theloderma asper* in Namdapha after close to a century. We are not sure if ours is the same species. It could be something new.

29. *Polypedates leucomystax*

Localities: Doimara (450m). Oct 2004 and May 2005

Individuals encountered: 4, Observed one.

Habits: Calling from low branches along streams and in a grassy patch with small shrubs along the road. One individual recorded in a village garden

	Specimen 1
Snout-Vent length	58.3
Head width	20.0
Head length	20.6
Eye-Snout distance	11.4
Eye-Nostril distance	5.8
Nostril-Snout distance	4.3
Eye diameter	7.1
Tympanum diameter	4.6, distinct
Inter Narial distance	5.5
Inter Orbital	A 12.5 P 20.1
Tarsal length	26.2
Tibio-Tarsal articulation	Reaching nostril
Webbing	I 0.5-1 II 0-1 III 0-1.5 IV 1-0.5 V Finger none

30. *Polypedates* cf. *naso*

Localities: Doimara (450m). May 2005

Individuals encountered: One

Habits: One sitting on a broken branch above a grassy patch close to a stagnant pool along the road.

	Specimen 1
Snout-Vent length	34.9
Head width	12.3
Head length	9.5
Eye-Snout distance	6.1
Eye-Nostril distance	2.7
Nostril-Snout distance	2.5
Eye diameter	4.6
Tympanum diameter	1.7, distinct
Inter Narial distance	3.7
Inter Orbital	A 6.7 P 12.0
Tarsal length	15.9
Tibio-Tarsal articulation	Reaching nostril
Webbing	I 0-1 II 0-1 III 0-2 IV 1-0 V Fingers none

31. *Rhacophorus* cf. *htunwini*

Localities: Sessni (1250m). May 2005

Individuals encountered: Many, 3 males (calling) examined in hand

Habits: Found on leaves of roadside plants less than 1.5m off the ground with stagnant water underneath. Observed in gatherings of 8-10 (within a few metres). Two types of calls heard.

Miscellaneous: The frogs changed colour from bright golden brown to ashen when caught

	Specimen 1	Specimen 2	Specimen 1
Snout-Vent length	43.6	46.2	41.2
Head width	15.1	15.5	14.7
Head length	11.7	12.0	10.6
Eye-Snout distance	7.7	7.5	7.0
Eye-Nostril distance	3.6	3.2	3.4
Nostril-Snout distance	3.9	4.5	
Eye diameter	5.0	5.3	5.1
Tympanum diameter	2.0, hidden	2.3 hidden	1.8 hidden
Inter Narial distance	4.1	4.5	4.4
Inter Orbital	A 9.2 P 13.3	A 8.9 P 14.2	A 8.3 P 13.0
Tarsal length	18.0	17.9	17.5
Tibio-Tarsal articulation	Reaching nostril	Reaching anterior corner of eye	Reaching nostril
Webbing	Toes I 0-0.5 II 0-1 III 0-0.5/0 IV 0/0.5-0 V Finger I 1-1.5 II 0-1 III 0.5-1 IV	Toes I 0-1 II 0-0.5 III 0-1 IV 0.5-0 V Fingers: I 1-1 II 0-1 III 1-0.5 IV	Toes I 0.5-0 II 0-0 III 0-0 IV 0-0.5 V Fingers: I 1-1 II 1-1 III 0.5-1 IV

32. *Rhacophorus maximus*
Localities: Khellong (750m). May 2005
Individuals encountered: three
Habits: 3 seen on the road at night. Another laid eggs in the bathroom bucket.

33. *Rhacophorus* cf. *taroensis*
Localities: Bompu (1900m). May 2005
Individuals encountered: many; several examined in hand

	Specimen 1	Specimen 2	Specimen 3
Snout-Vent length	60	58.6	57.3
Head width	20.6		20.3
Head length	17.2		18.4
Eye diameter	6.6	6.5	6.9
Tympanum diameter	3.9	3.4	3.8
Tympanum	Distinct and covered		
Tibio-Tarsal articulation	Reaching anterior corner of eye		

Habits: Observed in gatherings on branches above stagnant water, 0.5 – 4m off the ground, or in the pool itself. One pair seen in amplexus in water. A foam nest was seen in a pool and on a leaf 2m above a pool. 4-5 frogs were observed in that pool (below the nest) every night. Calls were heard from various sites at 1950m but the frogs were observed in only two sites.

34. *Rhacophorus* cf *translineatus*

Localities: Sessni (1250m). May 2004.

Individuals encountered: one.

Habits: seen on a branch 4m off the ground.

	Specimen 1
Snout-Vent length	74.0
Head width	22.1
Head length	19.7
Eye-Snout distance	12.7
Eye-Nostril distance	6.4
Nostril-Snout distance	5.9
Eye diameter	7.3
Tympanum diameter	3.1, hidden
Inter Narial distance	7.0
Inter Orbital	A 13.2 P 19.8
Tarsal length	17.5
Tibio-Tarsal articulation	Reaching nostril
Webbing	Toes: I 0-0 II 0-0 III 0-0 IV 0.5-0 V Fingers: I 1-1 II 0-0.5 III 0-0 IV
Others	A prominent supra tympanic fold, a prominent dermal calcar on heel, two tubercles below the anal ridge or fold above it,white excrescences around the vent

35. *Rhacophorus sp.*
Localities: Sessni (1250m). May 2005
Individuals encountered: two juveniles
Habits: observed sleeping on ferns 1.5m off the ground during the day

	Specimen 1	Specimen 2
Snout-Vent length	30.8	31.8
Head width	11.6	11.5
Head length	10.5	8.8
Eye-Snout distance	5.3	5.2
Eye-Nostril distance	2.8	2.7
Nostril-Snout distance		
Eye diameter	4.1	4.1
Tympanum diameter	2.0, distinct, covered	2.0
Inter Narial distance	3.5	3.9
Inter Orbital	A 7.0 P 10.8	
Tarsal length	11.5	12.3
Tibio-Tarsal articulation	Reaching anterior corner of eye	Reaching anterior corner of eye
Webbing	Toes: I 0-1 II 1-1.5 III 0-1 IV 1-0.5 V Fingers: I 1.5-2 II 1-1 III 1-1 IV	Toes: I 0-1 II 0-1 III 0-1 IV 0.5-0.5 V

Biodiversity Portfolio – 18

Genus : *Amphiesma*

Are these all the same species, or different? How many species? Are the top two a new species? Much work has to be done to answer even these basic questions.

Appendix A-8

A Preliminary Checklist of Butterflies of the Kameng Protected Area Complex

This very preliminary checklist of the butterflies and skippers of the Kameng protected area complex was compiled during field visits to Eaglenest under this project (Ramana Athreya, Viral Mistry and Shashank Dalvi) and from a earlier visit described in Athreya & Kartikeyan (1995).

The letter codes at the end of each row are: Pakke record (P), Eaglenest record (E), and if the species was recorded during the current project (Y)

The references used for identification are Evans (1932), Wynter-Blythe (1957), Haribal (1992), Smith (1993).

Family Papilionidae : Papilioninae			
Bhutan Glory *Bhutanitis lidderdalii*	-	E	Y
Tailed Jay *Graphium agammemnon*	P	-	-
Common Windmill *Atrophaneura polyeuctes (Tros philoxenus)*	-	E	Y
Great Windmill *Atrophaneura dasarada*	P	?	?
Nevill's Windmill *(Tros nevilli) ?*	-	?	?
Birdwing sp *Troides aeacus/helena*	-	E	E
Lime Butterfly *Papilio demoleus*	P	-	-
Redbreast *Papilio alcmenor*	-	E	Y
Great Mormon *Papilio memnon*	P	-	-
Common Mormon *Papilio polytes*	P	-	-
Red Helen *Papilio helenus*	P	E	Y
Paris Peacock *Papilio paris*	-	E	Y
Family Pieridae : Pierinae			
Large Cabbage-White *Pieris brassicae*	P	E	Y
Indian Cabbage-White *Pieris canidia*	-	E	Y
Spotted Sawtooth *Prioneris thestylis*	-	E	Y
Chocolate Albatross *Appias lyncida*	P	E	Y
Spot Puffin *Appias lalage*	-	E	Y
Pale Wanderer *Parenonia avatar*	-	E	Y
Lesser Gull *Huphina nadina*	P	E	Y
Yellow Orangetip *Ixias pyrene*	P	E	Y
Great Orangetip *Hebomoia glaucippe*	P	E	Y
Hill Jezebel *Delias belladonna*	-	E	Y
Red-breasted Jezebel *Delias acalis*	P	-	-

