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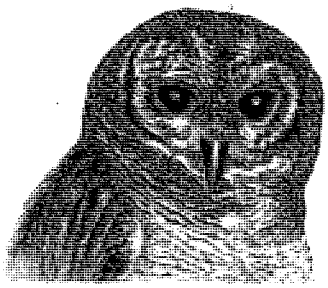

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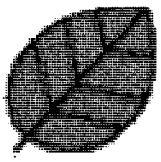

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PLENARY I
RAPTOR CONSERVATION AND CULTURE - AN INDIAN PERSPECTIVE

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India has a rich and ancient tradition of Sanskrit literature that goes back 6000 to 10,000 years. From the Vedic times we come across references to birds of prey such as eagles, owls, osprey, falcons and others. The Yajurveda (approximately 1400 BC) has attributed certain virtues to raptors, while other references are symbolic. An example of the former from the Yajurveda is: "*aalabhate vanaspatibhya ulukaan*|" which means "let the plants get the owls." It does not imply that owls were sacrificed to the forest trees during the sacred fire rituals. It probably indicates that because certain owls roost in the forest trees and that they are inter-related. The texts titled 'Shulba Sutras' (describing the geometry and construction of the huge fire altars) show that the ancient Indians handled raptors, were well acquainted with their biometry, and constructed the fire altar specific to each of the raptor species. For example, Shyena Chiti is a fire altar shaped like a falcon. Sanskrit lexicons provide many synonyms for the different raptor species. There are other Sanskrit compositions that elaborate on the art of falconry. Some birds of prey have religious importance and they are also described significantly in the ancient text on Indian medicine – the Ayurveda.

In my talk, I will showcase the approach of ancient Indians to raptors in a chronological order. This academic review of references from the Sanskrit literature also highlights the conservation aspects of raptors that were a prime concern of ancient Indian nature-related philosophy.

PLENARY II
HOW TO START A RAPTOR WATCH PROGRAM FOR RESEARCH AND EDUCATION: WHAT WE HAVE LEARNED IN 10+ YEARS OF WORK IN SOUTHERN THAILAND.

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In the last decade at Khao Dinsor (Pencil Hill) located in southern Thailand along the east coast on the South China Sea, we have made great progress in determining which raptor species migrate, in what number – as well as the timing of each species' migration. We have published scientific papers on both the southbound (autumn) and spring (northbound) migration of 30 raptor species, three bee-eater species – and other birds as well. In 2011 we began a ringing program and we now catch significant numbers of *Accipiter* species – and made discoveries about some bird species no one knew occurred in this part of Thailand. In terms of education, the Chumphon Raptor Center was completed in 2012 at a cost of $150,000 USD, and it is now the meeting point for our annual raptor festival that attracts visitors from all parts of Asia, Europe and North America. For visitors to Khao Dinsor (Pencil Hill) we constructed a series of observation shelters and platforms to enhance their experience. To fund the entire program, we have established the Flyway Foundation, because we hope to achieve what we set as our goal: to make all Thai people aware of the raptor migration; to invite and host people to come and see (enjoy) that migration; to study, document and protect the migration; and to ensure that future generations will be able to also enjoy it as we do now.

All of this had a very humble beginning: one morning in late September 1997 as I was leaving my house for work, I happened to look up to see large birds heading south overhead; when I returned home that evening, the large birds were still passing to the south. I very much wanted to know what kinds of birds these were; what were they doing here in southern Thailand, and where were they going? In my talk I will outline what began as a fortuitous event – that we developed into the current program by (a) involving people in as many different ways as possible; and (b) "thinking outside the box" to get our message out to everyone via highway signs; posters; a raptor festival and using the media in every way possible. Most people love raptors – it is translating that love into a plan and taking action – where we have had a bit of success so far here in Thailand, and that is what I will try and explain in my talk.

PLENARY III
WRITING AND PUBLISHING A SCIENTIFIC PAPER: AN INSIDER'S GUIDE

CHERYL R. DYKSTRA

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Editor In Chief, Journal of Raptor Research and Raptor Environmental

Writing a scientific paper may seem mundane and tame compared to the excitement of field research, but doing it well is critical to the scientific process. Many manuscripts that have been rejected by journals could have been saved by careful rewriting, but researchers do not always have access to the information they need to be successful authors.

Examination of the causes of manuscript rejection at *The Journal of Raptor Research* provides insight into the important techniques and "tricks" for getting a manuscript published. Reasons for rejection in 2008-2012 include critical flaws in study design (22.1%) and analysis (10%), conclusions that were not supported by the data (8.4%), poor writing (14.2%), failure to follow the journal's instructions (2.1%), and content that was not appropriate for *Journal of Raptor Research* for various reasons (43.1%).

To write papers that get accepted, researchers need to first design their studies with the end goal in mind, paying particular attention to the hypothetico-deductive approach, sample size, and the potential for pseudoreplication. The steps to publication include: analyze appropriately, choose the right journal, identify the main finding and write an outline, explain the novelty of the result, prepare simple figures that illustrate the result, write clearly (avoiding wordiness, passive voice, and excess use of abbreviations), assign authorship appropriately, follow the journal's formatting instructions exactly, and understand the publishing process.

Although publishing is one of the most challenging aspects of raptor research, it can also be one of the most rewarding, and successful authors are gratified by knowing that they have contributed to our knowledge base and the conservation of raptors.

PLENARY IV
REVIEW, UPDATE AND FUTURE PROSPECTS FOR FOUR CRITICALLY ENDANGERED VULTURES IN INDIA

VIBHU PRAKASH, ASAD R RAHMANI; TOBY H GALLIGAN, RHYS E GREEN, R.D. JAKATI, DEVENDRA SWARUP, BC CHOUDHURY; SACHIN RANADE AND CHRISTOPHER G R BOWDEN*.

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Populations of the three resident *Gyps* vultures declined dramatically across India and South Asia - by over 99% in 15 years. By 2003 the primary cause was identified as the veterinary drug, diclofenac present in the tissues of a major food source - domestic ungulate carcasses. Efforts to prevent their total extinction have included banning the production of veterinary diclofenac formulations and their use, and initiating a conservation breeding programme for future reintroduction once the threat has been removed.

Identifying a safe alternative drug was a key step in the process. There have also been further in-situ measures including the 'Vulture Safe Zone' initiatives, advocacy work by local groups and some vulture restaurants. Recent road transect surveys and other population monitoring is showing signs that the population declines are significantly slowing down and even some suggestions of localised recovery.

Whether Red-headed vulture also declined for the same reasons is not totally clear, but the trends appear similar and work is underway to investigate this further. The conclusions from the declines, actions and outcomes so far are that the measures identified are beginning to take effect, but also that further urgent steps are still required. These steps include the need for safety-testing new replacement drugs before they enter veterinary practice and further measures to prevent human diclofenac from being illegally misused.

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PLENARY V
NAGALAND FALCON CAPITAL OF WORLD "AMUR FALCON CONSERVATION BY THE NAGALAND FOREST DEPARTMENT

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During 2012 there was concern in international community about harvesting of Amur falcon, during their migrating from Nagaland to southern Africa. The villagers harvest the migratory raptors for their meat when they visit Doyang Wokha district of Nagaland between the end of October and beginning of November. This is the scene in 2012. Here is turnaround with in short time, this year (2013) not even a single bird is harvested, thanks to the villagers and efforts of the forest Department with the help of local NGOS and church. Pangti, Sungro and Asha villagers near the Doyang in Nagaland pledged to protect Amur falcons. The real heroes are people of three villages Pangti, Sungro and Asha who have shown the world how communities will help in protecting and conserving wildlife. The people have sacrificed their livelihoods and worked in protecting the Amur Falcon helping the forest department. The Forest Department involved Churches in wokha, churches participated and played major role in spreading the awareness programme and the green theology among the people. This is one of the "unique conservation movement" in the world where church is involved in conservation.

The Department has organised awareness programme in schools and villagers by conducting meeting, workshops and seminars and also conducted Amur Falcon Marathon. The Forest Protection force has patrolled the roosting site round the clock. Amur falcon protection is not possible without the help of NGOs like Natural Nagas and Wildlife Trust of India, NBWCT students of Pangti village, Fisher men community, Village Councils have helped the Forest Department in this conservation movement of Amur Falcon This model of community conservation by people within a short period should be replicated in other parts of the world. The people once hunters have became conservationists. Ornithologists named Nagaland as Falcon Capital of the world. Bombay Natural History society has appreciated conservation efforts of Nagaland Forest Department

THEMATIC

RAPTOR CONSERVATION AND CULTURE

RAPTOR CONSERVATION AND CULTURE, IN THE CONTEXT OF THAILAND

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There are 58 diurnal raptor species known to be in Thailand. The raptor diversity is high. Of all 58 species, there are 11 raptor species that are categorized according to Global Threat Status. Throughout Thai history, we do not pay attention to diurnal raptors more than parts of our environment. The raptors were mentioned in texts, poetry, folk songs under five names: E-rung (Crested Serpent Eagle), Ok (White-bellied Sea Eagle), Rang (vulture), Insee (eagle), and Yeow (all other diurnal raptors). They were described as part of scenery. There is no sculpture, ritual, worship, or taboo. The only one taboo was with one nocturnal raptor: Barn Owl. The association between Barn Owl and death was no longer believed. We do not use any raptor to hunt. We appreciate the diurnal raptors in just the same way that we cherish our nature. The two oldest examples in Thai literature are included. Although there was no culture to promote conservation of raptors in particular; the shared sense of nature appreciation in poetry helps to conserve nature in general. Many still write poems to describe their birding trips. Thailand has many projects on raptors in the last 10 years, mostly by small groups. Some projects are scientific. Some aim to raise public awareness. The most interesting raptor conservation project in Thailand is a local project at Baan Nongplalai and Baan Bangjak to help raptor migrants in their winter ground. In summary, there is no cultural importance of raptors in Thai culture that can be used in the benefit of conservation. But there are other aspects of Thai culture that help conservation.

RAPTOR CONSERVATION AND CULTURE IN INDONESIA

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Ornithologically Indonesia is rich in bird diversity (appr 1,600 species or 17% of the world's total number known to occur in the country), many are endemic and restricted to small islands. Diurnal raptor species recorded in Indonesia is also relatively high (80 species) inhabiting various habitats ranging from urban areas to tropical rain forest. Indonesia is also wintering area for raptors breeding in northern parts of eastern Asia; two raptor flyways terminate in the country: East Asia Continental Flyway and East Asia Oceanic Flyway. Ecologically, in Indonesia raptor diversity has been relativelly well studied; but in terms of etno-ornithology, culture related raptor studies are still few in the country, and relevant academic papers are scarce. In term of species, Brahminy Kite *Haliastur indus* and Javan Hawk Eagle *Nisaetus bartelsi* are two raptor species often mentioned in the spirit of nationalism, traditional values and symbol of the country as well as personal status symbol. In relation to archaeological remains, two old temples: Borobudur and Prambanan have raptor reliefs illustrating Accipitriformes: hawk and *Otus* sp. Besides, folklores on owls are still passed on by word of mouth in some islands. Although the country does not have rich history on falconry but recently, falconry is practiced in a limited manner in the country. Through literature studies and discsussion with relevant persons, this paper will further discuss raptor-culture related issues including conservation efforts in Indonesia.

ETHNO-BIRD RELATIONSHIP AND TRADING OF RAPTORS AND OWLS IN NEPAL (2009-2013)

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The survey was conducted with informal interview with 1472 respondents from 49 districts of Nepal (2009-2013) . Respondents were found having both negative and positive spiritual and cultural believes about the raptors and owls. Body parts of raptors and owls were found to be very important in different communities and use them as medicine, in cultural and religious ceremonies and decoration. Some of the community were fully dependent upon the hunting and trafficking of raptors and owls for living. 23 districts were found to have moderate trade intensity and 19 low trade intensity. From the respondents, Kathmandu, Bhaktapur, Kaski, Chitwan, Dhading, Lamjung, and Kapilbastu were districts with high raptors and owls' trade. Most respondents were not aware about the legislations, acts and regulations to control the hunting and trade of wild fauna and flora that Nepal Government have. Effective government legislation and law implementation , awareness and conservation campaign in high trade intensity areas and rehabilitation centre for birds was necessary to be launch as soon as possible.

RAPTOR CONSERVATION AND CULTURE IN MONGOLIA

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A total of 44 raptor species, belonging to 3 families and 17 genera, are listed in Mongolia. The IUCN Regional Assessment in 2009 suggested that 3 species (6.8%) were assessed as Endangered. Raptors including hawks, falcons and eagles are mentioned in historical references in different languages in Mongolia. However, it is difficult to determine either to species or family level on petroglyphs and most archeologists settle on the term "raptor birds" shown in petroglyphs. We have chronologically listed below the raptor used on cave and rock paintings, and some decorated tools;

- Ancient art developed in 30000 – 15000 years ago B.C on cave and rock paintings and animal domestication began in 15000 – 8000 years ago B.C.

- Raptor worship existed from 3000–2000 years ago B.C due to animal domestication or "private properties" on rock paintings.

- Raptors decorated on tools such as knives and belts began 2000 years ago,. as is the culture of falconry. Falconry was one of the most popular cultures in Mongolia during the Great Mongolian Empire in the 13th century. However, nowadays falconry in Mongolia only exists in the Kazakh Community.

- The first Dynasty was established 200 years ago in Mongolia, named "Hun Dynasty". Since the Hun Dynasty, raptors have extensively appeared in national flags, stamps and other important tools throughout Mongolian history.

AVIFAUNA IN JUDAISM

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The *Old Testament* is the name the first Christians gave the collection of Jewish holy books known as the "Tanakh". A *testament* is a covenant, a treaty, and the Old Testament is the covenant between God and the Jewish people. Birds are mentioned in the text in a wide range of subjects ranging from ecological descriptions, to dietary roles (kashrut laws), and to their annual migrations. **Bird(s)** - are used 42 times in the Old Testament; **Fowl(s)** - are used 74 times. There are many usages of the generic words "Birds" and "Fowl" even before the birds, themselves, are named: Genesis 1:20-22; 2:20; 6:7, 20; 7:3, 8, 14, 21, 23; 8:17-20. **Turtledove(s) or Turtle, Pigeon or Pigeons** - these terms are used 66 times. The first bird mentioned by name is the Raven (*Corvus corax*; Genesis 8:7). Noah sent it forth till the flood waters dried up. Then Noah sent out a **Dove** and it returned with first sign of land - an olive branch in its beak (Gen. 8:8, 11-12). Exodus 16:13 mentions **Quail** (*Coturnix coturnix*) that covered the camp of Israel in the Wilderness of Zin, while on autumn migration. Samuel 26:20 talks about the king of Israel hunting **partridge** (*Amoperdix heyi*) in the mountains. Job 39:13 describes the fine plumage **of the Peacock** (*Pavo cristatus*). Being native only in the Far East, it was undoubtedly an ornamental bird 3000 years ago like at present. Job 39:13 The **Ostrich** (*Struthio camelus*) was known for its feathers and plumage, and the last was hunted in 1918 in the region. It was also known for its habit of laying its eggs and going off without incubating them, letting the sun incubate them (Job 39:13-18). Psalms 84:3 **Sparrows** are mentioned 40 times in the Old Testament alone. And, it is thought that the translators used "Sparrow" for any small, insignificant bird they encountered. The Swallow mentioned is probably the **Barn Swallow** (*Hirundo rustica*), or possibly the **Common Eurasian Swift** (*Apus apus*). Both birds migrate through Israel. **Eagles** are mentioned 30 times in the Old Testament, actually and metaphorically. There are several species of eagles in the mountains and deserts of the Middle East. Also mentioned in Job 39:26 is the Hawk that knows when to fly south. Micah 1:16 mentions "*...as bald as a Vulture*" as in the Lappet-faced **Vulture** (*Torgos tracheliotos*). After the fall of the First Temple and the removal of the Jewish population to Babylon, Isa. 14:23 mentions **Bitterns** (*Botaurus stellaris*) that will inhabit the desolate marshy areas; and owl (*Strix butleri, Athene noctua*) the abandoned hovels.

RAPTOR CONSERVATION AND CULTURE IN XINJIANG, THE WEST OF CHINA

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In western China, the local raptor culture and falconry tradition can be traced back thousands of years in ancient rock paintings, and today Krygyz tribesmen at the festivals in the streets of Akqi County, Xinjiang, in western China, are reminiscent of a time over 730 years ago, when Genghis Khan led a military expedition across Asia and Europe. Mongol forces were accompanied by numerous hunters and falconers who supplied fresh food for such expeditions. From 2010 to 2013, raptor culture was studied and observed to the effects of falconry and tradition on wild raptor populations. We estimate that the number of raptors used for falconry is 1830~2230, and includes Goshawk (*Accipiter gentilis*), Golden Eagle (*Aquila chrysaetos*), Sparrow-hawk (*A. nisus*) and Saker Falcon (*Falco cherrug*). Chinese falconry is in direct conflict with Chinese law, the National Animal Protection Act (1988) which protects all wild birds of prey. And we know the Kazakh and Kyrgyz ethnic groups prefer to catch larger raptors such as Golden Eagles, whereas the Uygur, Hui, Yi, and Manchu people catch and tame only smaller raptors such as Goshawk, Sparrow-hawk, Barbary (*F. pelegrinoides*) and Saker Falcons, etc. Traditional methods of capturing and taming birds probably had little effect on raptor populations. Today, too many raptors are removed for wild populations to sustain the losses. It is possible that raptors could be supplied by captive breeding, but such breeding is expensive and requires expert knowledge. In addition, after capture and training, the birds (mostly captured as young birds) become tame and are not suitable for release back into the wild and thus will not contribute to the wild breeding population. It has been discovered that falconry has been transformed from a recreational activity into an economic activity. The falcon prices have growing rapidly in the last 15 years, which has dramatically incentivized the capture in the field and trade of raptors to the detriment of the population and the ecosystem. One trained raptor can bring ca. 6000~7000 Yuan (RMB) for the falconer. In comparison, the per capita income of the peasants and herdsmen in the region is 2641~3150 Yuan (RMB)/Year. The contrast is striking. The conflicts between the custom and conservation of raptors have excited for a long time. It brings a new challenge to the conservation of the raptors in Xinjiang Uygur Autonomous Region, western China.

RAPTOR CONSERVATION AND CULTURE IN MALAYSIA

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Malaysia, located in South-east Asia, is divided into two regions by the South China Sea: Peninsular (West) Malaysia on continental Asia and East Malaysia, consisting of Sarawak and Sabah states, on the island of Borneo. As a result of this zoogeographical coverage and its location on the flyways of migratory birds, Malaysia has a rich raptor fauna with at least 44 species of diurnal raptors and 19 species of owls, including eight and three species, respectively, threatened with global extinction. The population of many raptor species is thought to be declining due to loss and degradation of forest habitats and, to a lesser extent, human persecution. Legal protection for all species of raptors is governed by national as well as regional legislations. The protected areas system in Malaysia, covering some 6% of the country, provides in-situ conservation of raptors. Malaysia is also a signatory to international agreements which in essence require the protection of raptors and their habitats. Malaysia is a relatively young country in terms of history and culture with its population consisting of the majority ethnic Malays, the descendants of the early Chinese and Indian immigrants and the many indigenous groups. The majority of the population, with the exception of some indigenous groups, do not have strong cultural ties with raptors and generally regard eagles and hawks as symbols of power and bravery and incorporate them in folklore, emblems and images. Among certain indigenous groups in Borneo, the Brahminy Kite is widely featured in their traditional beliefs and customs and the arrival of the migratory Japanese Sparrowhawk is used to mark a particular stage in the rice-planting calendar. In some communities, owls are considered omens of bad luck but the Barn Owl is widely used in Malaysia to control rodent pests in agricultural plantations.

HOW DID THE PEOPLE HAVE THE RELATION WITH RAPTORS IN JAPAN?

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The Record that the Emperor Ojin enjoyed hawking in about A.D.200 is the oldest description of the raptor in Japan. Some falconer clay figure called Haniwa is excavated from Kofun (ancient big tomb) of the sixth century.

There are many places that have name including hawk or eagle nationwide. Place name often appeared to have been associated with falconry, but several places are consistent with the breeding site of raptors still.

Each family has a family crest as the symbol of family. Samurai favored the crest using hawk feathers and there are about 60 varieties. In present, family crest is used in the ceremonial occasions such as weddings.

Arrows were made at the times when samurai had flourished during the 10-18th century. Many eagles were hunted as the highest-grade material of arrow feathers. The hunting was continued in certain areas until completely prohibited by law in 1947.

Further, hawks had been captured as a valuable source of protein during the migratory season in Ryukyu Islands until the 1950s.

There were the hunters called Matagi. Some of them were making livings by hunting hare, fox and raccoon dog using a mountain hawk eagle during winter. It is no longer seen after the war because of the prohibition of maintaining hawks and the shortage of successor.

Of these, the culture of using raptors by the capture is no more seen at present with the change of the times and the sense of values of people.

Instead of these, the taking pictures of raptors and the observation of migratory hawks are becoming popular since the 1970s. With the spread and improvement of photographic equipments, this population has increased rapidly. Therefore we have new problems for conservation, such as shooting location or management of raptor habitat information."Culture of use" is shifting to "Culture of coexistence with pleasure".

THE CURRENT STATE OF OSPREY (*PANDION HALIAETUS*) POPULATIONS IN THE TAIGA ZONE OF NORTH-WEST RUSSIA.

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Between 1999 to 2013 we examined large lakes and reservoirs in the north-western area of the forest zone and found hundreds of osprey nests and nesting sites. Till the 1970-1980s, in the European part of Russia the number of many large species of birds of prey drastically reduced. Under these conditions the most important centres of preservation of rare species have become nature reserves. The responsibility for the increase of ospreys in the taiga zone of North-West Russia belongs to the Darwin Reserve (ca. 112,000 ha), and is located on the coast of Rybinsk Reservoir. Since 1945 till the present there has been a significant increase in the number of Ospreys from 3-4 up to 55-60 breeding pairs annually. In the 1980s the number of Ospreys in the reserve reached its maximum and young birds began to settle on adjacent territories that led to an increase in the number of breeding pairs in the region on average 4.6 times within 15 years.

Current abundance of ospreys in the European part of Russia is 2000-4000 pairs. According to our data their number in the North-West of Russia is 600-700 couples. By early 1990s, on large water bodies a spatially-ethological structure of ospreys' populations has developed. It is characterized by the nests being placed in raised bogs at distances of 2-10 km from the coastal waters. The reason the ospreys were displaced from the optimal coastal habitat to sub-optimal is active settlement of white-tailed eagles *Haliaeetus albicilla* on the coast as well as the developing of coastal areas by humans. Nesting aggregations form linear structures along the axes of the peninsulas, i.e., equidistant from the two coasts. It allows the birds not only to reduce the number of encounters with white-tailed eagles nesting on the coasts but also to use their hunting areas with greater efficiency. A significant role in the increase of ospreys' is the construction of artificial platforms. Ninety nest platforms were erected between 2002 to 2013; and 15-20 % are annually populated by Ospreys. To date, 151 osprey chicks have fledged from the artificial nests during this period. Breeding success varied from 1.6 to 3 chicks per nesting couple per season, on average - 2.43 fledglings per pair (n = 41). Success indices of breeding and productivity are significantly higher for couples nesting in artificial breeding sites.

STATUS OF RAPTOR DIVERSITY IN GOA, INDIA.

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Raptors, the birds of prey are at the top of the food chain. They play an important role in regulating the prey population and nutrient cycling, hence an added need for their conservation. Contemporary literature indicates that Goa is inhabited by 46 species of raptors belonging to five families of orders Falconiformes and Strigiformes, of these 16 species are migrants. Among the raptor species sighted in the state, White backed Vulture (*Gyps bengalensis*), Long-billed Vulture (*Gyps indicus*) and Greater Spotted Eagle (*Aquila clanga*) are already in the threatened category. A study was carried out to know the status of raptors in Goa, in terms of diversity and habitat preference by them, if any. The study was conducted in natural forest and monoculture plantations at fortnightly interval for two years. The observations revealed that, in natural forest 14 (cumulative total) raptors belonging to six species were sighted, 6 raptors of three species in teak plantation, 14 raptors belonging to just two species in*Acacia* and 12 Eurrasian Sparrow Hawk's (*Accipiter nisus*) in Cashew plantation were observed. In rubber plantation not a single raptor was observed during the entire study period. On the plateau eight species were recordeded, of which Brahminy Kite (*Haliastur indus*) was dominant followed by Black Kite (*Milvus migrans*) . White bellied sea Eagle (*Haliaeetus leucogaster*) and Pallas Fishing Eagle *(Haliaeetus leucoryphus*) preferred wetlands, Shikra (*Accipiter badius*) and Eurrasian Sparrow Hawk (*Accipiter nisus*) were sighted in forest area. Occurrence of large number of raptors around the garbage dumps, fishing jetties and butchers' stalls confirms the inference that raptors can coexist with humans. The present study indicates that different raptor species exhibit different habitat preferences. The species based ecological studies, can provide us clues for measures to be taken to conserve them. As a result, those species which are on the verge of being threatened can be prevented from entering this category and those which are already threatened can be pulled out.

NESTING ECOLOGY & HABITAT SELECTION OF BLACK KITE (*MILVUS MIGRANS GOVINDA*)

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Breeding habitat and nest-site selection are important determinants of the population dynamics of birds. The distribution of nesting raptors is influenced by nest site and food availability. Nesting of Black Kites is investigated in Vadodara city, Gujarat, India. Nest sites were identified in the city by random search and distribution categorized based on degree of urbanization, human activities, and habitat composition (tree species, height of nest, height of tree, canopy cover, sub-branches, trunk diameter at breast height (DBH), number of nests, clutch size, distance to nearest water, distance to nearest building, distance to road, etc.). All nests were found nearer to Vishwamitry River, garbage dumping site or poultry farms. During a study conducted from 2009 to 2011 in Vadodara City 83 nests were observed. Of these 45 were located near busy roads, 8 near garbage dumps and 3 nests were in gardens. In industrial areas only 1 nest was found, but 26 were located near human inhabitation. Most preferred to nest in Neem trees (Azadiracta indica) -. The mean tree height of nest trees was 21.9 ±0.006 meter while height of nest was 4.32± 0.42 meter. The mean canopy cover of nest trees was 71% ± 1.01 while the DBH was 20.06 ± 0.18 cm. Nest trees showed significant correlation between canopy cover and total tree height and nest height. We conclude that human habitation and water sources are important for successful nesting of Black Kites.

DISTRIBUTION AND ABUNDANCE OF BLACK KITE (MILVUS MIGRANS GOVINDA) IN KOLKATA, WEST BENGAL, INDIA.

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Black kite (*Milvus migrans govinda*) is distributed throughout India and provides the vital ecological services by scavenging on garbage dumps. However, no surveys on black kite were previously conducted in eastern India. This lack of information makes it difficult to take effective measures for their management on a scientific basis. The present survey was undertaken to assess the distribution and abundance of black kite in Kolkata Municipal Corporation (KMC) area through an initial extensive survey, extended rapid survey and intensive surveys employing 'encounter transect' and 'roost count' methods. The results revealed that black kites were distributed throughout the KMC area with an overall mean encounter rate of 26 ± 0.598 kites/km which significantly varied in different parts of the study area ($F=51.329$, $P<0.05$) as well as in different seasons ($F=12.717$, $P<0.05$). Abundance of roosting black kites also varied significantly between the roosting sites ($F=41.115$, $P<0.05$) and seasons ($F=55.136$, $P<0.05$). Both the methods revealed similar seasonal pattern with maximum kites in summer and minimum during winter. Furthermore, preliminary surveys indicated that the numbers of black kite were significantly low in adjoining rural areas ($t=17.498$, $df=89$, $P<0.05$).

Conservation of any scavenging raptors in human-dominated landscapes is undoubtedly challenging and requires innovative, site-specific management strategies. Rapid and large scale habitat alteration due to boom in real estate sector and food scarcity for modified garbage disposal measures were found to be the threats for the black kite in the present study. Thirty eight communal roosts of black kites were identified for the first time in KMC area and several of them were located on private lands. Hence, marking of the roost sites, regular monitoring of roosting black kites and ensuring food for these scavengers are some of the conservation issues to ensure continual existence of black kites in this urban landscape.

POPULATION AND DISTRIBUTION OF BLACK KITE (MILVUS MIGRANS) IN BUNDELKHAND REGION, INDIA.

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The Black kite (*Milvus migrans)* belongs to Accipitridae family. Black Kite is an average sized bird of prey and a common resident in Indian cities. It is distributed in over four continents, and is probably the world's most abundant raptor. Inspite of being the world's most common raptor, the population of black kite is diminishing particularly in Europe and parts of Asia, as a result of agricultural pesticides, water pollution, carcass poisoning and hunting. An intricate study was done on population distribution of *Milvus migrans* in Bundelkhand Region from 2007 to 2011. Estimation of kite population was done through survey and direct count method. Total 144 roosting and 64 breeding sites were located in study region. The estimated population sizes were 670, 825, 847, 995 and 1072 in 2007, 2008, 2009, 2010 and 2011 respectively. Maximum number of *Milvus migrans* was reported in Jhansi for all the years while minimum were seen in Datia. In last few decades, their population appeared to be in thousands due to abundance of high trees for nesting and roosting and absence of electric power lines. Local people revealed that the *Milvus migrans* population was disappearing due to various reasons. With increase in human population, habitats were rapidly shrinking in Bundelkhand Region. Depletion or alteration of habitat seemed to be the major cause of dwindling population of Black kite.

NEST SITE SELECTION OF BLACK KITE (MILVUS MIGRANS) IN LUCKNOW, KANPUR AND UNNAO DISTRICTS OF UTTAR PRADESH, INDIA.