Family Pieridae : Coliadinae			
Common (Lemon) Emigrant *Catopsilia pomona*	P	-	-
Tailed Sulphur *Dercas verhuelli*	-	E	Y
Three-spot Grass-Yellow *Eurema blanda*	P	E	Y
Common Grass-Yellow *Eurema hecabe*	P	E	Y
Dark Clouded Yellow *Colias croceus*	-	E	Y
Family Lycaenidae : Theclinae			
Common Acaciablue *Surendra quercetorum*	P	-	-
Silverstreak blue *Iraota timoleon*	-	E	Y
Common Tinsel *Catapaecilma elegans*	-	E	Y
Common Imperial *Cheritra freja*	P	-	-
Long-banded Silverline *Spindasis lohita*	P	E	Y
Silver Royal *maneca bhotea*	P	-	-
Common Tit *Hypolycaena erylus*	-	E	Y
Fluffy Tit *Zeltus amasa (Z. etolus)*	-	E	Y
Assam Flash *(Rapala tara)*	P	-	-
Copper Flash *Vadebra petosivis (Rapala pheritima)*	P	-	-
Family Lycaenidae : Lycaeninae			
Purple Sapphire *Heliophorus epicles*	P	E	Y
Golden Sapphire *Heliophorus brahma*	-	E	Y
Green Sapphire *Heliophorus androcles*	-	E	Y
Powdery Green Sapphire *Heliophorus tamu*	-	E	Y
Family Lycaenidae : Polyommatinae			
Violet Four-Lineblue *Nacaduba pavana*	P	-	-
Six-Lineblue *Prosotas? nora?*	-	E	Y
Tailless Lineblue *Prosotas dubiosa*	P	-	-
Una *Una usta*	P	-	-
Elbowed Pierrot *Caleta elna*	P	E	Y
Common Caerulean *Jamaides celeno*	-	E	Y
Metallic Caerulean *Jamides alecto*	-	E	Y
Dark Caerulean *Jamaides bochus*	-	E	Y
Peablue *Lampides boeticus*	-	E	Y
Common Pierrot *Castalius rosimon*	P	-	-
Pale Grassblue *Zizeeria maha*	P	-	-
Grassblue *Zizeeria knyasna*	-	E	Y
Quaker *Neopithecops zalmora*	P	-	-
White-banded Hedgeblue	-	E	Y
Plain Hedgeblue *Celastrina lavendularis*	-	E	Y
Pale Hedgeblue *Celastrina cardia*	-	E	Y
Large Hedgeblue *Celastrina heugelii ?*	-	E	Y
Common Hedgeblue *Acetolepis puspa*	P	E	Y

Family Lycaenidae : Riodininae			
Punchinello *Zemeros flegyas*	P	E	Y
Tailed Judy *Abisara neophron*	P	E	Y
Dark Judy *Abisara fylla*	-	E	Y
Striped Punch *Dodona adonira*	-	E	Y
Family Nymphalidae : Amathusiinae			
Jungle-Queen *Sticopthalma sp*	-	E	Y
Family Nymphalidae : Satyrinae			
Common Palmfly *Elymnias hypermnestra*	P	-	-
Common Woodbrown *Lethe sidonis*	-	E	Y
Yellow Woodbrown *Lethe nicetas*	-	E	Y
Banded Treebrown *Lethe confusa*	-	E	Y
Blue Forester *Lethe scanda*	-	?	?
Rusty Forester *Lethe bhairava*	-	E	Y
Tailed Red-Forester *Lethe sinoryx*	-	E	Y
Scarce Red-Forester *Lethe distans*	-	E	Y
Straight-banded Treebrown *Lethe verma*	-	E	Y
Scarce Lilacfork *Lethe dura*	-	E	Y
Dusky Labyrinth *Lethe yama*	-	E	Y
Tiger Brown *Orinoma damaris*	-	E	Y
Dusky Diadem *Ethope himachala*	-	E	Y
White Owl *Neorina patria*	-	E	Y
Lilacine Bushbrown *Mycalesis franscica*	-	E	Y
White-edged Bushbrown *Mycalesis mestra*	-	E	Y
Long-brand Bushbrown *Mycalesis visala*	-	E	Y
Striped Ringlet *Ragadia crisilda*	-	E	Y
Himalayan Five-Ring *Ypthima sakra*	-	E	Y
Variegated Five-Ring *Ypthima methora*	P	E	Y
Common Five-ring *Ypthima baldus*	P	E	Y
Large Three-Ring *Ypthima newara (Y. nareda)*	-	E	Y
Great Satyr *Aulocera padma*	-	E	Y
Family Nymphalidae : Charaxinae			
Black Rajah *Charaxes fabius*	P	-	-
Common Nawab *Polyura athamas*	P	-	-
Family Nymphalidae : Apaturninae			
Indian Purple Emperor *Apatura ambica*	-	E	Y
Black Prince *Rohana parisatis*	-	E	Y
Circe *Hestina nama*	-	E	Y
Popinjay *Stibochiona nicea*	-	E	Y

Family Nymphalidae : Nymphalinae

Tabby *Pseudergolis wedah*	-	E	Y
Angled Castor *Ariadne ariadne*	P	-	-
Common Castor *Ariadne merione*	P	E	Y
Rustic *Cupha erymanthis*	-	E	Y
Large Yeoman *Cirrochroa aoris*	P	E	Y
Indian Fritilary *Argyreus/(Argynnis) hyperbius*	-	E	Y
Yellow Pansy *Precis hierta*	P	E	Y
Blue Pansy *Precis orithya*	-	E	Y
Lemon Pansy *Precis lemonias*	P	E	Y
Peacock Pansy *Precis almana*	P	E	Y
Grey Pansy *Precis atlites*	P	E	Y
Chocolate Pansy *Precis iphita*	P	E	Y
Red Admiral *Vanessa indica*	-	E	Y
Painted Lady *Cynthia/(Vanessa) cardui*	-	E	Y
Indian Tortoiseshell *Aglais cachmirensis*	-	E	Y
Common Jester *Symbrenthia lilaea*	P	E	Y
Himalayan Jester *Symbrenthia hypselis*	-	E	Y
Great Eggfly *Hypolimnas bolina*	P	E	Y
Autumn Leaf *Doleschallia bisaltide*	-	E	Y
Blue Oakleaf *Kallima horsfieldi*	-	E	Y
Orange Oakleaf *Kallima inachus*	P	-	-
Common Map *Cryestis thyodamas*	-	E	Y
Common Maplet *Chersonesia risa*	P	E	Y
Common Sailer *Neptis hylas*	P	E	Y
Sullied Sailer *Neptis soma*	-	E	Y
Clear Sailer *Neptis clinea*	P	E	Y
Small Yellow Sailer *Neptis miah*	-	E	Y
Common Lascar *Pantoporia/(Neptis) hordonia*	P	-	-
Orange Staff Sergeant *Parathyma cama*	P	E	Y
Colour Sergeant *Parathyma nefte*	P	-	-
Black-vein Sergeant *Parathyma ranga*	P	-	-
Common Sergeant *Parathyma perius*	P	-	-
Himalayan Sergeant *Parathyma opalina*	-	E	Y
Small Staff Sergeant *Athyma zeroca*	-	E	Y
Commander *Modusa procris*	P	-	-
Grey Commodore *Bhagadatta austenia*	-	E	Y
Green Commodore *Sumalia daraxa*	P	E	Y
Clipper *Parthenos sylvia*	P	-	-
Knight *Lebadea martha*	P	-	-
Panther *Neurosigma doubledayi*	-	?	?
Grey Count *Tanaecia lepidea*	P	E	Y
Plain Earl *Tanaecia jahnu*	P	-	-
Powdered Baron *Euthalias kesava*	P	-	-

Streaked Baron *Euthalia jama*	P	?	?
White-edged Blue Baron *Euthalia phemius*	-	E	Y
Family Nymphalidae : Helioconiinae			
Cruiser *Vindula erota*	P	-	-
Red Lacewing *Cethosia biblis*	P	E	Y
Leopard Lacewing *Cethosia cyane*	P	E	Y
Family Nymphalidae : Danainae			
Glassy Tiger *Parantica aglea*	P	E	Y
Chestnut Tiger *Parantica sita/(tytia)*	P	E	Y
Chocolate Tiger *Parantica melaneus*	P	E	Y
Dark Blue Tiger *Tirumala septrentionis*	P	-	-
Double-branded Crow *Euploea sylvester/(coreta)?*	-	?	?
Striped Blue Crow *Euploea mulciber*	P	E	Y
Blue-spotted Crow *Euploea midamus*	P	E	Y
Magpie Crow *Euploea radmanthus*	P	E	Y
Family Hesperiidae : Pyrropyginae			
Plain Banded Awl *Hasora/(Chromus) vitta ?*	-	E	Y
Common Banded Awl *(Chromus alexis)*	P	-	-
Family Hesperiidae : Pyrginae			
Multispotted Flat *Celaenorrhinus pulomaya*	P	E	Y
Common Spotted Flat *Celaenorrhinus leucocera*	P	-	-
Fulvous Pied-Flat *Coladenia dan*	P	E	Y
Tricolored Pied-Flat *Coladenia indrani*	-	E	Y
Small Common Flat *Sarangesa dasahara*	P	-	-
Family Hesperiidae : Hesperiinae			
Indian Skipper *Spialia galba*	P	-	-
Chocolate Demon *Ancistroides nigrita*	-	E	Y
Common Banded Demon *Notocrypta paralysos*	P	-	-
Spotted Demon *Notocrypta feithamelii*	-	E	Y
Restricted Demon *Notocrypta curvifascia*	P	E	Y
Tree-Flitter *Hyarotis adrastus*	P	-	-
Common Dartlet *Orien's gola*	-	?	?
Rice Swift *Borbo cinnara*	P	-	-
Beavan's Swift *Borbo bevani*	-	?	?
Great Swift *Pleopidas assamensis*	P	-	-
Halpe? sp	-	?	?