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The Black Kite (*Milvus migrans*) is a medium-sized bird of prey belonging to the family Accipitridae. Unlike others of the group, they are opportunistic hunters and are more likely to scavenge. Although still large in number, the population is declining when compared to past. Nest site preference of black kite nesting in Lucknow, Kanpur and Unnao in Uttar Pradesh was studied during the breeding period in 2010 - 2012. Field surveys were conducted at appropriate time of the day, using binoculars and SLR cameras. Black kites usually nested in large trees (Peepal, Semal, neem or on electricity towers) with no leaves or few leaves. The branch where nest was constructed was at a mean distance 1.5 to 2 m from the trunk or adjacent to the trunk. All the nests were located along human proximity. The site was selected irrespective of noise pollution, usually along the main roadsides or along the railway tracks. The nesting place was always near appropriate food availability such as garbage dumps in city. Total nests (56) located in Lucknow, Kanpur and Unnao were 26, 19 and 11 respectively. Of the total nests, 53.57% were on peepal (*Ficus religiosa)* trees, 19.64% on Semal (*Bombyx ceiba)* and 8.9% on neem (*Azadarichta indica)* while 17.85% were on electricity towers. We concluded that the shortage of potential nest trees may limit the Black Kite population in coming years. The study recommends the protection as well as promotion of trees preferred for nesting by the black kite.

A REPORT ON STATUS OF BLACK KITE (*MILVUS MIGRANS*) IN ISMAIL YUSUF COLLEGE CAMPUS MUMBAI, MAHARASHTRA

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Status of *Milvus migrans* in the Ismail Yusuf College, Jogeshwari (E),Mumbai campus was surveyed on a weekly basis for a year between 2011 to 2012. Out of 21 avian species found on campus (*Accipiter badius* , *Athene brama, Corvus splendeus,* , *Acridotheres tristis* , *Psittacula krameri, P. cyanocephala, P. eupatria, Columba livia, Halcyon smyrnensis, Saxicoloides fulicata* ,*Rhipidura aureola* ,*Dicrurus macrocercus* , *Prinia socialis* , *Eudynamys scolopacea* , *Megalaima haemacephala* , *Orthotomus sutorius, pycnonotus cafer, Oriolus oriolus, Leptocoma zeylonica* and *Centropus sinensis*) *Milvus migrans* dominated and was estimated to be 65 % of total avifaunal population (80 individuals). Green canopy of palm trees (*Palmyra palm*), large banyan trees (*Ficus benghalensis*) and coconut trees (*Cocos nucifera*) spread in sixty acres of area offers an ideal habitat for *Milvus migrans*. They were found to carry pieces of meat, fish and small chicks from nearby fish market and to bring them to their nests and to feed their chicks. Nest preparation material included small twigs, plastic bags and small pieces of clothes and preferred top of the trees as nest sites. Copulation activity was observed at the top of palm and banyan tree as well as on the terrace of college buildings. But, human activities like cutting of trees for construction and burning by the nearby locals and human interference for picking palm and coconut fruits are causing a disturbance and subsequent decrease in their nesting attempts which were recorded by the camera (Nikon 3100) during the study period.

STATUS AND DISTRIBUTION OF RAPTORS IN ANDAMAN & NICOBAR ISLANDS

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The Andaman and Nicobar (A&N) Islands, popularly known as 'Bay Islands', are situated in the Bay of Bengal, mid way between peninsular India and Mayanmar, spreading like a broken necklace in the North-South direction. These islands are located between 6° 45', 13° 41' N and 92° 12', 93° 57' E. There are 572 islands that lies 193 km away from Cape Negrais in Myanmar, 1,255 km from Kolkata and 1,190 km from Chennai. Total geographic area of A&N Islands is 8,249 km^2, of which Andaman group of islands cover 6,408 km^2 while Nicobar group cover 1,841 km^2. The climate is typical tropical and it is always warm, but with sea-breezes. The A&N Islands comes under the zone of tropical rain forest of the world and constitute a globally important biodiversity hotspot as they are off the mainland and isolated, and endemism is very high in all taxa. A total of 284 species of birds were recorded from A&N Islands, belonging 56 Families under 17 Orders. Twenty six species of raptors belongs to five families are reported to date. Of these, seven species are migrants. Three species are endemic to these islands and listed as globally threatened namely Andaman Serpent-eagle *Spilornis elgini* (Blyth), Nicobar Sparrowhawk *Accipiter butleri* (Gurney) and Great Nicobar Serpent-eagle *S. klossi* Richmond. In order to asses the status and distribution of diurnal raptors in Great Nicobar Biosphere Reserve in Great Nicobar Island, Ritchie's archipelago in Middle Andaman, and Saddle Peak National Park in North Andaman, a road side survey study was conducted between 2008 - 2013 . We identified 12 species from Great Nicobar Biosphere Reserve, 10 from Ritchie's archipelago and eight in Saddle Peak National Park. The raptors of Andaman and Nicobar islands require intensive long-term study to assess their population, distribution and other detailed ecological aspects.

DIURNAL RAPTORS OF THE WESTERN GHATS: THE ASSOCIATION BETWEEN BODY SIZE, RANGE SIZE, HABITAT PREFERENCES AND DIET BREADTH

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The tropics are home to 222 species of diurnal raptors. However, not many studies have been done to look at the distributional ranges of different species with relationship to their biological parameters. Our review aims to study the relationship between the geographical ranges, body sizes, habitat utilization patterns, and dietary preferences of diurnal raptors within the Western Ghats (WG), India. A database of available published literature from 1899 to 2012 was compiled to generate distribution maps of individual species within the WG to calculate individual range size. This study compiled a total of 49 species, and 43 of which were considered for analysis, excluding rare sightings and vagrants. The results indicated no association between habitat preferences and species' dietary preferences. However diet breadth was negatively correlated with range size indicating that species with broader range of diets tend to have a narrower geographical range. The relationship between body size and habitat diversity was positively associated but marginally significant, indicating that larger species tended to utilize more habitat types. The threatened species that were resident within the WG were generally larger. This was because the critically endangered vultures are larger than most other raptors. Thus, habitat conservation with adequate prey base in the Western Ghats will play a crucial role in the conservation of resident raptor populations.

DISTRIBUTION, ABUNDANCE, AND HABITAT SELECTION OF FLORES HAWK-EAGLE (*NISAETUS FLORIS*) IN LESSER SUNDA ISLAND, INDONESIA

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The Flores Hawk-eagle *Nisaetus floris* is a Critically Endangered species which exclusively occupies the last remnant forest of Lesser Sunda Island, Indonesia. Studies to understand its distribution, abundance and habitat selection through the conservation area, protected forest, forest reserve, nature reserve and recreation forest reserve are ongoing in and around Lombok, Flores and Sumbawa Island, Indonesia. We present data from a 2011 till 2012 study of the distribution and abundance of a population of Flores Hawk-eagle across most of its habitat. . This paper summarizes the information of Flores Hawk-eagle in 18 locations at Lombok Island, 28 locations in Flores Island, and 15 locations in Sumbawa Island. Our study revealed that the species is present in high numbers in the islands. The annual average population of this eagle is 330 individuals consisting of 165 pairs in Lombok, Flores and Sumbawa Island. The study suggests that this population has increased substantially since eight years ago. The distribution of the species commonly occurs at elevations of >700 meter above sea level while lower elevation of <500 meter, is dominated by Brahminiy Kite *Haliastur indus*, Bonelli's Eagle *Aquila fasciata*, Short-toed Snake Eagle *Circaetus gallicus*, White-bellied Sea-eagles *Haliaeetus leucogaster*. Among the most serious threat to the survival of the eagles are land use change, shifting cultivation, hunting, illegal logging, gold mining, and forest clearance for agriculture.

MODIFICATION OF THE DISTRIBUTION RECORD OF JAVAN HAWK-EAGLE (*NISAETUS BARTELSI*) IN EAST JAVA

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Javan Hawk-eagle (*Nisaetus bartelsi*) is Indonesia's national symbol, yet its existence is increasingly threatened by natural factors and illegal trade. Information about its distribution and sighting reports mostly came from West or Central Java, while its population in East Java had been scarcely observed. Previous sighting reports of this species came from a few NGOs or birdwatchers, and those reports were not properly compiled. Observations from 2008-2013 and reports from birdwatchers as well as the area administrator have been collected to generate a distribution data of Javan Hawk-eagle across East Java. Observations took place at the areas where this species had been recorded before, for instance at the national parks, regions administered by the Natural Resources Conservation Agency, grand forests, or state-owned protection and production forests administered by Perum Perhutani. The new reports show that Javan Hawk-eagle can still be frequently seen in the places mentioned by the former reports, with several additional places like Baluran National Park, Sempu Island, Ngliyep Beach, as well as at the coffee plantations and protection forest in Bondowoso-Situbondo. This species has also been reported to appear in the production or protection forests close to neighbourhoods. These reports and observation results demonstrate that there are still many sites left unexplored.

SIGHTINGS, HABITAT PREFERENCE AND DISTRIBUTION OF PEREGRINE FALCON *FALCO PEREGRINUS CALIDUS* IN THE CITY OF NAGPUR, CENTRAL INDIA, AND ITS FUTURE IN A GROWING CITY.

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There are two subspecies of Peregrine Falcon, the Shaheen Falcon *Falco peregrinus peregrinator* and *Falco peregrinus calidus* recorded in and around the city of Nagpur, Maharashtra, India (300m above msl). Shaheen Falcon *F. p. peregrinator* is a resident on the Indian subcontinent, and *F. p. calidus* is a migratory subspeciesShaheen have been seen sporadically around Nagpur: one in 1991, one in 2000, one in 2010, and only one pair, unconfirmed, seen sometime around 2009, only once.

This paper describes the sightings, distribution and habitat preference of *F. p. calidus* in an urban setting. Between December 2007 to September 2013, there have been regular sightings of *F. p. calidus* in the city of Nagpur. 2007:1, 2009:1, 2010: 2, 2011: 3, 2013: 7. *F. p. calidus* visits the city between August and April, and frequents two diverse habitats: high-rise buildings in congested urban areas, and a lake in the city.

This habitat selection of *F. p. calidus* poses unique challenges towards protecting the birds, their habitat, and available prey. The challenges are due to: 1. the stress of human fishing activities on Ambazari lake, which the *F. p. calidus* seems to have made it's winter home. There is increased disturbance to the migratory birds, and the number of migratory birds visiting the lake, which are the prey of the falcon, has declined over the years. 2. The other chosen habitat is a patch of busy Civil Lines area, with good tree cover, which has a tall unused building. There is a large colony of feral pigeons which roosts on this building, and the *F. p. calidus* hunts these feral pigeons. This is a single population of pigeons, and any change in roosting site, or significant reduction in their population here will affect the presence of the falcon. The trees where the falcon rests in Civil Lines are interspersed with buildings, and there is a significant movement of humans there. No hunting of these falcons has yet been observed. It will entail raising awareness amongst the urban residents and office goers, as well as local fishermen, towards this bird's presence, and the importance of its survival.

THE STUDY OF FIELD SURVEY IN THE EASTERN GRASS-OWL (*TYTO LONGIMEMBRIS*)

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The Eastern Grass-owl (*Tyto longimembris pithecops*) is a subspecies endemic to Taiwan. It was also enlisted as an endangered species in 2009. However, information about its distribution and population is vague, and suitable survey method for this bird is not tested. Playback technique was often used to investigate rare or secret bird species like owls. This study aims to test three survey methods, such as playback/listening, automatic recording, and automatic playback/ recording, and try to find out the most suitable survey method for surveying this species in the near future for the conservation strategy.

The detection rate of the playback in breeding season (October-March) was 5.72 ± 4.2%, and 5.97 ± 4.38% in non-breeding season(April-September), and was slightly higher in March (12%) and July (12.9%). The absence of the owl in most sample areas may be responsible for the low detection rate. If only the 9 owl-presence sites were included for analysis, the detection rate could reach 100% when the playback time accumulated to 425 min in the breeding season and 470 min in the non-breeding season. It would take only 185 min in breeding season and 470 min in the non-breeding season to detect the owl for two known nesting sites.

During April-September, the detection rate could reach 100% when the duration of automatic playback/ recording was up to 880 minutes, and the automatic recording 3020 minutes. The grass owl uttered call more often both in April and August, and at 18 - 19 p.m.

By considering the pros and cons of the three survey methods, we suggest that the playback/listening is the most suitable method for surveying the Eastern Grass Owl. After analyzing the habitat composition of the owl-presence sites (n=9), we found that most were composed largely of savanna and woodland.

RAPTORS OF THE ALTAI-SAYAN REGION: DISTRIBUTION, NUMBERS, THREATS, AND TRENDS.

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In the Altai-Sayan region 37 species of birds of prey and owls 11 were found. 30 species of the birds of prey (European Honey Buzzard, Crested Honey Buzzard, Black Kite, Hen Harrier, Pallid Harrier, Montagu's Harrier, Marsh Hawk, Goshawk, Eurasian Sparrowhawk, Japanese Sparrowhawk, Upland Buzzard, Common Buzzard, Short-toed Eagle, Booted Eagle, Golden Eagle, Eastern Imperial Eagle, Steppe Eagle, Greater Spotted Eagle, White-tailed Eagle, Eurasian Black Vulture, Lammergeier, Saker Falcon, Peregrine Falcon, Hobby, Merlin, Red-footed Falcon, Amur Falcon, Lesser Kestrel, Common Kestrel) and 10 species of the owls (Eurasian Eagle Owl, Long-eared Owl, Short-eared Owl, European Scops Owl, Tengmalm's Owl, Little Owl, Eurasian Pygmy Owl, Northern Hawk Owl, Ural Owl, Great Grey Owl) nest here. Rough-legged Buzzard, Long-legged Buzzard, Pallas's Fish Eagle, Eurasian Griffon Vulture, Himalayan Griffon Vulture, Gyr Falcon and Snowy Owl are regularly observed during migrations. There are known observations of Egyptian Vulture. Monitoring of breeding groups carried out from 1999 for White-tailed Eagle (Haliaeetus albicilla), Golden Eagle (Aquila chrysaetos), Eastern Imperial Eagle (A. heliaca), Steppe Eagle (A. nipalensis), Greater Spotted Eagle (A. clanga), Booted Eagle (Hieraaetus pennatus), Upland Buzzard (Buteo hemilasius), Black Kite (Milvus migrans), Saker Falcon (Falco cherrug), Peregrine Falcon (Falco peregrinus), Merlin (Falco columbarius), Eurasian Eagle Owl (Bubo bubo). Monitoring of Ural Owl (Strix uralensis) started in 2011.

The region has preserved the largest in the Russian populations of Golden Eagle (1400-1900 bp), Eastern Imperial Eagle (1150-1350 bp), Steppe Eagle (1110-1490 bp), Greater Spotted Eagle (350-370 bp), Booted Eagle (1174-1407 bp), Eurasian Black Vulture (71-96 bp), Lammergeier (55-86 bp), Saker Falcon (1196-1440 bp), Peregrine Falcon (681-1059 bp), Merlin (4160-6656 bp: all population lymani subspecies and populations pallidus and aesalon subspecies), Eurasian Eagle Owl (2617-4034 bp).

Status of populations of most species of birds of prey in the Altai-Sayan region is stable. In Tuva in 2002-2003 a sharp decline in the number of Eastern Imperial Eagle, Steppe Eagle, Greater Spotted Eagle, Eurasian Black Vulture, Upland Buzzard and Saker Falcon eagles were marked, probably due to poisoning bromdialonom during migration through Mongolia. Since 2010 restore their numbers began due re-occupation nesting sites by young birds. Steady downward trend in the number is observed only for Saker Falcon, and upward trend – for Peregrine Falcon.

FACTORS AFFECTING TO FLEDGING SUCCESS OF GRAY-FACED BUZZARDS *BUTASTUR INDICUS*.

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Gray-faced buzzard (*Butastur indicus*) is a typical migratory raptor species in East Asia. It breeds in northeastern China, the Korean Peninsula, and Japan (expect Hokkaido Island), while it winters in southwestern Japan and Southeast Asia. The buzzards prefer to breed in SATOYAMA, the traditional rural landscape of Japan that consist of irrigated rice paddies and secondary forests, and nest in mature pines or Japanese cedars. They feed on frogs, snakes, insects and a variety of other small animals. Since they listed as vulnerable in the Red List of Threatened Species published by Ministry of the Environment of Japan in 2006, its rapid population decline has been a source of concern. In my lab, we conducted monitoring breeding buzzards in Iwate Prefecture where the northern limit of its breeding range is. For 6 years (from 2007 to 2012) we collected data on the 63 nests. According to the survey, number of fledging success was higher in nests early start of breeding (2.25 fledglings avg. N=28) than in the nest late start of breeding (1.69 fledglings avg. N=29). Also, breeding stage tended to be 10 days earlier in old reuse nests, comparing old reuse nests (breeding nests used in previous year) and newly constructed nests at that year. It seems that reuse old nests do not require time and energy to build new nests and affect earlier start of breeding. Thus, it suggested that artificial maintenance and repair of old nests prior to their migration would contribute to increase fledging success rate of this species and become one part of conservation efforts.

BREEDING BIOLOGY OF TAWNY FISH-OWLS *KETUPA FLAVIPES* AT WULIN, CENTRAL TAIWAN.

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Little is known about the breeding behavior of Tawny Fishing-owl *Ketupa flavipes* in Asia. It was first described in Taiwan with only one-nest observation at a low-elevation stream in eastern Taiwan. Between 2010-2013 we observed four nests of two breeding pairs at mid-elevation streams in Chichiawan and Yersheng at Wulin, central Taiwan. The pairs occupied stream sections of about 7 km in length. The two females re-mated after they lost their original mates in 2011 and 2012, respectively. Three nests were located in broken tree tops, 10-12 m high, 120-130 cm DBH, and 30-450 m from water. The Yersheng female, a floater in 2009, nested at the same tree twice. Females laid 1-2 eggs during late February and early March. A total of 6 eggs hatched between 27 March and 2 April. Two newly-hatched chicks of the same nest perished after their female parent deserted them after heavy rain; the sick female was found dead two days later. The diet of young owls comprised mainly of Taiwan shoveljaw carp (*Onychostoma barbatulum*), by Taiwan Common Toad (*Bufo bankorensis*), and small rodents, shrews, and birds like brown dipper (*Cinclus pallasii*)) and Mandarin duck (*Aix galericulata*) chick. One to seven feeding bouts were delivered to the nests per day. Brooding stopped after one month of hatching. After 57-59 days of nesting period, four owlets fledged, having attained ca. 70% of their parents body mass of 2,440g and 2,000g, respectively.

THE MOVEMENT PATTERNS OF ORIENTAL HONEY BUZZARDS (*PERNIS PTILORHYNCHUS*) IN TAIWAN.

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Oriental Honey Buzzard (*Pernis ptilorhyncus*) is an important migratory raptor in East Asia. It was considered as only a migratory species in Taiwan until a resident population was found in 2005. Resident and migratory individuals seem to be morphologically indistinguishable. We have satellite tracked their movements in order to learn their migration route through Taiwan. However, the 12 individuals we tracked up to 2013 did not leave Taiwan. Summer field surveys found Oriental Honey Buzzards in all parts of Taiwan. Northern Taiwan seems to have more birds than the other regions. Satellite tracking data showed that all tracked birds remained within Taiwan throughout the year, but their movement patterns varied. Based on their movement patterns, Taiwan's Oriental Honey Buzzards can be grouped into 3 types: north-south moving type, irregularly moving type, and local residents. Except the irregularly moving type, Oriental Honey Buzzards show high fidelity to breeding area, wintering area, and movement routes. This study did not find any migratory Oriental Honey Buzzards, but gained significant understanding on the distribution and movement of this species within Taiwan.

OBSERVED BEHAVIOUR OF CRESTED SERPENT-EAGLE (*SPILORNIS CHEELA*) IN WILD BOAR (*SUS SCROFA*) –WALLOW.

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The Crested Serpent-eagle *Spilornis cheela* is a diurnal raptor protected by Indonesian law. It preys on amphibians, reptiles, and other vertebrates. This foraging activity requires it to descend to the forest floor. A frequent occurrence in the understory is the result of Wild Boar (*Sus scrofa*) wallow. Following initial observations we hypothesized that these depressions that fill with run-off and provide water, mud, minerals and other resources could benefit the Crested Serpent-eagle. We conducted camera trapping at three wallow sites in order to survey the activity pattern of wild boar and of the raptor use of the wallow. Three camera traps were deployed in the Biology Education and Research Forest (Hutan Pendidikan dan Penelitian Biologi—HPPB), Andalas University, West Sumatera, Indonesia. Of a total of 122 days of observations , we obtained 113 photos and 150 5-second video recording. In 27 photos and 21 videos we recorded Crested Serpent-eagle activity on 13 different visits. Serpent-eagle visited wallow sites between 1000 to 1700 hrs, and peak activity was between 1200 to 1500 hrs. On each occasion, visits to the wallow were solitary. Using the photos and video recordings, we are able to describe their activity pattern. The Crested Serpent-eagle usually descends a short distance from the wallow, walks into the pit where it spends two to four minutes before it walks out and flys away. This behaviour is obviously a non-foraging activity. We think that it drinks water and maybe even practice *geophagy* in order to gain minerals from the clay. Our observations are an important contribution to our understanding of wild boar-wallows as water and/or minerals for Crested Serpent-eagle and other forest animals.

HABITAT PREFERENCE, NEST SITE SELECTION AND BREEDING SUCCESS OF BONELLI'S EAGLE *HIERAAETUS FASCIATUS* IN MAHARASHTRA AND KARNATAKA, INDIA

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Bonelli's Eagle *Hieraatets fasciatus* (Family: Accipitridae) is a resident, diurnal, uncommon raptor. We studied the habitat preference, nest site selection and breeding success of Bonelli's Eagle in Maharashtra and Karnataka states, India from 2006to 2013. In the study area it breeds from October to March. We recorded the nests in various habitats such as evergreen and semi-evergreen forests, deciduous forests, semi-arid regions, agricultural cropland, near water bodies and in mountains. In all 29 nesting sites were studied, of which 20 were on tree (nest height 12 - 15 m), 8 on cliffs (45 - 50 m)and 1 a on cell phone tower (25 m). The tree species used for nesting were *Eucalyptus* spp., *Bombax ceiba, Ficus religiosa* and *Syzigium cumini*. In Europe, it mainly breeds in cliffs, where its population is declining, whereas in our study area we found maximum nesting on trees followed by cliffs. We studied 123 breeding attempts in seven consecutive breeding seasons. The nesting success was 100 %. Of these, 87 were on trees 35 on cliffs and 1 on mobile tower Out of 123 breeding attempts hatching success in 16 attempts was 72% (23 young from 32 eggs). The average breeding success was 1.5(on trees 1.4, cliffs 1.6, mobile tower 2). The prey items included mammals, birds and reptiles. Threats to tree nesting eagles included tree felling, trapping for illegal trade as pets and falconry, hunting and poisoning because of its poultry lifting habit. In general, there were no threats observed for cliff nesting eagles because the nests were situated in inaccessible and remote sites.

URBAN ECOLOGY OF RED-HEADED FALCON FALCO CHICQUERA IN BANGLADESH.

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Raptors worldwide are declining due to the direct effects of a variety of anthropogenic factors. In the face of these declines, raptors species that have adapted to urban areas may have a greater chance to survive in the face of habitat loss. Wildlife habitat in urban and rural settings in Bangladesh has been greatly diminished over the past few decades, leading to species loss (13 species extinct; 10 mammals, 2 birds and 1 reptile). Six pairs of Red-headed Falcon *Falco chicquera* were studied in urban and suburban areas in four districts in Bangladesh. Four pairs extensively used man-made structures for nesting, roosting, hunting and feeding. One of these four pairs consecutively nested in man-made structures since 2009.

Reproductive success was highest for this pair (46%, n=24). In 2012 one pair nested near a chemical factory and one nestling with deformed legs was found. We suspect this to be the result of chemical contamination. Use of man-made structures appears to be a response to the shortage of large trees and this could be regarded as ecological flexibility that may help this species survive in increasingly urbanized landscapes.

THE SAKER FALCON IN RUSSIA AND KAZAKHSTAN

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70 years ago the Saker Falcon (*Falco cherrug*) was a common species of Russia and Kazakhstan. The Eastern European population in Volga-Ural region has been extinct completely due to the situation in wintering grounds and migration routes. Also, the number of species was strongly reduced in the whole area of its breeding, while the range has shrunk significantly (about 90%).

Now the number of Saker Falcon is estimated to be from 1900 to 2700 pairs in Russia and from 1882 to 2179 in Kazakhstan (Moshkin, 2010). At present about 75% of the Russian Saker Falcon population breeds in the Altai-Sayan region. Now the main breeding groups of the species are Altai-Sayan – about 1300 br. p., Western Kazakhstan (Usturt) – about 1600 br. p., Eastren Kazakhstan – about 100 br. p., Central Kazakhstan – about 150 br. p.

A total of 1196–1440 breeding pairs (1325 pairs on average) and 562–668 successful pairs (615 on average) are estimated to inhabit the Altai-Sayan region in 2011. The total number decreased during the last 9 years (2003–2011) by 28%, during the last 3 year (2008–11) by 12.7%, and during the last year (2010–11) by 9.7%.

In Kazakhstan trend for 20 years was -61% (Moshkin, 2010), in Eastern Kazakhstan – -96.4% (Levin at al., 2010)

Crushing the population connect with negative factors impacting both in breeding places, and during wintering migration: legal and illegal trapping, bird electrocution, poisoning are the main.

However, disappearance of females and as a result a sharp decrease in ages of females in breeding pairs, that was confirmed by perennial observations, and by bird ringing, show, that pressure of catching on the species is excessive.

MIGRATION PHENOLOGY OF STEPPE EAGLE (AQUILA NIPALENSIS) AND OTHER RAPTORS IN THOOLAKHARKA WATCH SITE, NEPAL.

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Study on migration phenology of Steppe Eagle and other raptors was conducted in central west Nepal from Thoolakharka watch site ($28^0$18.188' N, $083^0$49.788', El 2050 m) between 15 September and 04 December 2012. Our goal was to determine total migrating Steppe Eagles and other raptors as well as their migration phenology. In 81 days of migration study, we have counted approximately 10,000 individuals of raptors leaving the Tibetan plateau and northern Asia and heading south in Middle-East or even Africa following the Himalayan Ranges of Nepal and India. In total we have counted 30 species of migrating raptors including 10 species of Eagles [Pallas's Fish-Eagle *(Haliaeetus leucoryphus)-2,* Short-toed Eagle *(Circaetus gallicus)- 2,* Crested Serpent-Eagle *(Spilornis cheela)-26,* Indian Spotted Eagle *(Aquila hastate -3,* Greater Spotted Eagle *(A. clanga) – 3,* Steppe Eagle – *6597,* Golden Eagle *(A. chrysaetos) – 7,* Bonelli's Eagle *(A. fasciata) – 13,* Booted Eagle *(Hieraaetus pennatus) – 155* and Mountain Hawk-Eagle *(Nisaetus nipalensis) – 1]*, four species of Vultures [Egyptian Vulture *(Neophron percnopterus – 24,* Himalayan Vulture *(Gyps himalayensis) – 1270,* Griffon Vulture *(G. fulvus) – 85* and Cinereous Vulture *(Aegypius monachus) - 73*], six species of Falcons [Lesser Kestrel *(Falco naumanni) – 66,* Common Kestrel *(F. tinnunculus) - 83,* Amur Falcon *(F. amurensis) - 78,* Eurasian Hobby *(F. subbuteo) – 80,* Saker Falcon *(F. cherrug)- 5* and Peregrine Falcon *(F. peregrinus calidus) – 29*], three species of *Buteos* [Himalayan Buzzard *(Buteo (buteo) burminacus) – 180,* Long-legged Buzzard *(B. rufinus) – 4* and Upland Buzzard *(B. hemilasius) - 4*], two species of *Accipiters* [Eurasian Sparrowhawk *(Accipiter nisus) – 107* and Northern Goshawk *(A. gentilis) - 3*], two species of Harriers [Northern Harrier *(Circus cyaneus) – 19* and Pallid Harrier *(C. macrourus) - 1*], Osprey *(Pandion haliaetus)-3*, Oriental Honey-buzzard *(Pernis ptilorhyncus)-381* and Black-eared Kite *(Milvus lineatus) - 324.* Steppe Eagle migration started from 5th October and continued till the end of the observation period with average number of 14 eagles/hr. The highest daily count was 572 eagles on 3 November. Migration of Steppe Eagle was observed between 0800 H to 1700 H. The peak number was observed in the afternoon hours (1200 H to 1600 H) and highest count of total number of the Steppe Eagles during this time was 1907. We have counted highest of 243 Steppe Eagles within a single hour between 1400 H to 1500 H on 8 November. In Thoolakharka watch site approximately 60% Steppe Eagles passing overhead were adult. We identified and counted 697 Juveniles (1st plumage), 1328 Sub-adults (2nd – 4th Plumage) and 1931 adults (≥5th plumage). Overall, the best time to see the most species in one day was in early November – but different species peak at different times during the autumn migration. For example, in 2012 the Amur Falcon and Lesser Kestrel migration peaked from approximately 20 October through 5 November, Oriental Honey-buzzard peaked from 25 to 31 October, Himalayan Vulture peaked from 10 to 20 November. On the other hand, the largest movement of Steppe Eagles occurred in early to mid-November. Even in late November, the Steppe Eagle migration was strong (up to 300/d), and species such as Himalayan Vulture, Griffon Vulture and Cinereous Vulture were regularly seen moving east to west past us.

FLIGHT IDENTIFICATION AND COMMENTS ON THE SIX ACCIPITER SPECIES SEEN DURING SOUTHBOUND MIGRATION AT KHAO DINSOR, THAILAND (2011-2012).

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The migratory bottleneck watch site, Khao Dinsor (Pencil Hill) on Thailand's southeast coast is the premier raptor migration watch site in the Oriental region with more than 250,000 raptors of at least 30 species seen, on average, each year. Six *Accipiter* species are observed here – the most at any raptor watch site in the world. Five are migratory: Chinese Sparrowhawk (*Accipiter soloensis*); Japanese Sparrowhawk (*A. gularis*); Shikra (*A. badius*); Besra (*A. trivirgatus*); and Eurasian Sparrowhawk (*A. nisus*). Another species, Crested Goshawk (*A. trivirgatus*) is resident in the area though some juveniles may migrate as well. Each *Accipiter* species (including male vs. female, and adult vs. juvenile) can be identified in flight by a few key morphological characters combined with flight pattern as they move past our watch site – and we will detail these characters in our presentation with photos. The Chinese Sparrowhawk is the most commonly seen *Accipiter* (and in certain years the most common raptor migrant) with 80-125,000 counted; Besra and Eurasian Sparrowhawk are the least commonly seen (<50/yr). Our data show that Japanese Sparrowhawks have the longest migration period of any raptor species at Khao Dinsor: from mid-August through early November at least. One species (Chinese Sparrowhawk) is an obligate flocking species though lone adults (late August) and lone juveniles (late October) occur. For the *Accipiters*, we are most interested in understanding why in one species (Japanese Sparrowhawk), adults migrate first and juveniles follow later in the season. By comparison, juvenile Shikras precede adults to a great degree. Finally, adult and juvenile Chinese Sparrowhawks migrate together in huge flocks. Identification is one key to understanding the biology of a species, and it might then be possible to develop conservation strategies to ensure the future of the raptors all of us enjoy watching so much.