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Fire-tailed Myzornis

Bar-winged Wren-Babbler

Wren-Babblers are tiny secretive birds much sought after by birdwatchers. Of the 13 Indian species 8 are found in Eaglenest; one of them is on the IUCN red list

Beautiful Sibia **possibly the first photograph of a wild bird**

The Eaglenest area is home to over400 species of birds including many (WPA) Schedule 1 species, rare and range-restricted species, and species on the IUCN red list. : tragopans, Ward's trogon, hornbill, pied falconet, parrotbill, shortwings, blue-fronted robin, beautiful nuthatch, etc ... to name iust a few.

Ramana Athreya / Eaglenest Biodiversity Project / Kaati (funded by The Rufford-Maurice-Laing Foundation, UK)

Appendix A-9

A model for community-based ecotourism in Eaglenest wildlife sanctuary[1]

1. Background

I first visited Pakke Tiger Reserve and Eaglenest and Sessa wildlife sanctuaries in December-January 1995, as a birdwatcher, and was immediately struck by the immense riches the places had in store for the wildlife tourist. I returned to Eaglenest in November 2003 to document the biodiversity of the area and to explore more seriously my decade-old, inchoate plans for wildlife tourism there. In the interregnum ecotourism and community-participation had become much-used (and abused) buzzwords in conservation circles; and between 1999 and 2003 I had traveled extensively across South America as a species of ecotourist and observed at first hand the large flux of ecotourists from, principally, N. America and Europe. I had the opportunity to view from up close the various models of ecotourism and how much, or how little, it actually helped the supposed beneficiaries – the local communities and the wildlife. Over the last 3 years I have aggregated 6 months in the Eaglenest area documenting biodiversity, organising five ecotours, and community initiatives in conservation and ecotourism. This report is based on my experience of these 3 years in Eaglenest and a wider perspective of international ecotourism gained in South America.

1.1 Ecotourism

Ecotourism is a hold-all term for a wide range of outdoor holidays – casual picnics and mountain hikes, animal watching, fishing and even adventure sports like rafting; from basic camping to luxurious resorts; from read-a-book-under-a-tree to manic exertions to augment one's bird list. Western Arunachal Pradesh has scope to host many of the above activities but this report deals only with holidays spent in wilderness with some inclination towards enjoying and observing flora and fauna. Even within this restricted definition ecotourists fall into 3 categories:

1. **Casual Nature Lover**: who enjoys a few days in the wilderness for breathe fresh air, walk in the quiet woods, scenic vistas, picnic by a waterfall, photograph flowers, etc
2. **Mega Mammal Tourist**: who visits a sanctuary or national park, primarily to see the poster-mammals – tiger, elephant, rhino, gaur, swamp deer etc
3. **Serious Naturalist**: who is interested in the rest of the fauna and flora (the "minor" mammals, birds, butterflies, herpetofauna, fungi, plants, etc)

Superficially, categories (2) and (3) appear to be the same but there is a definite difference on the average, admittedly with some stereotyping, in the two types of tourists: anyone can be a Mega-Mammal-Tourist while Serious-Naturalists have to be able to rough-it-out (camping in remote areas and walk long distances) to observe their target species – it requires motivation and at least some scholarship. Without ignoring the other two categories South America has taken great strides in cultivating Serious-Naturalists. Unfortunately, mega-mammal ecotourism still holds sway in India, by a huge margin, among the general public and even government departments (tourism and wildlife). There is a fourth category which strictly speaking is not ecotourism but would qualify for it, especially when viewed from the point of view of community initiatives; and so

4. **Ecologists**

[1] Part of the study for this appendix was carried out under the Rufford Small Grant project while the rest of it, including writing up, was funded by the Ford Foundation through Winrock International India.

An ecotour package has two principal components – hospitality (boarding, lodging, transport and various add-ons in these spheres) and knowledge (guiding in the field and at the campsite). A tour may also include other components not related to wildlife (cultural programmes, handicrafts, etc). While these make a tour more attractive to some clients, others, especially Serious-Naturalists, may view these as undesirable intrusions. Most Indian operators limit their services to hospitality – perhaps reflecting the reality that Indian ecotourists predominantly populate the first two categories. However, the last decade has seen a spurt in the number of Serious-Naturalists. Furthermore a significant fraction of foreign ecotourists, especially birdwatchers, fall into this category. As of now only a handful of Indian agencies can adequately serve this segment, primarily because of the lack of quality ecoguides with adequate knowledge of flora and fauna.

Like other commercial ventures ecotoutrism needs a well-identified product – four trees and a picnic stream do not an eco-destination make! One cannot over emphasize this point. Corbett is an extraordinary wilderness with excellent forests, lovely rivers, and great scenery but visitors go to Corbett for its USP, its tiger; like the rhino of Kaziranga, like the marsh birds of Bharatpur. The number of birders to Nameri tiger reserve in Assam has gone up ever since sightings of the elusive and endangered white-winged duck and ibisbill have become regular. The remoteness of Arunachal destinations is not a problem, in fact it can be a good selling point; but an inability to identify and market their USP will be fatal.

Ibisbill on River Nameri. Photographed by Peter Schmidt. March 2006 tour

Even an extraordinary wilderness like Eaglenest will flop as an ecotour destination in the absence of good documentation of what is or isn't available, i.e. identifying its USP. The major reason for visitor flow jumping from 3 in 2004 and in 2005 to over 75 in 2006 was the webpages of the Eaglenest Biodiversity Project which provided ample photographic proof of the wildlife visibility in that area. Everyone knows that Arunachal Pradesh is one of the principal biodiversity hotspots of the world but that is not sufficient for attracting serious ecotourists. Ecotourists spend a lot of money over the course of a tour and usually have a limited amount of time at their disposal – a typical international visitor will spend 3000-5000 US$ (air travel, guide fee, local organization) for a 2 week stay in India and will want to stand a very good chance of seeing lots of wildlife, especially species unique to the area. A two-week specialty bird tour which did not show 250 species is simply not doing justice to its clients, and a good tour should be targeting a species list in excess of 300 species. In fact participants in the three bird tours I led to that area saw between 360 and 410 species in just 18 days. A good knowledge of the area and its fauna is essential.

1.2 Community-Participation

Community-Participation is another term which covers a wide range of meanings. There is no ambiguity about *community* itself – it refers to people living on the periphery of protected areas who are typically on the lower rungs of the development ladder. In ecotourism, as in many other fields of commercial endeavour, most of the profits remain with the people who market a tour package, which almost always means a city operator. Typically, community participation is limited to the presence among the tour staff of a few persons from the local community in the low-to-mid levels of the hierarchy. At most, a prominent person from the community stands to corner much of the profit from tourism. ***This, in my opinion, is not community participation.***

There is no reason why this should motivate the community into protecting their backyard forest – and it does not. I would like to emphasise that my opinion is not related to a socialist scheme of distribution of profit. My simple argument is that if forests are viewed as a communally owned resource (as it is in Arunachal Pradesh) and if the long-term conservation of a wilderness requires a

contribution from every member of the community, it stands to reason that unless the community as a whole benefits there will be no widely embraced urge to protect the wilderness.

On the other hand this skewed distribution of profit is not entirely inappropriate. A successful commercial venture requires a highly coordinated effort and initiative, which are difficult to find in a village council, especially one with little hierarchy. An individual who can provide the necessary drive and vision at the top will, very appropriately, expect a larger share of the profits. Furthermore, remote communities are handicapped by lack of connectivity, business experience, knowledge of trends in the outside world and capital. Any ecotourism venture has to factor in these issues if it is to succeed commercially and contribute to conservation efforts.

1.3 Potential of Eaglenest area for ecotourism

While this project is primarily concerned with conservation of Eaglenest, Eaglenest is only a part of an extraordinary swathe of wilderness extending from the Brahmaputra valley in the south to the snow peaks on the Indo-Tibetan border to the north. From the grasslands, marshes and woodland at just 50m altitude in the floodplains of the Brahmaputra, through the terai swamp forests of Nameri (alt. 100m), foothill forests of Pakke and Doimara (alt. 100-1000m), upper-tropical, subtropical and temperate broad-leaved forests of Eaglenest-Sessa (alt. 500-3200m) and on to the drier inner valleys, temperate conifers and alpine meadows of Dirang (1500-4200m). In just 300 km along a winding mountain highway, or half that distance as migrating geese fly, a visitor can access an entire suite of stunning biodiversity. Crucially, there are roads throughout the area – apart from the Kaziranga-Sela highway which runs past Nameri, Pakke and Eaglenest-Sessa there are many side roads including the one through Eaglenest which affords unrivalled access across 2800m of an extraordinary montane ecosystem.

We are only beginning to find out how rich the area is (see Athreya 2005). Only birds have been documented to some degree of completion (this report; Choudhury 2003; Barua 2005, 2006) and 750-800 species are known between Kaziranga and Sela; i.e. 2/3 of the birds of India and closer to 3/4 considering only Mainland species (excluding Andamans & Nicobars and pelagic species). This project has yielded geographical and/or altitudinal range extensions of over 80 species of birds. As recently as this year I discovered a new species of bird, a spectacularly coloured babbler, from Eaglenest - indicating how much needs to be learnt even in the case of birds.

The Kaziranga-Nameri-Pakke-Eaglenest-Dirang transect (KNEPD) is unique in India in its combination of intact forests, span of altitude and accessibility across the altitudinal range. Namdapha is as rich and has the altitudinal range but inaccessible above 1000m altitude. Dibang Valley lacks lowland forest and roads into the highest altitudes. In species richness KNEPD stands second only to the Eastern Slope of Andes in Peru (the famous Manu road, for example). Properly packaged and marketed Eaglenest can aspire to become the top birding destination in the country.

But there is a caveat – while Kaziranga attracts all types of ecotourists, Nameri, Pakke, Eaglenest and Dirang cannot offer enough mammal sightings to hold the attention of Mega-Mammal-Tourist. They can host the Casual-Nature-Lover but their USP is the riches they offer to Serious-Naturalists. This has to be borne in mind while marketing Eaglenest – while it is a zero for the mega-mammal tourist and passable for the casual nature lover **Eaglenest is unquestionably the top destination, the jewel in the KNEPD stretch, for the serious naturalist.**

The only comparable ecotourism destination is Bhutan, which has targeted high-end foreign tourists by limiting the number of permits issued annually as well as requiring that each visitor spend at least 200 US$ a day inside Bhutan; a guided trip to Bhutan will set back a foreign visitor by about 300-500 US$ per day. Western Arunachal is quite similar to nearby Bhutan, both in its Buddhist ambience and spectacular wildlife though, by all reports, Bhutanese forests are in a better state of

preservation and Bhutan has for long done an excellent job marketing its mystical allure. With a proper strategy Arunachal (the Government, private enterprise and village councils) can position itself to absorb the less well-off visitors with budgets in the range of 50-200 US$ per day.

3. A model for community participation

3.1 Model Outline

A successful ecotourism venture requires that it be directed by 1-2 individuals having the requisite motivation and vision. On the other hand the community as a whole has to have a say in the process and a share of the revenue. The model I favour is to

1. identify a community organization to oversee all ecotourism operations in the area – i.e. draw up regulations keeping in mind the needs of the community, tourists and long-term conservation of Eaglenest and play an active role in strictly enforcing the regulations.
2. empower the organization to collect an entry fee from each visitor on behalf of the community. This community fee may be utilized to finance projects which benefit the community as a whole (school facilities, health facilities, student scholarships, etc)
3. allow private operators, both local and outsiders, to manage their ecotour operations without much interference but subject to the regulations in force.

This model provides a good balance between private initiative (and profit) on the one hand and community oversight and benefit on the other. The community fee will be in lieu of the protected area entry fee normally charged by Forest Departments across India. As of now, the Govt. of Arunachal Pradesh does not charge any fee to visitors to Eaglenest and Pakke.

Eaglenest is an excellent place to try this scheme on an experimental basis. There are neither permanent nor seasonal settlements of the local tribes inside the protected area. The only people living inside the sanctuary are six sentries, and their families, employed by GREF (the road-construction group associated with the Indian army) to keep an eye on their assets. Eaglenest and its surrounding buffer areas used to or still belong to just two tribes – Sherdukpens of Rupa-Doimara and Buguns of Singchung. While there is some amount of hunting by the local people the magnitude is much less than in other parts of Arunachal Pradesh. The income from ecotourism is not expected to be large, at least in the first few years, but the tribes are small enough that even a small income can make a difference.

3.2 Quantum of Community Fee

This can be fixed by the Government of Arunachal Pradesh after considering representations from all the interested parties: tour operators, local communities, tourists and any other interested party. Obviously, the fee should not be so high as to discourage ecotourists. Nor can it be so low as to make its collection an exercise useless for community development. There are no precedents in Arunachal Pradesh for determining the appropriate quantum of fees. However the Assam Forest Department has a well defined fee structure which seems to be uniformly applied at all its Protected Areas (I have personally visited Kaziranga, Nameri and Orang) which can be adopted for Eaglenest.

Entry fee for people (per person per day):

1. Foreign nationals : Rs. 250
2. Indian nationals : Rs. 100
3. Indian students, researchers and long-term (more than 1 week) visitors : half the above rate
4. Residents of Arunachal Pradesh – casual tourists : Rs. 50
5. Residents of Arunachal Pradesh – on planned nature orientation tours : free

Entry fee for motor vehicles (per vehicle per day):

1. large capacity vehicles (more than 8 passengers) or trucks : Rs. 1000

2. light motor vehicles (regular jeeps, cars, small pick-ups etc) : Rs. 500
3. Motor-cycles : Rs. 25
4. Long-term researchers (more than 1 week) may be charged a quarter of the above rates

The entry fee for foreigners is the same that Assam charges foreign visitors to its national parks and sanctuaries. Typically a serious foreign ecotourist spends between US$ 2000 and US$ 4000, including airfare, on a 2-week visit to India. Therefore, the above entry fee (95$ for 14 days) is not a great strain financially and would go particularly well if presented as a fee which directly contributes to local community development.

Similarly, an Indian visitor from outside the north-eastern states will be spending a lot more on travel than the community fee prescribed here (Rs. 700 for a week's stay). In my opinion, no Serious-Naturalist will or should complain about having to pay this amount especially when it is a contribution towards conservation of the area.

Tour operators, not surprisingly, are reluctant to carry this fee, arguing that this would be counterproductive for tourism in Eaglenest; that there are equally good places without such a fee in Arunachal Pradesh. First of all, an additional Rs. 250/100 per day is not a substantial increase over the total cost of the tour and ecotourism in Assam bears this out. Secondly, Eaglenest is indeed nothing special for the casual tourist but the aim must be to encourage the more responsible and knowledgeable ecotourists, who understand Eaglenest's specialty and is willing to contribute to its long-term survival. Serious visitors can stay for a longer period (itself a good indication of seriousness and interest) to reduce their per diem fee. In any case, one should actively discourage the casual tourist who may come to Eaglenest to have a party with friends for a day or two – there are many other, less precious, picnic areas in Arunachal for such activities.

The vehicle entry fee will help in discouraging the use of vehicles on the fragile mountain road and also make the users pay for the upkeep of the road. The vehicle fee can be used to employ local people to maintain the road.

3.3 Nature of the Community Organisation

I list below the principal requirements that the community organization must satisfy:

1. It must be a formally registered entity (a society?).
2. The principal objects of the Organisation must include :
    a. long-term conservation of the flora and fauna of Eaglenest
    b. education programmes among the local communities to raise awareness levels of the extraordinary, globally-recognised riches of Eaglenest
    c. Eco-development programmes around Singchung-Rupa-Doimara-Khellong to reduce the dependence of these communities on forest produce (fuel, construction material, etc) as well as generate employment through sustainable use of forest resources.
    d. Monitoring the entry into and egress from the sanctuary area of people and goods.
    e. Control of hunting, fishing and collection of forest produce
    f. Regulation of the tourism operation in the Eaglenest area

    Many of these activities require close co-ordination with the Forest Department. Indeed this Organization should be viewed as an *NGO arm* of the Department rather than a parallel institution competing with it. This relationship can be enshrined by making the Forest Officer of Eaglenest the ex-officio chairman of the organisation's governing council.

3. Its governing council must include the following members
    a. the forest officer in charge of Eaglenest as the chairman of the council
    b. 3 members nominated by the Bugun community of Singchung
    c. 3 members nominated by the Sherdukpen community of Rupa-Doimara.

d. 2-4 outside resource persons with expertise in ecotourism, ecology and conservation

4. All decisions shall be arrived at after discussions in a consensual manner as far as possible or by a vote if necessary. The non-local members, i.e. the forest officer and resource persons, shall not vote, except in case of a tie among the local members.

5. This Organization shall share out the tourism revenue (entry fees) equally between the Singchung and Rupa communities. The money shall be handed over to local organizations so designated by the respective village councils. Singchung already has the Bugun Welfare Society which has the socio-economic development of Buguns as well as conservation of Eaglenest on its agenda and has been involved in this project. It shall be incumbent on both the village councils to subscribe to and implement the objects of the Organisation.