DEMOGRAPHICS AND ECOLOGY OF WINTERING AQUILA EAGLES IN THAILAND.

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Aquila eagles are winter visitors to Thailand. There are three species recorded and include Greater Spotted *Aquila clanga*, Steppe *Aquila nipalensis* and Eastern Imperial Eagles *Aquila heliacal*. The counts at a paddyfield site in Phetchaburi province, central Thailand, where all three eagle species aggregated, foraged and night-roosted, were done on weekly visits from November 2011 to March 2012. The habitat was an area of seasonal paddy field, approximately 10 by 20 km^2, with scattered trees of >15 m. Maximum number per day of eagles, identified to age-class plumages (namely hatch-year/juvenile, subadult, adult) was performed to determine the demography of the eagle population. Age-class identification was confirmed by available photographs, followed Forsman, 1999. Forty Aquila eagles were recorded. Greater Spotted Eagle was the most numerous species (N = 24; 18 juvenile, 4 subadult, 2 adult). Nine Eastern Imperial and seven Steppe Eagles were also counted. None of them were adults. Four Eastern Imperial were juveniles and 5 subadults, whereas two Steppe Eagle were juvenile and 5 subadult. Foraging aggregates of the eagles were positively related to plowing periods in the paddies when carcasses of Ricefield Rat *Rattus argentiventer* and Greater Bandicoot *Bandicota indica* were unearthed due to flooding of the fields and injury by the plowing machine. Interspecific kleptoparasitism among the three species of Aquila on the rodent carcass and live rodents was frequent. Black-eared Kite *Milvus migrans lineatus* were also kleptoparasitized by the eagles when carrying food items. Paddy fields are an important foraging site for Aquila species and plays a significant role to sustain the wintering populations.

AUTUMN MIGRATION OF AMUR FALCON *FALCO AMURENSIS* IN THAILAND.

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Amur Falcon *Falco amurensis* is a trans-oceanic and trans-continental migratory species. In Thailand, the species is generally regarded as rare passage migrant. Based on the satellite tracking data, the falcons travel through South-east Asia over the golden triangle of Myanmar-Laos-Thailand border, towards the Indian subcontinent, before launching the Indian Ocean crossing to reach Southern Africa. To study the autumn migration of Amur Falcon in Thailand, a season-long count of Amur Falcon migration in autumn was carried out from late September to early November at Wat Tha Ton site, Chiang Mai province in northern Thailand. The site is located immediately close to Shan state in Eastern Myanmar. The results, when compared to those originated from the five consecutive year counts at Radar Hill count site in southern Thailand, and sighting records throughout the country, showed that there are two patterns of movement of the falcon in the country; the first pattern is the major route where the falcons travels in flocks, heading from North-east towards South-west directions into Eastern Myanmar. The second is single falcons observed elsewhere in the country, as individuals wandering away from the first aforementioned major migratory path.

All sight records at Radar Hill site pertained exclusively to the falcons in juvenile plumage whereas the records in the other parts of the country were either juvenile or female birds. All of the falcons seen at Radar Hill headed southward to the Malay Peninsula, where rare occurrences of the similar age-class falcons were accorded with the records in southern Thailand. The findings suggest the juvenile dispersal pattern of the species. And Amur Falcons migrated in remarkable different altitudes, ranging from the inter-valley paddy fields of 200-600 meters above sea level to the Daen Lao Mountain range of 2000 m high before they crossed the country border, and entered Myanmar.

RINGING MIGRANT SPARROWHAWKS IN SOUTHERN THAILAND AT KHAO DINSOR.

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We banded migrating birds, including raptors, at Khao Dinsor, coastal south Thailand, during the 2011 and 2012 southbound migration seasons. For raptors we deployed five, 12 m-long, (3-5 cm mesh) mist-nets, the uppermost panel set to reach 3.5-4 m height, in vegetation gaps along a ridge top, perpendicular to the line of flight. We set nets on 19 days in total during the two seasons. Neither live birds nor other prey (nor decoys) were used to attract the raptors, thus reducing sampling bias. We trapped 48 migrating *Accipiter gularis* (Japanese Sparrowhawk); 26 *A. soloensis* (Chinese Sparrowhawk); and 1 *A. badius* (Shikra). Almost all (96%) were caught during only ten days during late September to early October, when the birds were flying into south-west monsoon headwinds. Most *A. gularis* were captured after 14h00 when headwinds strengthened substantially due to increased thermal activity on south-facing slopes, or inclement weather/onset of dusk forced *A. soloensis* flocks, and lone *A. gularis,* to look for roosting areas on the ridge. Our results indicate: (a) almost all non-juvenile birds showed arrested moult of flight feathers; (b) the measured weights and wing lengths of adult m/f *A. soloensis* showed overlap, though females were on average approximately 16 g heavier than males, and females had only slightly longer (c. 7 mm on average) wing lengths; (c) by comparison there was no overlap in wing lengths of measured adult m/f *A. gularis* – females averaged 27 mm larger than males. There was a slight overlap in weight with females averaging approx. 50 g heavier than males. So far as we know, we are the only research station that has captured this many *A. gularis* and *A. soloensis* on migration. Our plans for 2013 and beyond are to expand the range of raptor species caught and begin satellite tracking certain individuals/species.

RADAR STUDY ON THE SPRING MIGRATION OF GRAY-FACED BUZZARDS *BUTASTUR INDICUS* AT HENCHUN PENINSULA, SOUTHERN TAIWAN.

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The migration pattern of Gray-faced buzzards (*Butastur indicus*), the second most numerous migratory raptor in East Asia, is little known at Luzon Strait. In April 2007, we employed weather radar at Kenting of Henchun Peninsula to study the spatial and temporal distribution and flight behavior of migrants. Buzzard flocks migrated across Luzon Strait toward Taiwan (n = 171) averaged 4.21 km in length (± 6.58 SD, range 0.5–46.4 km) and 1.20 km in width (0.45, 0.5–3.3 km). About 60% of them bypassed the Peninsula on which ground observation was undertaken, which was partly a result of wind directions en-route. Buzzards tended to fly on days with tailwind conditions, avoiding those with headwind. Ground speed of flying buzzards averaged 50.93 ± 8.61 km (n=136), and increased under favorable wind condition. Buzzards approach the Peninsula most often between 12:00-15:00, and a few arrive after sunset. Average flight height was 379.2 ± 135.2 m (n=105), and birds flew lower when facing head wind.

OBSERVATION ON WINTERING HARRIERS IN BLACKBUCK NATIONAL PARK, BHAVNAGAR - INDIA

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A tropical grassland, internationally known for the largest concentration of Blackbuck *Antilope cervicapra*, is now famous for the largest population of harriers *Circus* spp. in the world during winter, and also for one of the largest breeding populations of the Lesser Florican *Sypheotides indica* in monsoon. The existence of a large, regular winter roost of harriers *Circus* spp. has been known since the mid-1980s, and assessments of the number of birds present at the peak period have ranged up to 2,000 (Clarke 1993).

Over 185 species of birds have been recorded from this area (Akhtar 1998). The area has been reported as the largest roosting ground in the world for four species of harriers, which migrate to the Park: Western Marsh *Circus aeruginosus*. Montagu's *C. pygargus*, Hen *C. cyaneus*, and Pallid *C. macrourus* harriers. Another threatened bird is White-browed Bushchat or Stoliczka's Bushchat *Saxicola macrorhyncha* which has been recently confirmed from this site. During winter, Macqueen's Bustard *Chlamydotis macqueeni* (Near Threatened) is also found in this area in small numbers.

Forest Department and local bird watchers with an NGO and the Students of Department of Marine Sciences monitor the harrier population since last two decade. Estimate the population of wintering harriers in the National Park by direct count method. The population is around 800 to 2600 in the last 7 years.

The harrier population in Blackbuck National park is influenced by the rainfall and the crop pattern of the surrounding region. The harriers are beneficial to the cotton growing farmers as they control the locust population damaging the cotton crop.

BREEDING ECOLOGY OF RED-NECKED FALCON *FALCO CHICQUERA* IN PUNE DISTRICT, MAHARASHTRA, INDIA.

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The Red-necked Falcon *Falco chicquera* (Family: Falconidae) is a resident, uncommon, diurnal raptor. Scant information is available on the ecology and breeding status of the species. Hence, we studied the breeding ecology of the Red-necked Falcon in Pune district, Maharashtra, India from 2006 to 2013.The study was conducted in Haveli, Purandar, Baramati, Indapur and Phaltan talukas (sub-districts) in the western part of Pune district, which fall in the bio-geographic zone of the Deccan Plateau. We found that it breeds from January till May, and recorded three types of nest sites: tree nests (n=10), on mobile towers (n=4) and on electric high-tension pylon (n=1). The nest trees were *Ficus religiosa*, *F. bengalensis*, *Eucalyptus* sp. and *Azadirachta indica*. Nests of crows were reused in 5 instances of the 10 tree nests. Both parents contributed in nest building and bringing food to the young but only the female incubated the eggs. We observed 52 breeding attempts over seven consecutive years, of which 36 were on trees, 11 on mobile towers, and 5 on pylons. All breeding attempts were successful. In 15 nests we observed number of eggs laid (n=53) and the number of young hatched (n=38). Hatching success was 71.7 %. The incubation period was 33 to 34 days. During the study period, altogether 112 young fledged from 52 breeding attempts. The average breeding success was 2.0 (range 1 - 3). The average breeding success was marginally higher for trees than towers and pylons. We also studied the habitat preference of Red-necked Falcons. We observed that in general, they preferred agricultural cropland, semi-arid habitats and urban fringes for nesting, while in some instances (nests on mobile towers) they nested in urban areas. Their diet consisted mainly of birds, but also bats, reptiles and insects. There is some relationship in habitat parameters and choice to build a nest in tree or on tower. Breeding success, however, is only marginally affected and is slightly more for tree nests. There is some relationship between food preference and habitat in the 5 km radius of the nest. But breeding success is not related either to the food or to the habitat.The threats to the falcons were mobbing by House Crows *Corvus splendens*, Black Kite *Milvus migrans* and Indian Grey Hornbill *Ocyceros birostris*; felling of nest trees (n=2) and hunting by local people because of the falcon's poultry lifting habit.

PRELIMINARY INSIGHTS IN DISTRIBUTION AND DEMOGRAPHY OF THE FOREST OWLET *HETEROGLAUX BLEWITTI* IN MADHYA PRADESH, INDIA

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Owing to its small population and discontinuous distribution in Central India, the Forest Owlet is declared as a Critically Endangered Species by IUCN. In December 2012 we began a long-term study of the distribution, demography and ecology of Forest Owlet in Khandwa district of Madhya Pradesh. In the first phase of the project, an intensive study area from East Kalibhit Range has been selected to assess the distribution of the Forest Owlet. The study area is divided in to 2 km x 2 km survey units which are further divided in to 16 500 m x 500 m survey stations. From March to June 2012 a distribution survey by occupancy method was conducted in 50 of the survey units and 792 survey stations. Twenty-five individuals of Forest Owlet were located at 12 survey units. For understanding demography patterns, color banding of birds is being conducted. Color banding is essential to locate individual birds for monitoring their nesting and breeding success. Color banding will also help to answer questions related to ecological requirements of Forest Owlet. Preliminary analysis on ecological co-variates indicate that the Forest Owlet is found primarily in teak dominant forests, in plain or gently undulating terrain, in forest interior with an altitude ranging between 350-450 meter asl. The Forest Owlets occupy sites which had low level of timber logging, fire occurrence and vehicular traffic. Medium intensity of livestock grazing was observed from the occupied sites. The final outcome of this study will help understand the environmental factors affecting occupancy, demography and ecology of the Forest Owlet in Madhya Pradesh.

ASSESSMENT OF HABITAT SELECTION AND THE EFFECTS OF ANTHROPOGENIC DISTURBANCE UPON PALLAS'S FISH EAGLE (*HALIAEETUS LEUCORYPHUS*) IN MONGOLIA

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A total of 26 species of long distance migratory raptors have been record for Indonesia between 2001 – 2012. The three most common species recorded in Indonesia are Oriental-honey Buzzard *Pernis ptiloehynchus*, Chinese Goshawk *Accipiter soloensis* and Japanese Sparrowhawk *Accipiter gularis*.

There are five important migration watch sites in Indonesia at Rupat Island in Sumatra, Puncak in West Java, Penggaron in Central Java, Mt. Segara Bali Island and Sangihe Island in North Sulawesi. These sites have become traditional watch sites in the last decade.

Rupat Island is a satellite island of Sumatera, which is ca. 38 km south of the Malaysian Peninsula. This island is an important route of migratory raptors in both seasons. Other important route is Sangihe Island in Sulawesi. During spring and autumn 2007 ca. 230, 214 raptors were record in the area (Germi et.al 2009). The count indicates that there is a large raptor movement from the Philippines to Indonesia in the East Asian Oceanic Flyway.

Puncak pass area in Western Java, Penggaron in Central Java and Mt Segara in Bali are also important routes. Those areas are a bottleneck on the islands of Java and Bali. Thousands of raptors migrate through this area every year. Moreover, Penggaron in Central Java is also important in both autumn and spring migrations.

Several conservation efforts had been conducted in these important areas and include monitoring, public awareness and annual raptor festival. Moreover, Rupat Island has established an Ecosystem Essential Area which is a protected area for migratory raptors.

RICE FIELD USE BY RAPTORS IN NORTHERN PENINSULAR MALAYSIA

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Rice fields, the landscape of the primary Malaysian traditional crop, provide important habitat for raptors. In Malaysia, very few studies have examined raptor communities present in this agriculture area. Field data of Permatang Pauh, Penang, Peninsular Malaysia was obtained between 2000 and 2011 from field observation, road surveys and Bird-I-Witness database maintained by Malaysian Nature Society. Peninsular Malaysia's location on the East-Asian Australasian flyway makes it a host to more than 120 migratory birds with at least 44 species of diurnal raptors recorded. In this study, a total of 20 species of raptors were sighted utilizing a diversity of habitats in the area. Consisting of families Pandionidae and Accipitridae, 10 were migratory raptors, seven residents, one resident and migrant, and two vagrants. Species identified included *Aquila clanga* and *Aquila heliaca*, two wintering species ranked as IUCN Vulnerable. Others were *Pandion haliaeetus, Alviceda leuphotes, Pernis ptilorhynchus, Milvus migrans, Haliastur indus, Haliaeetus leucogaster, Elanus caerulus, Circaetus gallicus, Spilornis cheela, Circus spilonotus, Circus melanoleucos, Accipiter trivirgatus, Accipiter gularis, Aquila pennatus, Spizaetus cirrhatus, Microhierax caerulescens, Falco tinnunculus* and *Falco peregrinus*. The high diversity of raptor occurrence was largely restricted to the cultivation season with maximum abundance during harvesting and migratory season (September-March). This could coincide with their food availability that consists of small mammals feeding on different ripening stages of rice. Small mammals crowding into marginal habitat along canals and roads might increase prey availability during the harvest season. Large predators such as *Haliastur indus* (Brahminy Kite), *Elanus caeruleus* (Black-shouldered Kite) and *Spilornis cheela* (Crested Serpent-eagle) were observed to occur in the harvested areas and respond quickly to the intentional burning of fields. Most raptors in this study were believed to originate from nearby forest patches, mangrove and oil palm plantation. Rice fields serve as important feeding grounds, roosting and wintering habitats for resident and migratory raptors. Urbanization and rice field conversion in the area must be informed by data on the relative importance of the different habitats to the existing raptors.