4. The Next Steps

4.1 Legal Structure for Community Fee (by the Govt of AP)

The principal thing is to explore the modalities by which tourism revenue from and maintenance of tourism facilities can be legally handed over to a local community NGO. There is a precedent in the Great Himalayan National Park (GHNP), Himachal Pradesh. This handover may be even simpler in Arunachal Pradesh where many forests are community owned and there is a strong tradition of village-level self-government. Very briefly, the communities around the GHNP and the then Director of the National Park (Mr. Sanjiva Pandey) formed a society whose objects included biodiversity conservation and socio-economic development of the communities. The Government of Himachal Pradesh through a Govt. order authorised the society to administer the tourism activity in the area and collect the tourism revenue and utilize the same to further the objects of the society. The society was also in a position to apply for other grants from various sources to achieve its goals. Using a copy of the Society's Memorandum of Association (MOA) provided by Mr. Pandey, Dhananjai Mohan and I have drawn up a draft MOA including the key features adapted/suitable for Eaglenest. This draft MOA for Eaglenest is included in Appendix A-13 of this report

4.2 Simplify Forest Entry Procedures for Tourists (by the Govt of AP)

Last year the Divisional Forest Officer at Seijusa (who administers both Pakke and Eaglenest) opined that the permit required the authority of the Chief Wildlife Warden while the latter referred us back to the DFO. On the other hand in 2004 the DFO, Seijusa, (another person) issued an entry permit for foreign ecotourists within a day of our application. As per Wildlife Protection Act (2000) the CWW is the authority for issuing entry permits. However, as has been done in many parts of India the CWW can authorise his field officers, either the DFO at Seijusa or, even better, the Range Forest Officer at Singchung, to issue routine tourist permits. In Eaglenest some of the local members of the aforementioned community organization may also be authorized to issue permits. In all cases, a permit should be issued only after the community fee has been collected.

4.3 Required infrastructure (by the Govt of AP)

Eaglenest **does not** require a massive infrastructure investment right now. Torrential rains make maintenance an expensive exercise and the quantum of tourism is as yet insufficient to justify the investment and maintenance costs. Nevertheless some basic infrastructure would be useful. The 5 campsites in Eaglenest – Lama Camp (alt. 2350m), Sunderview (2450m), Bompu (1950m), Sessni (1250m) and Khellong (750m) – should have basic facilities to host about 10 tourists at a time:

a. Running water – piped in from a nearby stream
b. Toilets – simple shower stalls with wash-basin and a septic tank with 2-3 commodes.
c. Kitchen – just a small pad for a couple of stoves and a water connection.

For the toilet as well as the kitchen portable tents can be used for the walls and roof, which can be folded and kept away when not in use. All other requirements can be ferried in by the tour party.

Images 1 a-e: The living facilities included large walk-in tents (top-left); the toilet complex (top-right) including portable water tanks, wash basins, shower stalls (left), and sitting commodes (right); camp cots with mattresses (bottom-left) and dining room with foldable furniture. The emphasis was on simple but comfortable facilities which could be moved in and out of the sanctuary easily.
Top-left: the March 2006 group relax in Bompu after a day's birding. Bottom-left: the April 2006 group savour breakfast at Lama Camp.

At the moment Eaglenest does not require massive investment in infrastructure to attract tourists. Portable facilities are adequate to serve the needs of the type of tourists who will find Eaglenest attractive.

4.4 Security (by the Govt of AP)

The Forest Department does not exercise any control in Eaglenest. In 3 years at Eaglenest I have never once had my entry permit checked, never been stopped and have encountered Department personnel inside the sanctuary area only once. Poaching is not as big as it could have been, except during the traditional New Year but armed timber poachers from the neighbouring, troubled areas of Assam are regularly encountered especially between Doimara and Sessni. The worry is that lack of security and increase in tourism may encourage them to try their hand at dacoity.

Hunting is a sensitive issue all over north-east India and requires careful handling. It will require a sustained awareness campaign as well as a sustained implementation of the law using formal/legal (forest department patrolling within the sanctuary and effective entry and exit regulation) and informal/traditional (village council diktats, local community patrolling etc). I am sure the village councils will realize the irony of promoting ecotourism on the one hand while local hunting parties roam in the area, apart from the danger of accidents when tourists and armed hunters overlap.

Tourism is entirely driven by public perception. Though Arunachal Pradesh itself is very safe it is already disadvantaged by its location, for north-east India has a world-wide reputation for ethnic violence. It is essential that every measure is taken to ensure that Arunachal's safety record remains unsullied. A security checkpost of 4-6 personnel in Doimara or Kamengbari will be quite sufficient to deter prospective dacoits.

4.5 Road (by the Govt of AP)

Apart from its flora and fauna one of the greatest attractions of Eaglenest is its jeep track which provides access without detracting from the wild, unexplored feel the forest has, of secrets waiting to be discovered round the next corner. It would be a great loss if, in the process of improving tourist facilities, Eaglenest were to lose this allure. Yet, the road also has the most potential to cause long-term damage. *Where there is a way there is a will – to encroach, to develop and to poach.* Any further development of the jeep track into a major road will sound the death-knell for Eaglenest. One only has to observe the developments along the Bhalukpong-Bomdila highway during the last 10 years to see where a main road will take Eaglenest.

To maintain the integrity of Eaglenest, for conservation as well as ecotourism, the road must be maintained in its present category: a single-lane dirt track with regularly spaced wider sections where two vehicles can pass – no black-topping, no two-laning and certainly no new alignments. The recent efforts to construct a major highway through Eaglenest have destabilized the fragile mountain terrain in several areas which will take many years to settle down again. One should only take up low-impact maintenance – clearing roadside shrubbery, clearing rock-slides, constructing and maintaining drainage channels to prevent water-logging, repairing the surface and maintaining existing bridges – which will not change the character of the forest around. In all cases labourers should be housed outside the boundaries of the sanctuary to reduce their impact on the protected area. A regularly maintained dirt-track will also adequately serve the needs of the small Doimara-Khellong community during their movements to and from Rupa.

4.6 Explore new areas for ecotourism (by NGOs)

The areas along the jeep track can handle about 50 visitors at a time which is adequate to handle the current tourist level. However one should plan ahead and explore and evaluate alternative areas to absorb an increase in tourists in the future.

4.7 Training of Personnel (by NGOs)

Camp staff need to be sensitized to cultural sensitivities of a diverse national and international clientele (social interaction, food habits, personal privacy, etc), punctuality, hygiene, and the need

to balance the requirements of ecotourism against the long-term conservation of Eaglenest – it is all too easy to kill the golden goose!

The Kangchendzonga Conservation Committee (KCC) in Yuksom, Sikkim, provides an excellent example of training and regulation of tourist guides. The Kangchendzonga national park hosts many thousands of visitors every year and the potential for ecological damage is tremendous. Despite the freezing conditions in camp sites above 3000m no one is allowed to cut firewood and fuel and stoves are carried up all the way from Yuksom. Garbage is either burnt or carried back to Yuksom. It would be good to invite members of the KCC to Eaglenest to share their ecotourism experience with Buguns and Sherdukpens; that KCC was founded and is managed by Sikkimese is an added advantage given our focus on promoting local community initiatives in Eaglenest.

Hygiene and punctuality should be at the focus of any training programme. The case for hygiene is self-evident, especially in a remote wilderness with no medical help. Punctuality is critical for a successful ecotour. Most animals are active at specific times and the day's schedule has to be built around these periods. Getting the breakfast ready in time is the most important time control during the entire day. Many animals are active only for a brief period during dawn and immediately after sunrise and it is imperative that camp staff understand the critcal importance of an early start.

4.8 Study the (negative) Impact of Ecotourism (NGOs)

There are 3 principal negative consequences that one can expect from ecotourism:

a. Cutting of trees for fuel and construction material
b. Deterioration of roads and footpaths which will require repairs which in turn will impact on the integrity of the surrounding forest.
c. Socio-economic changes which can be troublesome in a small tribal community

One can mitigate these consequences to a large extent with forethought and education (of visitors as well as local people). One can ban the use of firewood as in Kangchendzonga and have all parties ferry in their own stoves and fuel (gas or kerosene). Alternatively one can start a fuelwood plantation in the waste land outside the sanctuary and sell wood to the tour parties.

The deterioration of the road may be reduced by encouraging visitors to hike inside Eaglenest by imposing a substantial vehicle entry fee. The fee thus collected can be used to repair the ravages to the road caused by increased tourist traffic. Furthermore, the area management should ensure that road labourers live outside the sanctuary and commute every day for carrying out their allotted tasks. This will minimize the possibility of poaching and wood-cutting for fuel and construction.

The ecotourism model suggested here ensures that while individual members of the community stand to gain in proportion to their skill and motivation the community as a whole stands to gain from the community fee. To that extent every one will have a stake in its continued success.

Ecotourism should only be seen as one of the agencies of development – it will not make the entire community rich, or even anyone rich. Ecotourism can provide seed money for the community to explore other avenues of revenue generation – e.g. timber plantation (for fuel and construction), orchid cultivation, mushroom farming in forested areas – and these should be vigourously explored to spread the benefits across the community.

4.9 Responsibilities of the Local Communities

All the tasks mentioned in this section require inputs from and participation of the local communities to a greater or lesser extent. In particular the success of this proposed multifaceted project requires that the communities play a critical and dynamic role in

a. Interacting with the political leadership and administration to evolve the necessary legal structures.
b. Educating the members of the community of the importance and value of Eaglenest and its long-term conservation.
c. Educating the members of the community of the advantages and limits of ecotourism.
d. Drawing up a plan for the utilization of the ecotourism revenue in an effective manner.

5. Documentation and Research

5.1 The Knowledge Base of Serious Ecotourism

One cannot overemphasize the role played by research and documentation in marketing an ecotour destination like Eaglenest. Scenic places frequented by the casual tourist only need to advertise a few landscape photographs. Mega-mammal locations like Kaziranga or Corbett only need to display prominently posters of the rhino or the tiger. But Eaglenest, whose attraction is a large ensemble of "small animals" (i.e. biodiversity), needs fairly good documentation of its biodiversity to market itself to the Serious-Naturalist. For instance, international birders choose a destination based on (i) number of bird species (ii) degree of endemism (iii) presence of species difficult to see elsewhere (iv) availability of "spectacular" species (iv) seasonal dependence of species sightings. Thus a visitor wanting to see tragopans will time his visit to coincide with the display period of these spectacular pheasants in late March. Similarly Western Himalayas are best visited in late spring, eastern Himalayas in early spring, Kaziranga and Bharatpur in winter and Pt. Calimere and Okha during the spring and autumn migrations. Even within W. Arunachal Pradesh black-necked cranes can only be seen during December-February, flycatchers after May, etc. Some butterflies and herpetofauna are visible only in early summer while others are easier to encounter in October. Therefore, Serious-Naturalists base their tour decisions on more detailed data than Casual-Nature-Lovers and Mega-Mammal-Tourists and consequently an eco-destination catering to them has to have high quality documentation and high quality guides. At the least good documentation is essential to attract tourists as tour parties can bring their own specialist guides from outside.

Indeed, the difference between the tourist influx in the winters of 2003-04 and 2004-05 on the one hand (6 tourists in all) and of 2005-06 on the other (75+ tourists) was largely due to the large amount of photo-documentation of the biodiversity of Eaglenest made publicly available on webpages at http://www.clsp.jhu.edu/people/zak/ramana

The required documentation can be generated either by (i) employing professionals for a fee or (ii) authorising professional researchers or skilled amateurs to do so at their own expense. These skilled amateurs are in fact Serious-Naturalist ecotourists who also have time to spare and an interest in exploring new areas. There is a large pool of such volunteers in India who can be utilized to inventory the wildlife of Arunachal Pradesh at minimal cost to the Forest Department. Ecologists are also good resource persons for ecodestinations. They not only generate knowledge but also engender technical skills in local communities by employing field assistants. Unfortunately, researchers are looked upon with suspicion by the Forest Department and obtaining research permits is a tedious and morale-sapping process. The department's objectives would be better served by drawing up a list of research guidelines and encouraging researchers to work within those parameters without hindrance.

5.2 Vacations-for-Conservation Programme

In India skilled amateur naturalists outnumber their professional counterparts and recent years have seen a surge in wilderness vacations. After the publication of the Eaglenest Biodiversity Project webpages I called for volunteers to help with the biodiversity inventory and was overwhelmed by the response. Titled Vacations-for-Conservation this scheme was a simple deal – the biodiversity

project got a large number of enthusiastic volunteer naturalists who paid for their own expenses; in return those participants got an inexpensive vacation in a remote and extraordinarily rich wilderness with an experienced team of co-ordinators; as ecotourists the participants paid the community fee; the local camp staff had the opportunity to further their training in handling ecotourists; and the participants, with postings on the internet, have proved to be excellent promoters of Eaglenest as an ecodestination. Everyone benefitted – participants, our project, local community and Eaglenest.

To the best of my knowledge this was the first such programme organized in India and we are in the process of absorbing the lessons from this pilot effort. I would like to see this become a regular part of the calendar in Eaglenest and also have it replicated in other parts of Arunachal Pradesh.

6. A draft of a memorandum of association, rules and regulations of Eaglenest Conservation Society[2]

This draft is not meant to be a complete document. In fact it is not even meant to be a guiding document. We expect the local communities to draft an appropriate document after consulting among themselves and with the Forest Department of Arunachal Pradesh. This is merely an example of what such a society can aim for and what such a document may look like in the opinion of the authors. This is based on the documents of the local-community based Biodiversity Conservation Society founded at the Great Himalayan National Park under the stewardship of the then Field Director Mr. Sanjiv Pandey

A. Name

A.1 The name of the Society shall be Eaglenest Conservation Society, W. Kameng District, Arunachal Pradesh, which hereafter will be referred to as "ECS" or "The Society".

A.2 The head office of the Society shall be located at Singchung, W. Kameng, A. P.

A.3 The Area of operation of the Society shall be the area of Eagle Nest Sanctuary and surrounding forests of Arunachal Pradesh (specify boundary features - roads, streams etc - and include maps), hereafter called the Eaglenest Conservation Area (ECA).

B. Objectives of Society

The society shall be an autonomous and independent body with the principal aim of biodiversity conservation and socio-economic development in ECA. To this end, the Society shall have the following objectives:

B.1 To supplement and assist the efforts of the Forest Department of the Government of Arunachal Pradesh in discharging their duties inside ECA.

B.2 To promote economic-, social-, and eco-development of the Singchung and Rupa communities, Eaglenest wildlife sanctuary staff and other stakeholders.

B.3 To safeguard the natural environment and biodiversity in the ECA and other ecologically related areas and places in the vicinity in West Kameng district, Arunachal Pradesh.

B.4 To create, and or maintain such assets as may be felt necessary for achieving the above**.**

C. Functions of the Society

The Society shall take up all such direct or indirect activities as are required to achieve these objectives. These activities may be undertaken directly by the Society through its Members or Staff, or sponsored and supported by it through other institutions, agencies or individuals. These functions include, but are not limited to:

[2] This work, by Dhananjai Mohan and Ramana Athreya, was carried out during the Ford phase of the Eaglenest Biodiversity Project. The initial half of the community ecotourism initiative was started during the Rufford phase.

C.1 Conservation-oriented programmes for children and adults in ECA

C.2 Reduction and elimination of hunting in ECA.

C.3 Reduction of extraction of timber, bamboo, cane etc from ECA and undertaking steps to augment those resources by plantation in degraded land.

C.4 Assist the Forest Department in all its activities inside ECA

C.5 Manage all ecotourism activity inside ECA and utilize revenues from the same for the socio-economic development of the Singchung and Rupa communities.

C.6 Identify sustainable exploitation of renewable forest resources to generate employment opportunities for members of the two communities

C.7 Facilitate farming of orchids, mushrooms and such other produce and tree plantations to generate employment for members of the two communities.

D. Income and Property of the Society

D.1 The funds of the Society shall consist of the following:-

D.1.1 Income from the assets of the Society

D.1.2 Grants from the State or Central Government either directly to the Society or through the Management of the Eaglenest wildlife sanctuary

D.1.3 Fund raising for the ECS, nationally and international, to:

a. Plan, design, develop and execute specific projects in accordance with its objects
b. Develop a corpus fund for carrying out the functions of ECS.

D.1.4 Income from tourism in ECA including entry fees for people and vehicles, rental of field equipment, camping gear, camping grounds, all Forest Rest Houses/Inspection huts/Interpretation Centers at various places, etc; sale proceeds from posters, booklets, books, stickers, souvenirs, and other like items.

D.1.5 Grants, donation or assistance of any kind from foreign governments and other external agencies with prior approval of the Central Government.

D.1.6 Income from any other source as may be approved by the Governing Council

D.2 The income and property of the Society, however derived, shall be applied towards promotions of the objectives as set-forth in the Memorandum of Association, subject nevertheless, to constraints imposed by the agency (such as the State Government) providing the grants.

D.3 No portion of the income and property of the Society shall be paid or transferred directly or indirectly , by way of dividend, bonus or howsoever by way of profit, to the persons who at any time have been members of the society or to any person claiming through them provided that nothing herein contained shall prevent the payment in good faith of remuneration to any member thereof or other persons in return for any professional service rendered to the Society or traveling allowance, daily allowance or other charges.

E. Oversight of the Activities of the Society

E.1 The Society shall be responsible to the Government of Arunachal Pradesh, in particular the Forest Department under whose jurisdiction lies ECA

E.2 The Society shall provide to the Government of Arunachal Pradesh each year a copy of its Plan of Operation for the coming year and the Annual Report, Balance Sheet and Audited accounts of the previous year.

E.3 The State Government may appoint one or more persons to review the work and progress of the Society, and to hold inquiries into the affairs thereof; following which the Government may take such action and issue such directions as they may consider necessary in respect of any of the matter dealt with in the report and the Society shall be bound to comply with such directions. The government may by special order restrict or extend the scopes and functions of the Society keeping in view the performance and objectives of the Society. In addition, the State Government may, at any time, issue directives on matters of policy to the Society and the latter shall be bound to promptly comply with such directives.