BEHAVIOURAL OBSERVATIONS ON LONG-BILLED VULTURES (*GYPS INDICUS*) AT THE ADARWADI NESTING CLIFF IN TAMHINI GHAT, MAHARASHTRA, INDIA.

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The Long-billed Vulture (*Gyps indicus*) is poorly studied in its natural habitat and observations on nesting behaviour are primarily available only from captive populations. Being a declining species under grave threat, it is vital to document their nesting behaviour in the wild. A study was conducted on the small colony of *Gyps indicus* nesting on the cliffs at village Adarwadi, Tamhini Ghat (Maharashtra, India) for a period of 3 ½ years. Though the maximum number of vultures seen at any given time was 19, the colony may be of a bigger size. Data were collected bi-monthly using non-invasive methods and observations were made using a pair of binoculars at an average distance of 400 meters from the cliff nests. Our observations indicate peak activity and movement at the nest site between 1200 to 1530 hours. While the vultures were observed to roost communally during the day, only the nesting vultures remained at the nest site during the night. The nesting colony was most active late in the winters and early summer coinciding with their breeding behaviour. On average 2 fledgling chicks were observed each year. Bones collected opportunistically from the base of the nesting cliffs indicated that the adults brought back chunky portions of flesh for the chicks. The vultures rarely roosted on the cliff face – they typically slept either inside the caves or elsewhere away from the cliffs. The nests are usually formed inside the caves or on the covered ledges on the cliff except for one incidence wherein a pair had chosen to nest on an uncovered (open to the sky) ledge. Frequent movement of several individuals at nests, and the simultaneous rejection of some of those individuals indicate a determining factor in allowing the helpers at the nest site. Although nesting behaviour was seen at the beginning of each calendar year, a pair of vultures was observed to have mated twice in the month of May.

RAPTOR MIGRATION IN MONGOLIA

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To date, a total of 44 species of raptor of 3 families and 17 genera have been documented in Mongolia. Of these, 25 species (57%) are breeding visitors and passage migrants, 7 (16%) are vagrants, 5 (11%) are summer visitors and passage migrants, 5 (11%) are resident breeders, and 2 species (5%) are winter visitors. Raptor species richness differs across the country. High species richness of raptors occurs at Mongol Daguur Steppe, Hentii Mountain Range, Dornod Mongol Steppe (north-eastern and central Mongolia), Northern Khangai and Mongol-Altai Mountain Range (western Mongolia) most possibly due to these areas being located on the Central and East Asian Migratory Flyways. Data and information on raptor migration research in the country in the past were poor due to man power, capacity, and lack of communication and coordination between countries. Up to date, raptor researchers conducted migration studies on 6 species of raptors in Mongolia including Steppe Eagle (Aquila nipalensis), Saker (Falco cherrug) and Amur Falcons (Falco amurensis), Cinereous Vulture (Aegypius monachus), Short-toed Snake-eagle (Circaetus gallicus), and recently Pallas's Fish Eagle (Haliaeetus leucoryphus). They used metal rings, wing-tags, radio-telemetry and satellite devices for migration studies of raptors. Based on data and information of these migration studies in recent years we conclude that raptors from Mongolia take the general migration route of birds migrating on East Asian-Australasian and Central Asian Flyways depending on the species. In order to get accurate migration data and to coordinate effectively with across country borders, ARRCN should prioritize the species that we can collaborate on throughout Asia, initiate the activity for allocation of wing-tag colours for member countries, and identify the important Asian Raptor Sites under IUCN and ARRCN criteria.

FALL MIGRATION OF PALLAS'S FISH EAGLE IN MONGOLIA

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Pallas's Fish Eagle (*Haliaeetus leucoryphus*) is a globally vulnerable species with a decreasing population trend. The species' historical range extended from the Caspian Sea to China and from Russia to the Indian Subcontinent. The species' seasonal movements and migration patterns are complex and severely data deficient. Conflicting observations suggest the potential for two separate breeding migrant populations located in the north, around Mongolia and Kazakhstan, and the south, Pakistan to Myanmar, whose range overlaps around the Himalayas with inverse breeding seasons based upon climatic factors, such as the timing of spring thaw and the onset of the East Indian monsoon. During the summer of 2013, a 70g GSM-GPS transmitter backpack was attached to a juvenile Pallas's Fish Eagle at Ogii Nuur, Mongolia. The GSM-GPS unit collects ~300 data points per day with an average accuracy of +/- 18 m horizontal and +/- 22 m vertical. The collected GSM-GPS coordinates will be used to assess the geographic and temporal characteristics of seasonal movements. In addition, potential impact of seasonal weather conditions upon migration will be analysed via the MoveBank online NOAA Re-analysis-2 weather database run by University of Konstanz and Max Planck Institute fur Ornithologie and New York State University.

This project will provide the first assessment of the fall migration route and timing of migration for the northern population of Pallas's Fish Eagle breeding in Mongolia. This study is vital in light of recent global climate changes; determining future impacts upon Pallas's Fish Eagle migration without a comprehensive understanding of their seasonal movements would be impossible.

SATELLITE TRACKING THE AUTUMNAL MIGRATION OF THE AMUR FALCON *FALCO AMURENSIS* FROM NAGALAND, INDIA TO AFRICA

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The Amur Falcon *Falco amurensis* is a long distance, trans-equatorial migrant and has one of the longest and most arduous migration routes of any bird, travelling from their breeding grounds in eastern Asia to their wintering grounds in Southern Africa and back. Part of this annual migration involves a passage through India, including a major stop-over for a few weeks each year during October and November, at specific sites in northeast India especially in the State of Nagaland. It was at these stop-over sites that a large number of the falcons were reported harvested in 2012 for human consumption. Following a global publicity campaign, conservation initiatives were immediately introduced to stop the killing, which was considered both unlawful and unsustainable. To support the conservation efforts and to better understand the migratory movements of the Amur falcon during its passage through India, a satellite tracking study was begun in November 2013. A total of 30 Amur falcons were trapped using mist nets on the night of 6th November at the Doyang roost site in the Wokha district of Nagaland. All were weighed and select morphometric measurements recorded. Before release on 7th November, each falcon was ringed with a metal ring on the left leg and a color-coded plastic ring on the right. Also, three of the adult falcons (one male and two females) were each fitted with 5 gram solar-powered satellite transmitter manufactured by Microwave Telemetry Inc. The duty cycle of all three tags was programmed for continuous operation for 2 months thus allowing unprecedented detail on migratory routes and decisions of the tagged birds. Just a few days after release, the three falcons began their migration. They travelled separately but followed very similar routes. Within 10 days, all three falcons had reached Somalia, including three days of flight across the Arabian Sea from the western seaboard of India. After arriving in Africa the behavior and flight direction of the falcons changed which is discussed in the paper.

PRELIMINARY STUDY OF VOCAL BEHAVIOR ON MOUNTAIN HAWK-EAGLE *NISAETUS NIPALENSIS* IN TAIWAN.

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Vocalizations have been widely studied in avian species. However, there are relatively few studies on the vocalizations of raptors . Most of these studies focus on nocturnal species, whereas diurnal species are relatively neglected. Mountain hawk eagles *Nisaetus nipalensis*,a large raptor, is distributed across Taiwan, China, South-East Asian countries to Bhutan and India. Vocalizations of mountain hawk eagles are described in some studies, but none of them provide a comprehensive summary with which to conduct subsequent research. This study was conducted in the mountain region of South-Eastern Taiwan from 2006-2009. We found that mountain hawk eagles produce seven types of vocalizations based on context and structure. Some vocalizations occurred only during the breeding season or at the nest. Our aim is that this study provides a systematic and comprehensive result on the vocalizations of mountain hawk eagle and the preliminary understanding of vocal behavior in terms of seasonal and geographical changes

ACOUSTIC CHARACTERISTICS OF VOCALIZATIONS IN OWLS : IMPLICATIONS FOR SPECIES IDENTIFICATION AND CONSERVATION AWARENESS

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Owls belong to the order Strigiformes, and the majority of the species under the family Strigidae. They are generally medium sized birds, widely distributed, mostly nocturnal or crepuscular and feed on insects and small animals. Many have similar morphological appearance which makes them difficult to identify in their natural habitats. However, their vocalizations are distinct, and comprise of fairly loud, low pitched calls. I investigated the physical characteristics of vocalizations in six species of owls (*Otus lettia, Bubo bubo hemachalana, Glaucidium cuculoides, G. radiatum, Athene brama* and *Ninox scutulata*) recorded the vocalizations at various localities, mostly in eastern and western Himalaya, during April 2003 to May 2012. Vocalizations were recorded using Marantz PMD222/ PMD670 digital sound recorders and Sennheiser ME-66/ Audio-Technica AT815b microphones. Recordings were analyzed using Avisoft SAS Lab Pro. Analysis and interpretation of data reveals that all species use a species-specific signature vocalization composed of discrete, high amplitude repetitive calls made up of mostly simple, flat frequency elements and having mostly low frequency (Range: 0.29 to 2.00 kHz). However some species, such as the Spotted Owlet produce a wide band (Range: 0.6 to 18.5 kHz), harsh vocalizations made up of complex, frequency modulated multiple elements. It is concluded that vocalizations are not only helpful to understand the communication biology of owls, but also useful for species identification, playbacks for census and other studies on systematics and behavioural biology. Vocalizations can also be used for conservation awareness as owls are often killed or captured for esoteric religious activities.

BLOOD LEAD SURVEY FOR MIGRATING EURASIAN BLACK VULTURES (*AEGYPIUS MONACHUS*) IN THE REPUBLIC OF KOREA.

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Lead poisoning is the most common heavy metal toxicity for avian species including raptors. Lead poisoning in avian species is a multi-systemic disorder affecting the liver, kidney, heart, gastrointestinal, hematopoietic, reproductive, and the nervous system. Acute lead poisoning can lead to death but little is known about the long-term survival effects of chronic lead poisoning. It is well known from the California condor (*Gymnogyps californianus*) that lead poisoning from hunter spent lead ammunition is the major morbidity and mortality factor for the successful recovery of this endangered species. Since 2009 the Denver Zoological Foundation in collaboration with Mongolian colleagues has been evaluating blood samples from Eurasian Black Vulture (*Aegypius monachus*) chicks for blood lead levels (BLL) using the LeadCare® I point-of-care analyzer. We determined a mean BLL of 2.50 ±0.10 SE μg/dl, n = 121. We hypothesize that this level represents the normal background BLL in an area not contaminated with hunter spent ammunition. From wing tagging and GPS satellite telemetry projects we know juvenile birds from this population migrate to the Republic of Korea in November/December and return to Mongolia in March/April. Since we believe the nesting area in Mongolia is relatively free of hunter spent ammunition we wanted to see if these vultures might acquire lead while visiting Korea. Hunting with lead ammunition is permitted in the Republic of Korea. In 2012 we began collaborating with Korean colleagues evaluating free-ranging and rescued Eurasian Black Vultures. We evaluated 13 rescued juvenile Eurasian Black Vultures at a rescue center in northern South Korea close to the demilitarized zone. In 2013 we evaluated an additional 18 free-ranging vultures captured at a vulture restaurant during a canon net capture and 32 more birds that were presented to rescue centers from various places in the Republic of Korea. The mean BLL for all birds was 7.36 ±1.05 SE μg/dl, n = 63. There is a statistically significant difference between the BLL for chicks in Mongolia and migrating juveniles in Korea (U =6,672, P <0.001, Mann-Whitney U-test). The mean we determine in Korea is only an approximation because one bird presented with acute lead poisoning. The BLL was >65 μg/dl which is the upper end detection limit for the analyzer. This bird was assigned a value of 66 μg/dl. We believe this supports our hypothesis that the birds are acquiring lead during their winter migration. This paper will discuss BLL for 63 juvenile vultures from the Republic of Korea and its implications for acute and chronic lead poisoning in the Eurasian Black Vulture.

TEN YEARS AFTER DISCOVERING THE FATAL EFFECT OF DICLOFENAC RESIDUE ON VULTURES: IS THE ASIAN VULTURE CRISIS OVER?

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In 2003, The Peregrine Fund identified the veterinary drug diclofenac sodium as the cause of the catastrophic population collapse of three species of *Gyps* vulture in South Asia. Vultures that consumed livestock carcasses contaminated with residues of diclofenac died of renal failure at rates so high that their populations declined by >30% per year. In February 2004, a high-level summit meeting was held in Kathmandu, Nepal to disseminate results to government authorities from Pakistan, India and Nepal. By 2006, these governments had banned the veterinary use and manufacture of diclofenac. We present encouraging results from our pre-ban and post-ban vulture population monitoring in India, Nepal and Pakistan that suggest that *Gyps* vulture populations may have started to stabilize and at some sites may even be increasing. The crisis is not over, however, as populations are vastly depleted. We emphasize the need for continued work to restore vulture populations, especially *Gyps tenuirostris*, continued vulture population monitoring, and public awareness, especially on the emergence of new non-steroidal anti-inflammatory drugs (NSAIDs) in the veterinary market that could potentially jeopardize vulture conservation efforts in the region.

COORDINATING EFFORTS AND LATEST PROGRESS TO SAVE THREE OF ASIA'S GYPS VULTURES FROM EXTINCTION.

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All three resident Gyps vulture species of South Asia have declined by over 99% since the early 1990s and the main cause of these declines was diagnosed by 2004 as diclofenac poisoning. Efforts to agree the priority actions and to implement them in time to prevent extinction of these Critically Endangered species have been led by several organisations in conjunction with the range Governments. More recently in February 2011 these organisations formally joined together under the banner 'Saving Asia's Vultures from Extinction' (SAVE) which provides a clearer identity for the partners to work together to achieve their shared conservation goals. The composition and functioning of SAVE is outlined here, as well as the ways that this complements the newly formed 'Regional Steering Committee' for the species and the IUCN Vulture Specialist Group. The main achievements so far have been to instigate a ban in all four countries – India, Pakistan, Bangladesh and Nepal – of the veterinary formulations and use of diclofenac, as well as the establishment of viable stock of all three species in captivity. The captive populations are already breeding successfully, and we are approaching the preparation stages for release back into the wild assuming the diclofenac threat can be fully removed.

However, serious challenges remain, including widespread illegal use of human diclofenac formulations by vets, and the emergence of new replacement veterinary drugs that are also toxic to vultures. As well as the need to address both of these issues, SAVE has identified a further approach to the problems through the creation of 'Vulture Safe Zones' - areas of 100km radius where intensive monitoring, advocacy and awareness work is targeted and it is hoped these will be among the first areas where captive birds can be safely released back into the wild.

PROBABLE THREATS FOR VULTURES AND THEIR IMPACT ON THE SUSTAINABILITY OF 'VULTURE SAFE FEEDING SITES' OF RUPENDEHI AND DANG, NEPAL.

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Nepal supports six resident and three migratory vulture species of the nine species found in South-Asia. Among them, Indian Long billed vulture (*Gyps indicus*), (Oriental white-backed vulture (*G. bengalensis*), Slender-billed vulture (*G. tenuirostris*), and Red-headed vulture (*Sarcogyps calvus*) are listed as Critically Endangered; and the Egyptian vulture (*Neophron percnopterus*) as Endangered in IUCN Red list because of the drastic decline in their population from South-Asia. Diclofenac, one of the NSAID (spell out first time) has been identified as the primary cause of the population decline. Symptoms like visceral gout, kidney failure and finally death of vulture were observed after they had consumed carcasses with residues of Diclofenac. Vulture Safe Feeding Sites (VSFS) were first established in 2007 at Kawasoti, Nawalparasi in Nepal to provide Diclofenac-free carcasses to vultures.

The present study was conducted in three Village Development Committees (VDCs) of Rupandehi district (Bishnupura, Rudrapur and Suryapura), three VDCs of Dang district (Ghobodiya, Lalmatiya and Sisaniya) and Vulture Safe Feeding Sites of two districts (Rupandehi and Dang). The main objectives of the study were to detect the probable future threats for vultures and its impacts on sustainability of vulture safe feeding sites. Direct observation and questionnaire survey methods were implemented. During questionnaire survey, more than 600 samples were selected using Stratified Random sampling method. People were supportive towards VSFS but wanted Government to uplift their economic status. Competitors like dogs, crows and eagles were comparatively few in numbers but were found disturbing vultures at carcasses. Food scarcity, habitat loss, poisoning, low level of awareness among local people about vulture and NSAIDs, full dependence of people for VSFS management on foreign support and donation were found to be the major threats for vulture conservation and sustainable management of VSFS.

STATUS AND CONSERVATION OF INDIAN VULTURES

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Encompassing diverse climatological and geographical biome, India is bestowed with large number of floral and faunal varieties. Despite great loss of habitat and other anthropogenic pressures the avifauna of the country represents about 11% of global species. However, the same percentage of Indian avifauna is under threats of various category. Vultures, being large and scavengers, have been a prominent component of Indians agro-based lifestyle. As described in the epic *Ramanaya,* vultures played a significant role in Hindu mythology. Parsee communities respect and assort to "sky burial" wherein their dead are offered to the vultures. This is also true for Buddhist communities in northern India. In addition to above mentioned benefits, ecosystem services rendered by them are also invaluable. Along with several other common birds the population of almost all 8 species of vultures found in India has declined, and more than 97% population of three species – long-billed (*Gyps indicus*), griffon (*G.fulvus*) and white-backed (*G. bengalensis*) - have vanished from the plains of India in the past 20 years. While I used to observe them in hundreds in Bahratpur (Rajasthan), Darbhanga (Bihar) and Aligarh (Uttar Pradesh) and elsewhere in north India during 1970s and 1980, by 2000 they had almost vanished from most locations. This is the fastest decline ever recorded in a bird population in the world. Even the most common scavenger, the Egyptian vulture (*Nephron percnopterus*), is not so common. Although evolution and extinction are natural processes, disappearance of large species such as vultures in such a short span of time is intriguing and sad. Results of the studies conducted so far indicate that the diclofenac, a pain killer medicine, and certain diseases could be the reason for the population crash. However, there could also be several other reasons, such as gradual adoption of tractor-based farming that have reduced use of cattle in certain areas and decline of wildlife population thereby loss of food, loss of large nesting trees, extensive use of insecticides and pesticides resulting thinning of egg-shells, etc, for the crash of their populations. Therefore, in addition to captive breeding and reintroduction programs, there is an urgent need to investigate the matter with broader ecological objectives evincing 'multi causative factors' for suggesting remedial measures to maintain a viable population of vultures in India. Public awareness campaigns remains the most desirable tool for effective conservation and management of India's wildlife vis-à-vis the vultures.

MONITORING VULTURE POPULATION AT PENCH TIGER RESERVE, MAHARASHTRA, INDIA.

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Out of nine species of vultures found in Indian subcontinent, population of three species namely Indian Long Billed Vulture (*Gyps indicus*), Indian White Backed Vulture (*Gyps bengalensis*) and Slender Billed Vulture (*Gyps tenuirostris*) exhibited unprecedented dramatic decline during mid-nineties of the last century. Today vultures in Indian subcontinent are found predominantly in the protected areas with less human disturbance. Vulture population in the Pench Tiger Reserve, Maharashtra was monitored from 2011 to 2013. During survey, Indian White Backed Vulture (*Gyps bengalensis*) was found to be the predominant species (75%) of all gyps vultures. Small population of Indian Long Billed Vultures (*Gyps indicus*) (12.5%), Red Headed Vultures (*Sarcogyps calvus*) (10%) and Egyptian Vulture (*Neophron percnopterus*) (2.5%) was also found during the survey. The study time was split into monitoring the existing nests, searching the new nests, monitoring the activity at all the nest, survey of the villagers and of forest department personnel.

Changing pattern of the processing the livestock have changed the feeding habit of vultures dramatically. In Pench Tiger Reserve, we found that they are mostly dependent on the carcasses of the wild animals like Chital (*Axis axis*) 70%, Gaur (*Bos gauras*) 20% and Sambar (*Cervus unicolor*) 10% respectively.

Observations on nesting pattern of the vultures were recorded considering several parameters. It was found that 50% nests were built on Saja (*Terminalia alata*). 28.50% were on Dhoban (*Dalbergia pariculata*) and 21.50% were Siras (*Albizia procera*). 28% nests were close to the roadside where recognizable human disturbance like tourism etc. was noticed. Other observations included nest predation by House crow (*Corvus splendens*) and Black drongo (*Dicrurus macrocercus*) on the vulture nests.

Recommendations were made to the Maharashtra State Forest Department on the basis of the observations of the vulture population and diclofenac survey in villages in and around the Pench Tiger Reserve, Maharashtra.

VULTURE CONSERVATION ENDEAVOURS IN BUNDELKHAND REGION, INDIA.

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There are endless incidences when animals suffered due to never-ending desires and thoughtlessness of human beings. A recent example of this is the decline in vulture population. Until recently, little was known about vulture presence in Bundelkhand Region. The Bundelkhand region has an area of around 70,000 sq. km and stretches over districts of Southern Uttar Pradesh and Northern Madhya Pradesh. The results are based on work of last 6 years (2007-2012). Out of 9 vulture species in India, a total of 7 vulture species have been reported from the study region including 4 residential species (*Gyps bengalensis, Gyps indicus, Neophron percnopterus* and *Sarcogyps calvus)* and 3 migratory species (*Gyps himalayansis, Gyps fulvus* and *Aegypius monacus)*. The vulture conservation endeavors included rescue of dehydrated and injured vultures, proper laws to stop human disturbances (such as shooting of Hollywood movie "Singularity", tourism, mining etc.) to the vulture populations specifically during the breeding season. The protection of breeding, roosting and feeding sites to help in the conservation of vultures, awareness and education programmes for people to encourage them to contribute in vulture rescue operations through International Vulture Awareness Day, Wildlife Week, and workshops.

Proper coordination and understanding between various departments such as Forest Department (for surveying and monitoring of vulture colonies), Archaeological Department (for protecting of nests in monuments), Tourism Department (preventing disturbance by tourists), Agriculture Department (avoiding use of harmful pesticides and drugs) and Education Department (for awareness among local people, students, villagers and forest officials) have been established. This led to the first "vulture restaurant" in Mahavir Swami Sanctuary, Deogarh in Lalitpur. Regular monitoring and census are been carried out by the Forest Departments. The Forest departments will also have a one room "Rehabilitation centre". All the efforts have led to a stable vulture population in the region.

PCR BASED MOLECULAR SEXING OF RAPTORS

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Determination of sex is very important in ecological studies and conservation of the birds, including raptors. Since most of the raptors are monomorphic, sexing is not an easy task, even when the bird is in hand. We applied PCR based molecular sexing to determine the unknown sex of raptors, which were temporary kept in the cage facility of Natural Recourse Conservation Agency (Balai Konservasi Sumberdaya Daya Alam - BKSDA) Yogyakarta and Yogyakarta Wildlife Foundation.

The birds were voluntary handed over or confiscated from the owner/collector. The aims of the study were to obtain the most effective molecular primers among the most commonly used combination primers: P2/P8, 1237L/1272H and 2550F/2718R, to determine the sex of the raptors. Samples were obtained from the blood and DNA was extracted using DNA extraction kit.

Totally ten birds of four species were used in this study: Javan Hawk-Eagle *Nisaetus bartelsi* (3), Changeable Hawk-Eagle *Nisaetus cirrhatus* (5), Crested Goshawk *Accipiter trivirgatus* (1) and Spotted Kestrel *Falco moluccensis* (1). PCR conditions followed the previous studies and the amplicon were separated in 3% agarose gel electrophoresis and visualized under UV light. The result showed that only the combination primers of P2/P8 and 1237L/1272H successfully amplified all of the samples.

All Javan and Changeable Hawk-Eagle and Crested Goshawk samples had one band and were sexed as males. Spotted Kestrel was sexed as female. Meanwhile, the combination primer of 2550F/2718R was able to amplify only seven samples. However, the band pattern confirmed the same sexes as the PCR results using previous primers.

FLIGHT IDENTIFICATION OF THE BLACK-EARED KITE MILVUS MIGRANS LINEATUS VS. THE PARIAH BLACK KITE MILVUS MIGRANS GOVINDA IN NEPAL AND THAILAND.

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Two (sub)species of the Black Kite *Milvus migrans* occur in the Oriental Region: (a) the palearctic *lineatus* (Black-eared Kite) that is regularly observed on migration each October moving north to south in Thailand, as well as east to west in Nepal; and (b) the tropical breeding *govinda* (Pariah Kite) which makes shorter intra-regional movements in response to food availability, weather (seasonal rains), etc. Distinguishing between the two subspecies is difficult, particularly birds in flight. In this presentation, we detail differences between the two subspecies that we have noted in the field, and from photos we have taken and then analyzed as part of our raptor migration studies at Khao Dinsor, southern Thailand and Thoolakharka, in central west Nepal. Although there is overlap between the two subspecies in some plumage characters, by selecting individuals toward the extremes, we have found that the two most easily seen characters for flight identification are (a) the size of the white carpal patch over the lower base of the primaries; and (b) the color of the vent compared to the upper chest/breast area. We hope this information is beneficial to conservationists in the Oriental region concerned with the presumed decline in breeding populations of *M. migrans govinda*, as well as migrant and overwintering *M. m. lineatus*.

A STUDY OF GENETIC DIVERSITY OF BARN OWL (*TYTO ALBA*) BY USING MITOCHONDRIAL DNA IN THAILAND.

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Barn Owl (*Tyto alba*) is the most widely distributed species of owls. In Thailand, Barn Owls are found in barns, temples, abandoned buildings and open areas such as agricultural areas. They have been introduced to control rodents in oil palm plantations and paddy fields. Although, description and ecology about Barn Owl are abundant there is no information about genetic diversity of Barn Owl in Thailand. At present the Barn Owl populations are declining and the major causes are habitat loss, resulting from changing agricultural practices, road mortality and rodenticides poisoning. In the present study, we analyzed the genetic diversity on mitochondrial DNA of Barn Owls. We used the partial second subunit of the nicotinamide adenine dinucleotide dehydrogenase (ND2) sequence of mitochondrial DNA to investigate the genetic diversity of Barn Owls, found in oil palm plantations in Southern Thailand and other regions of the country. Blood samples from sixty-seven Barn Owls were obtained. Mitochondrial DNA of Barn Owls were extracted and amplified with specific primers for ND2 gene of Barn Owl using Polymerase Chain Reaction (PCR) technique. The PCR products were used for DNA sequencing and compared with data in GenBank. The 787- base pair (bp) fragments of mitochondrial ND2 gene were analyzed. We detected seventeen variable sites on ND2 gene . These variable sites were identified as seven haplotypes among the 67 samples. This result could provide the basic element for suitable management, conservation and captive breeding of Barn Owls in Thailand.

A RAPID, NONINVASIVE, DIRECT PCR ANALYSIS FOR SEX DETERMINATION IN MULTIPLE RAPTOR SPECIES.

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A rapid and accurate method to determine sex is important for the study of raptor biology because behavior, habitat, and migration can all be influenced by sex. However, the lack of sexual dimorphism that makes it difficult to differentiate between male and female is found in many raptor species, especially in young birds. The molecular method has been proved to be a valuable tool for sex determination. We investigated the possible application of direct PCR-base method amplified a region of the chromo-helicase-DNA-binding (CHD) gene to determine sex in raptors. Blood and feather samples were collected from Crested Serpent-eagle (Spilornis cheela), Black-shouldered Kite (Elanus axillaris), Rufous-winged Buzzard (Butastur liventer), Brahminy Kite (Haliastur indus), Spotted Owlet (Athene brama), Collared Scops Owl (Otus lettia) and Asian Barred Owlet (Glaucidium cuculoides). PCR was amplified directly from blood or feather samples. The result show that CHD-Z and CHD-W fragments were amplified in all raptor species. A single band (CHDZ, ~650 bp) was observed in male raptors and two bands (CHDZ, ~650 and CHD-W, ~450 bp) in females. The difference length between CHD-Z and CHD-W were identified clearly by 1.5% agarose gel electrophoresis. In conclusion, the direct PCR helps to successfully identify the sex in raptors, which requires noninvasive sample collection (1 feather). Especially, this method is rapid, simple, cost-effective, and large number of samples can be processed quickly and efficiently. Furthermore, the technique can also be applied for molecular sexing in other bird species.

DIVERSITY OF RAPTORS IN OMKARESHWAR NATURE RESERVE, KHANDWA –DEWAS, MADHYA PRADESH.

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Madhya Pradesh is rich in diversity of raptors but specific studies have not been undertaken. A study was conducted in 2010-11, to understand the diversity and distribution of raptors in Omkareshwar Nature Reserve (ONR). ONR is situated in Khandwa and Dewas district of Madhya Pradesh with a total area of 645.84 sq km2 which includes Omkareshwar National Park, Singhaji Sanctuary, Mandhata Sanctuary, Narmada Conservation Unit-I and Narmada Conservation Unit-II. The area was regularly surveyed for raptors and other species of birds in all the major habitats and all the 7 ranges of the reserve i.e., fresh water reservoir, grassland, dry deciduous forest, agriculture land in all the 7 ranges of the reserve

1. Narmada Nagar north (22°16′37.92′′N,76°27′53.95′′E)
2. Narmada Nagar south (22°19′50.48′′N,76°29′43.54′′E)
3. Punasa (22°13′50.71′′N,76°23′32.48′′E)
4. Satwas(22°32′01.26′′N76°41′01.26′′E)
5. Mandhata(22°14′59.45′′N,76°09′08.53′′E)
6. Pipari(22°24′02.69′′N,76°16′39.70′′E)
7. Punjapura(22°32′23.41′′N,76°22′00.24′′E)

In the nature reserve the vegetation type include Teak, Hardwickia , Boswellia , Acacia .In the reserve there are many natural water bodies. The entire area is surrounded by the Narmada River Basin.