F. Dissolution of ECS

If, on the dissolution of the Society, there shall remain, after the satisfaction of all debts and liabilities, any property whatsoever, the same shall not be distributed amongst any or all the Members of the Society. The property shall accrue to one or more of the following entities with the approval of the State Government:

a. An inheritor Society so identified by the Governing Council prior to dissolution, which has similar objects as ECS.
b. The Singchung and Rupa Organisations which have been identified by the respective communities as the co-recepients of the income from tourism in ECA.
c. The State Government

G. The Governing Council of the Society

G.1 Powers and Functions

The Governing Council shall have the following powers and functions:

G.1.1 To draw up policies for biodiversity conservation and ecodevelopment in ECA

G.1.2 To review the implementation of the above policies and provide overall guidance and direction for efficient functioning of the Society.

G.1.3 To secure effective coordination between the different Departments of the Government of Arunachal Pradesh, other Government/ Government-aided Institutions and Private Individuals and Organisations for achieving the objectives of the Society.

G.1.4 To consider and approve the Annual Report, Balance Sheet and Audited Accounts of the Society prepared by the Executive Committee for the previous year.

G.1.5 To consider and review the Plan of Operation and Budget prepared by the Executive Committee for the next year

G.1.6 To add, abridge and to amend these Rules of the Society with the approval of the State Government and in accordance with the provisions of the Societies Act.

G.1.7 To perform such other functions as are entrusted to it under these Rules in pursuit of the objectives of the Society

G.2 Composition, Appointment and Tenure

The Governing Council shall comprise

G.2.1 Local Members: The President: The Divisional Forest Officer in charge of Eaglenest wildlife sanctuary shall head the Governing Council as its ex-Officio President.

G.2.2 Local Members: The Singchung and Rupa village councils shall nominate three members each from their communities to the Governing council. One of the three shall be an office-bearer of the community organisation designated to accept the community fee from ecotourism on behalf of the community. The tenure of these Local Members shall be for a period of 2 years. There shall at all times be 3 members from each village council. One of the Local Members shall be appointed the Secretary of the Council

G.2.3 External Members: On the advice of the Local Members the President shall appoint to the Governing Council 2-4 representatives of NGOs and/or other professional organisations who may be expected to contribute towards the objects of the society. At least two-thirds of these members shall be from outside the state of Arunachal Pradesh. The tenure of these External Members shall be for a period of two years.

G.2.4 Special Invitees: On the advice of the other Members of the Governing Council the President may specially invite persons with appropriate professional qualifications and experience to participate in the deliberations of the Governing Council. The tenure of these Special Invitees shall only be for the duration of a single meeting of the Governing Council.

G.2.5 A list of members of the Governing Council shall be filed with the Registrar of Societies as required under the Societies Registration Act, 1860. Apart from this any change in the composition, other than those involving Special Invitees, shall be intimated to the Registrar of Societies within 30 days of the change.

G.3. Proceedings of the Governing Council

G.3.1 The Governing Council shall meet at least twice a year, with a thirty day prior notice and a summary of the business to be transacted at the meeting shall be communicated to the members well in advance.

G.3.2 If the President is not present in a meeting of the Council, the rest of the Members present may select one from among themselves as the President for that meeting.

G.3.3 One half of the members of the Governing Council, including at least one representative each from Singchung and Rupa, present in person shall form a quorum

G.3.4 The Council shall strive to arrive at all decisions consensually. Nevertheless a decision may also be arrived at by a simple majority of the 6 Local Members present and voting in the Council Meeting. Only in case of a tie among these members will the External Members and the President vote on the issue. In no case may the Special Invites, if any, vote to arrive at a decision.

H. Executive Committee of the Society

H.1 The Governing Council shall appoint an Executive Committee which shall hold and employ powers under the Council's supervision and to which it shall be responsible. The Executive Committee may or may not include members of the Governing Council

The principal functions of the Executive Committee are to

H.2 Discharge the functions of the society as per the policies and decisions of the Council

H.3 Administer the Society as per the Rules and Regulations and Policies of the Society.

H.4 Manage the funds of the society

In particular, the Executive Committee shall:

H.5 Draw up an annual Plan of Operation for ECA, in consultation with the State Government and Singchung and Rupa village councils, and implement the same with the approval of the Governing Council

H.6 Draw up an annual budget and seek the approval of the Governing Council for the same.

H.7 Review and report on the implementation of the Plan of Operation and Budgetary status to the Governing council from time to time

Present the Annual Report, Audited Accounts and Balance Sheet to the Governing Council at the end of the financial year. Copies of the same shall be provided to Forest Department of the Government of Arunachal Pradesh.

Hithaeglir - The Mountains of Mist from Nechi Phu, on the Bomdila highway

Birding Hotspots of

Western Arunachal Pradesh

by Ramana Athreya

Page content :

Localities

Pakke Tiger Reserve floodplains, lowland evergreen and riverine forests. (alt. 100-300m)
Eaglenest Wildlife Sanctuary tropical, subtropical, and temperate forests (alt. 500-3500m)
Dirang-Tawang black-necked cranes; temperate forests and alpine meadows (alt. 1500-4500m)

(top)

The Eaglenest Biodiversity Project was funded by a grant from the Rufford Foundation (UK) to Ramana Athreya.

13 March 2005
Kaati Trust, Pune

Appendix A-10

Webpages of the Eaglenest Biodiversity Project[3]

The webpages of the Eaglenest Biodiversity project may be viewed at

http://www.clsp.jhu.edu/people/zak/ramana/index.htm or at

http://www.aoc.nrao.edu/~sbhatnag/Nature/warunachal/index.htm

The webpages were published on the completion of the field work of this project in March 2005. The goals of publishing the webpages were:

1. To publicise the goals and achievements of the Rufford Small Grant project
2. To provide a freely available resource for ecotourists wishing to visit western Arunachal Pradesh
3. To provide a freely available database of the fauna of western Arunachal Pradesh

The complete set of webpages is as follows:

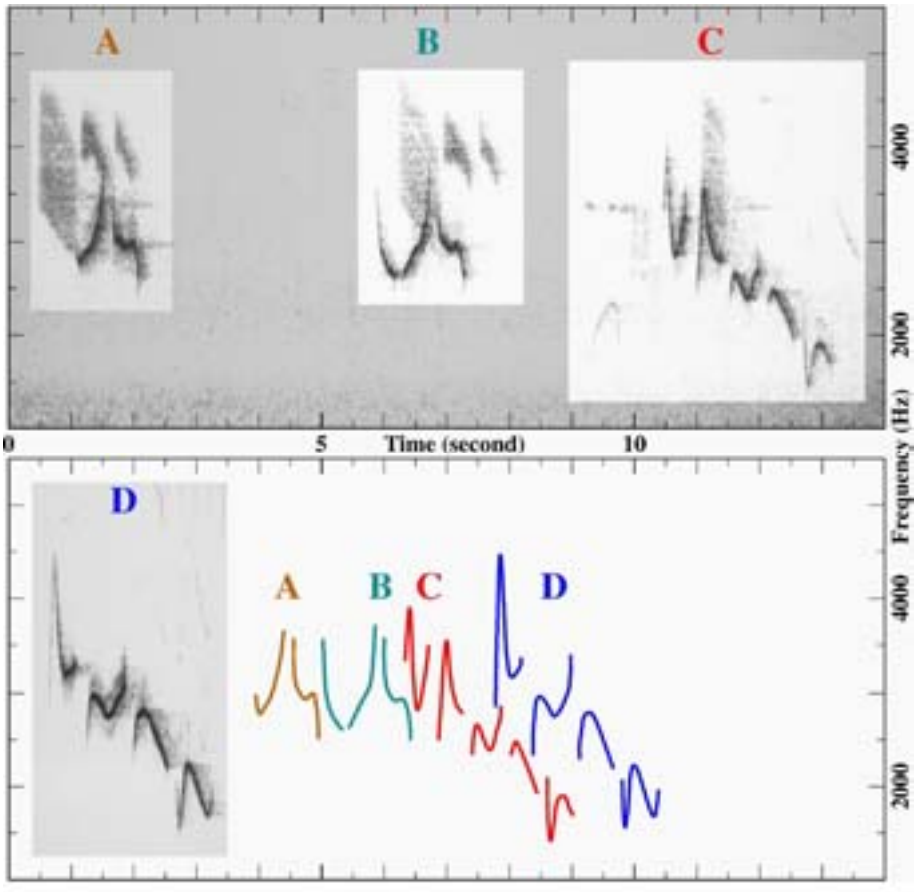
HTML file	**Contents**
index.htm	Introduction to western Arunachal Pradesh
wapMiscLogistics.htm	Information for the tourist for organizing a trip
wapLocPakke.htm	Information specific to Pakke including fauna
wapLocEaglenest.htm	Information specific to Eaglenest
wapLocDirangTawang.htm	Infornation specific to Dirang-Tawang
wapListMammal.htm	Checklist of mammals of western Arunachal Pradesh
wapListBird.htm	Checklist of birds
wapListHerp.htm	Checklist of herpetofauna (reptiles and amphibians)
wapImagesBird.htm (3 pages)	Images of birds
wapImagesHerp.htm (3 pages)	Images of snakes, lizards and amphibians
wapImagesButterfly.htm (2 pages)	Images of butterflies
wapImagesInvertebrate.htm	Images of invertebrates
wapImagesPlant.htm	Images of flowers
wapImagesFungus.htm	Images of fungi
wapImagesLandscape.htm (3 pages)	Images of Landscapes (Pakke, Eaglenest and Dirang-Tawang
wapMiscEaglenestBP.htm	Summary of the Rufford Small Grant Project
wapMiscReportsLinks.htm	Reports and links to related webpages
wapMiscMacaque.htm	On the recently discovered Arunachal Macaque
wapMiscReference.htm	Literature used during the project
wapMiscAcknowledgement.htm	Acknowledgements

Replace index.htm in either of the two above links by the HTML file listed above to view the corresponding contents. Alternatively all the pages are cross-indexed and may be conveniently accessed from the main page.

A part of the index.htm file is displayed on the facing page (header, cross-index and the page credit at the bottom) to show the organisation of the webpages.

[3] I am grateful to Izhak Shafran and Sanjay Bhatnagar for offering to host these webpages on their personal areas.

The holotype of the Bugun Liocichla was photographed in Lama Camp just outside the boundary of Eaglenest wildlife sanctuary, Arunachal Pradesh. The bird is probably a male.



Sonograms of Bugun Liocichla.
The notes from the 4 vocalisations have been juxtaposed in the bottom-right panel for comparison. The three diffuse structures superposed on the Liocichla notes in **A** and **B** are interlopers from a Streaked Laughing-thrush, as is the single structure sitting on top of note 2 in **C**.

Appendix A-11

A new species of *Liocichla* discovered at Eaglenest wildlife sanctuary[4]

On 1995-01-12 while birdwatching in Eaglenest wildlife sanctuary I had brief views of a pair of liocichlas which did not fit any description in Ali & Ripley (1987). My next sighting was of a flock on 2005-01-03 in the same locality. I saw them a second time on the same day and again on the next. From my field sketch Dhananjai Mohan identified the bird as Emei Shan Liocichla *Liocichla omeiensis*, an endemic of China restricted to areas over 1000 km from Eaglenest, though it was not clear whether the bird was identical or merely very similar. Pratap Singh, Dhananjai Mohan and I obtained mist-netting permits from the Forest Department but failed to even see the birds between 23rd-28th January 2005 and 5th-10th May 2005. I renewed my efforts on 2006-05-21 and finally netted a bird on 2006-05-25 which was released in the same area on the same day after obtaining detailed notes on its plumage and photographs.

Liocichlas are an Asian babbler genus hitherto comprising three allopatric species. Red-faced Liocichla *Liocichla phoenicea* (formerly Crimson-winged Laughing-thrush *Garrulax phoenicea*) is widely distributed in south-east Asia from north-eastern India to north-western Vietnam. Emei Shan Liocichla *Liocichla omeiensis* (also spelt Omei Shan) was for long thought to be confined to the Emei Shan Mountain in Sichuan though recent observations have extended its range north-westward and southward. Steere's Liocichla *Liocichla steerii* is endemic to Taiwan. Though not uncommon, *L. omeiensis* is classified as Vulnerable because of its localized distribution and attractiveness to bird trade. The other two species are not at risk.

The similarities between the Eaglenest taxon and Emei Shan Liocichla suggest that they are closely related, but the many differences in plumage and vocalisations – especially song – indicate a new species. I named the new species

Bugun Liocichla ***Liocichla bugunorum***

in acknowledgement of the contributions of Mr. Indi Glow, in particular, and the Bugun community, in general, to this project and also because all sightings of the new species except one have been in Bugun community forest land. One hopes that this discovery will spur conservation efforts in that area.

The new species, an obvious *Liocichla* (including the marked *Leiothrix*-like jizz), has the overall colour olive with a black cap, prominent orange-yellow lore and yellow post-ocular spot, and patches of golden yellow, crimson and white on the wing. The olive is greyer above and bright yellowish on the breast. The closed tail is blackish above and flame-coloured below with a prominent orange-red tip. In contrast, Emei Shan Liocichla has a grey cap, less prominent loral and post-ocular markings, grey underparts, and an olive tail with black bars above. The principal differences between Bugun and Emei Shan Liocichlas are listed in Table 1. Steere's Liocichla differs from Bugun Liocichla in having a grey crown streaked with white, a differently shaped pre-ocular spot, grey rump contrasting with olive back, an olive upper tail with white tip and lack of red in under tail coverts.

Another bird had been netted earlier on 2006-05-21 in the same area (within 10 m of where the holotype was netted) but escaped after only a few photographs had been taken. It differed from the

[4] This appendix is a summary of the paper formally describing and naming this new taxon:
Athreya R. 2006: A new species of *Liocichla* (Aves: Timaliidae) from Eaglenest Wildlife Sanctuary, Arunachal Pradesh, India. *Indian Birds* 2 (4):82

holotype in the duller yellow-olive on its wings, much duller copper-red on underside of tail, no red in undertail coverts and in having broad yellow tips to tail feathers. Though the two birds were not sexed, the plumage differences between the holotype and second bird are perhaps due to their differing sex (male and female, respectively).

The song of Bugun Liocichla was first noted by Fredrik Ellin and Peter Schmidt (participants of the March 2006 bird tour) at Lama Camp on 2006-03-24. Subsequently, at the same location on 2006-04-09 Margaret Widdowson, Michael Catsis and I (participants of the April 2006 bird tour) recorded the song on tape and played it back to call the birds out. I have so far recorded 4 vocalisations of the species which may be transcribed as: **A.** "weee–keew" **B.** "yu–weee–keew" **C.** "wieu.u–wee.i–tuu.i–tuu.uw–tu.oow", these notes on a descending scale, slightly slurred and inflected at the end, and **D.** "weei.u–tuuu.i–tuu.uw–tu.oow", these notes similar to the last four of **C** but higher in pitch and more stressed. The initial consonant is barely audible in all these notes. All the notes are fluty, usually with a terminal inflection and quite distinctive. **C** is similar to that described by Ellin & Schmidt and is probably the "normal" song. However, the song can start from any of the five notes and end at any subsequent note but always with the notes in that sequence.

Before the May 2006 effort which resulted in the netting of the holotype the Bugun Liocichla had been seen by over a dozen observers on about 10 occasions. All sightings except one have been clustered in the heavily disturbed Lama Camp area. Simon Allen (April 2006 bird tour) spotted a flock moving away from roadside scrub into primary forest near Bompu which some of us also got to see. They have also has been observed at all heights from the ground to the canopy of tall trees (30 m), hopping on the ground, working through the undergrowth, in tangled vines and even tree-creeping like Cutia. Clearly, the species can exist in disturbed areas and utilize a variety of vegetation types. Bugun Liocichla have been observed in flocks of 2–6 birds in January. In April, they were seen in pairs as well as small flocks. In May, all sightings were of pairs. They have been seen by themselves or in the company of, variously, Cutia, Red-headed Laughing-thrush, Blue-winged Laughing-thrush and Bar-throated Minla. While they frequent dense shrubbery they seem not to be particularly shy and a substantial fraction of the sightings have been in exposed situations.

Till date I am only certain of a population of 14 birds – the 10 individuals I saw on 2005-01-03 near Lama Camp and the 4 individuals we saw on 2006-04-08 near Bompu. Furthermore only 3 (breeding?) pairs responded to song playback in May 2006. I have no reason to assume that the entire population is limited to 14 birds and eventually they may be even found in other areas to the west and east of Eaglenest in Bhutan and Arunachal Pradesh. Nevertheless the fact remains that a strikingly coloured species with distinctive plumage and vocalisations was only reported for the first time in 2006 and only from two localities. Clearly, the species is not numerous.

Normally, a new taxon is only described after collecting a "type" specimen. This first specimen, the *holotype*, is the prime representative of the species where science is concerned and is essential to enable other scientists across space and time to evaluate independently and objectively the taxonomic status. Paradoxically, well-maintained collections of specimens spanning several centuries have been responsible for maintaining the stability of the taxonomic system while at the same time allowing scientists of a future generation to re-evaluate the status of old taxa in the light of new knowledge and techniques. The answers to such basic questions as *how many species and what?* which are important inputs into many academic and conservation issues are anchored to vast collections of preserved specimens.
The description of the Bugun Liocichla was done without collecting a specimen. While this is certainly a shortcoming I felt that the conservation imperative had a stronger case than the scientific one though it will have to be rectified some day. The course of action I favour is to intensively survey western Arunachal Pradesh for this species (using the recorded song) and to collect a pair for scientific purposes once a larger population is confirmed.

Status and conservation: The species is highly local and not numerous. Even though it seems to survive in a variety of habitats it does not thrive. There must be as yet unknown ecological factors which constrain its numbers. It is essential that we study the ecology of this species to first understand their distribution and safeguard them. The major threat to the species is the planned highway through Eaglenest which passes right through the areas where the bird has been seen. At the very least, the conservation of this species requires that large-scale disturbance in its haunts are avoided until more is known of this spectacular addition to the Indian and world's avifauna.

This astonishing discovery of a such a striking bird also raises the exciting possibility of many more, especially less distinctive, taxa (not just birds) waiting to be discovered in that remarkable area.