Surveys were done in vehicles and boat and transects using binoculars and standard field guides. The records were maintained for all the seasons during the study period for the entire study area. 26 species of raptors were recorded in all 7 ranges of the study area; 23 species in Narmada Nagar North, 19 species in Narmada Nagar South, 12 species in Punasa , 17 species in Pipari , 14 species in Punjapura, 16 species in Mandhata and 11 species were found in Satwas. In all five families of raptors were reported in the study area. Family Pandionidae with one species; Accipitridae with maximum 16 species; 6 species in family Strigidae, 3 species in family Falconidae and only one species was recorded in family Tytonidae. It is concluded that Omkareshwar Nature Reserve had the richest diversity of raptors which need to be extensively studied and proper conservation plans should be established.

DIVERSITY STATUS OF *FALCONIFORMES* AND *STRIGIFORMES* IN VARIOUS HABITATS OF RIVER CHAMBAL IN RAJASTHAN STATE, INDIA.

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River Chambal is the only perennial riverine wetland ecosystem of Rajasthan and shares its border with Madhya Pradesh and Uttar Pradesh. It passes through six districts of Rajasthan state *viz.* Chittorgarh, Kota, Bundi, Sawai-madhopur, Karauli and Dholpur. It occupies an area of ca. 648 Kms from Garh Singadiya in Kota district to Gadi Tedawali in Dholpur district of Rajasthan state. The major portion of the Chambal falls under National Chambal Wildlife Sanctuary and Jawahar Sagar Wildlife Sanctuary. In addition, it shares its boundary with Bhainsrorgarh Wildlife Sanctuary and Kela Devi Wildlife Sanctuary. These protected areas greatly contribute to the conservation of different habitats of the River Chambal along its length and which harbours great faunal diversity which includes diurnal and nocturnal raptors. Extensive surveys conducted between 2010 to 2013 revealed 43 species of raptors and owls. Some of the raptors such as Pallas's Fish-Eagle: *Haliaeetus leucoryphus* (Pallas, 1771), White-rumped Vulture: *Gyps bengalensis* (Gmelin, 1788), Long-billed Vulture: *Gyps indicus* (Scopoli, 1786), Red-headed Vulture: *Sarcogyps calvus* (Scopoli, 1786), Pallid Harrier: *Circus macrourus* (S.G. Gmelin, 1770), etc recorded are in various categories of conservation status. The paper presents their habitat distribution, abundance, migratory and conservation status.

The man induced habitat destruction and ever increasing interference due to population pressure including developmental activities are the major threats to this wetland and to the species found in or in its vicinity. A three state joint effort is required to prevent the Chambal River ecosystem from further degradation. The recorded diversity of raptors indicates the prevailing pristine environment all along the Chambal River except at few places where immediate conservational measures are required to save the environment of this wetland.

STATUS OF RAPTORS OF KANHA TIGER RESERVE, MADHYA PRADESH, INDIA.

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The Kanha Tiger Reserve (KTR) is well known for its tigers. It lies in the central highlands of Madhya Pradesh, India. Kanha was brought under the umbrella of "Tiger Project" in 1974. The core zone consists of 940 km^2 of the KTR and an additional 1009 km^2comprise the buffer zone. Management objectives targeted some of the large mammals but birds remain neglected. Though avian checklists are available, very little study is known about the raptors. The objective of this paper is to highlight the status and the ecology of some of these raptors.

Observations were made between August 1993 to December 1997 during the tenure of the author as a Ranger Forest Officer in the KTR. Bird watching was opportunistic while patrolling and other field work.

In KTR 32 species of raptors have been identified - 18 species of Accipitridae, 3 Falconidae, 1 Tytonidae, and 10 of Strigidae. Populations of 15 raptor species are decreasing.

Four species of vultures display a decline in numbers in India. They are- Red-headed Vulture *Sarcogyps calvus*, Indian Vulture *Gyps indicus*, White-rumped Vulture *G. bengalensis* and Egyptian Vulture *Neophron percnopterus*. The first three are "Critically Endangered" where as the Egyptian Vulture is "Endangered". White-rumped Vulture is relatively common in KTR and may be safe in the National Park as it feeds on dead wild animals. Solitary Red-headed Vulture and Egyptian Vulture are seen and are rare in the Park; however Egyptian Vulture is seen in the Buffer Zone. The Indian Vulture has disappeared completely from Kanha National Park.

Of the three Harrier species- Pallid Harrier *Circus macrourus,* Pied Harrier *Circus melanoleucos*, Western Marsh-harrier *Circus aeruginosus* - only the Pallid Harrier, which is classified as "Near Threatened", is declining . The Mottled Wood-owl *Strix ocellata*, is an endemic to the Indian Subcontinent, and is stable.

The Park authority should ensure the implementation of the ban on the use of diclofenac in treatment of live stock. The population of birds of prey particularly Vultures, and Pallid Harrier, should be monitored regularly and their nesting sites documented thoroughly in the KTR.

RAPTORS IN WEST SUMATRA: SYNTHESIS FROM VARIOUS SURVEY TECHNIQUES.

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Sumatra is one of the richest islands in Indonesia, due to its size, variability of habitats and it past connection with Asia continent. Sumatra possesses more than 580 bird species, where 31 among them are endemic to this island. Raptor species, which place on the top of the food trophic, also give contribution to the diversity of avian in this island. Recent publication listed 34 diurnal raptor species from Sumatra Island. Here we will take into account both of diurnal and nocturnal raptors from West Sumatra province in the central part of the island. Data is compiled from various fieldworks conducted from July 2009 until June 2013 in West Sumatra through the use of some field techniques such as digiscoping, mistnetting, camera trappings and surveying bird in captivity. As result, we enlisted 10 (ten) species of raptors, which include diurnal raptors from order Falconiformes with two families and six species (Accipitridae: *Halistur indus*, *Haliaeetus leucogaster*, *Spilornis cheela*, *Accipiter gularis*, *Ictinaetus malayensis*; Falconidae: *Falco peregrinus*) and nocturnal raptors from order Strigiformes (one family, Strigidae with four species: *Otus lempiji*, *Bubo sumatranus*, *Ketupa ketupu* and *Glaucidium brodiei*).

In this writing, we emphasize the potential of mistnetting technique for raptor birding, such as its durability to survey nocturnal and elusive species, its applicability to measure body parameters, biological indication, as well to apply tag for individual identification. We also see it as one alternative technique to survey migrant raptor that specificly choose the mountainous line in western side of Sumatra island as their migration route. We confirmed two forms of Sunda Scoop-owl using this technique; brownish form from lowland and grey form from highland. The recent use of camera trapping technique also gives a considerable hope for documenting behavioral aspect of raptor.

FEEDING OPPORTUNITIES FOR EGYPTIAN VULTURES IN UTTAR PRADESH, INDIA

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Egyptian vultures are colonial birds. After the vulture crash in India, Egyptian vultures are most commonly seen vultures in Uttar Pradesh at present. The food of Egyptian Vulture varies extremely and is one of the major causes that have helped the Egyptian vultures to face and adapt to the changing habitats and food availability. Food availability is a basic concern for animal survival; consequently, it is a fundamental component to identify the habitat utilization, survival changes and population density of the animal. The study started in Uttar Pradesh in 2010 and is continuing. The food availability as well as the variety was noted through direct observation while surveying for the scavengers at appropriate time of the day, using binoculars and SLR cameras. The results show that the Egyptian vultures feed on cattle carcasses when available, they are seen feeding on bone pieces in Bone mills as well as sugarcane factories. They are seen around the slaughter houses as well as garbage sites. *Neophron percnopterus* also known as 'Gobar Giddh' (literally Cow-dung Vulture) is observed searching invertebrates from dung that is thrown in large quantities near the slaughter houses and leather factories. The stray dogs are the strong competitors while feeding. The Egyptian vultures are always seen waiting for the turn to feast on carcasses. Although the reported feeding opportunities may be enough for the scavenger to continue, it may have an effect on the breeding success and that should be studied further. This study illustrates the capability of the *Neophron percnopterus* to exploit different food resources, as well as point out the importance of feeding sites and recommends their management for the persistence and productivity of the species.

THE CRASH IN RESIDENT *GYPS* VULTURE POPULATIONS IN INDIA AND THE CONSERVATION MEASURES INITIATED TO SAVE THEM FROM POSSIBLE EXTINCTION.

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Nine species of vultures are recorded from the Indian subcontinent. The populations of three resident Gyps species, namely Oriental White-backed Vulture *Gyps bengalensis*, Long-billed Vulture *G. indicus* and Slender-billed Vulture *G. tenuirostris* crashed during the mid nineties. Vulture declines were first documented at Keoladeo National Park, Bharatpur, Rajasthan. Subsequently, the crash in populations was documented across the country. Numbers of Oriental White-backed Vulture declined by 99.9% between 1992 and 2007 on transects surveyed each year during that period. The equivalent decline in the combined total of *Gyps indicus* and *G. tenuirostris* was 96.8%. However the surveys conducted in 2011 revealed that populations of all three species of vultures remained at a low level, but the decline had slowed. The main cause of crash in vulture populations was found to be the veterinary use of diclofenac, a non-steriodal anti-inflammatory drug given to cattle for treating inflammation and pain. The vultures get exposed to the drug diclofenac when they feed on a carcass on ungulate which was administered diclofenac hours before its mortality. The drug is extremely toxic to vultures and causes kidney failure which results in visceral gout.

A complete ban on the use of diclofenac in livestock, the establishment of conservation breeding centres and establishment of vulture save zones are suggested to prevent the extinction of these three species of vultures.

EFFORTS IN CONSERVATION OF RESIDENT *GYPS* SPECIES OF VULTURES IN THE STATE OF ASSAM.

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The three species of resident *Gyps* vultures - Oriental white-back vulture (*Gyps bengalensis*), Long-billed vulture (*Gyps indicus*) and Slender-billed vulture (*Gyps tenuirostris*), in Asia have declined by almost 99% in last decade. The veterinary drug diclofenac is considered as the main cause of the problem. Based on an estimate, there were over 40 million vultures of the three species in India in the nineties; and today, only a few thousands of vultures exist. Historically in India, the Slender-billed Vulture was recorded from Himachal Pradesh in west to Arunachal Pradesh in the east along the Himalayan foothills; but now it is confined only to the eastern part largely to Assam state. Although the remnant population is small, it is very important for the survival of the species. The Oriental white-backed vulture has wider distribution in India but facing drastic decline all over including Assam. The vulture population is under constant threat of diclofenac poisoning (as NSAID is used as painkiller both in animal and human). The vultures die even by single feeding on the diclofenac laced carcass. To save the three species from extinction, In-situ and Ex-situ Conservation efforts are being carried out in India. In the year 2007, the third Vulture Conservation Breeding Center (VCBC) in India has been set up in Assam for the augmenting the wild population as well as to save them from extinction. Oriental white-backed Vulture and Slender-billed vulture found in Assam have been considered for conservation breeding program here. The protocols have been developed for husbandry and veterinary care, keeping in mind their reintroduction in the wild as the final objective. Both species have been breeding successfully at the VCBC, Assam since 2011. Also, concerted efforts are being made in the areas where there are extant vulture populations so as to save them from diclofenac poisoning. This has lead to emergence of the concept of establishing Vulture Safe Zone. An area of 100 km radius around Majuli island (26.9500° N, 94.1667° E) has been identified for establishing Vulture Safe Zone where targeted advocacy and awareness programs have been initiated. The cattle carcass sampling and pharmacy surveys are being carried out to determine the efficacy of advocacy and awareness programs. The ultimate objective of this project is to create a safe zone for vultures in Assam for reintroduction of vultures in the wild from the captive breeding centre and also to save the remnant population of vultures of that area from the threat of diclofenac poisoning.

POPULATION STATUS OF EGYPTIAN VULTURE (*NEOPHRON PERCNOPTERUS*) IN ALIGARH, UTTAR PRADESH, INDIA

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A survey of Egyptian Vulture (*Neophron percnopterus*), which is listed as endangered in the current IUCN Red List category was conducted in Aligarh city and its surrounding areas from January to April 2013. We established seven line transects, each 5 km long in major roads radiating out from Aligarh city for documenting population of Egyptian vulture. Each transect was monitored eight times during the study period. Animal carcasses were also recorded on these transects. We also identified and monitored 12 garbage dumps in different localities of Aligarh, which were monitored 8-10 times for documenting population of the species. The density of vultures varied from 0-0.0019 individuals/sq km in the selected transects. The encounter rate for the species varied from 0-0.43 individuals/km in the selected transects. Animal carcasses encountered during transect monitoring varied from 0.03 to 0.25/km along transects. The average group size of vultures recorded in transects varied from 0-2.13 individuals. The density of the Egyptian vulture in 12 garbage dumps varied from 0-8.75 individuals/sq km. The study indicates that the population of Egyptian vulture is declining continuously over the past 15-20 years in Aligarh as a result of various factors. The species was recorded in hundreds till mid 1990s in the same areas where the present study has been conducted. The total population of Egyptian vulture has been indicated to be about 55 individuals in Aligarh in a previous study on status of vultures in 1999. However, the total population of Egyptian vulture surviving presently in Aligarh is between 30-35 individuals, which is an alarming signal towards developing a comprehensive conservation plan for the species.

VULTURE CONSERVATION IN MOYAR VALLEY, TAMIL NADU, INDIA.

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Old world vultures have suffered a steady decline over the years in the sub continent where they were common. The main reason appears to be a NSAID, diclofenac, but habitat loss is also a factor. Owing to the drastic decline, vultures have been awarded the status of critically endangered and are red listed by the IUCN.

Vulture populations in forests have not been studied in depth and yet the criticality of their status requires a study to ascertain their true status. Hence, sporadic studies or observations gain importance.

Vultures in the Moyar valley, South India and runs through Mudumalai, Bandipur, and Sathyamangalam, is of interest because they have not suffered a great decline and only the population of Egyptian vultures seems to be in great danger. All others, viz, White backed, Long billed and King vultures are apparently stable. .The long-billed had always occurred in small numbers. The reason seems to be the contiguous savannah type forest with a good prey base and reduced anthropogenic activities with NSAID effect—the shifting pattern of nesting and local migration may also influence this factor.

Several studies of short duration and observations support this theory. We have collated these observations and studies for the years 2009 - 2013. . Habitat conservation appears to be a significant parameter in order to sustain an optimum population. Our findings are unlike other efforts to artificially breed and introduce decimated populations. The Moyar Valley is a good example of a naturally suited site for in-situ conservation.

PROVISIONS FOR ASSESSMENT OF CHANGES IN RAPTOR BIODIVERSITY IN DELHI, INDIA, BEFORE AND AFTER THE CRUSH OF THE VULTURE POPULATIONS

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Raptors in Delhi were studied between 1967-1971 by VG (as UNESCO education expert) and by his short visits in 1984-1986, and in 1996 by both VG and NZ. It was performed by mapping of active nests (728 in total) and nesting territories (68) within 26 sample areas (0.15 – 5.1 km^2, totally 37 km^2 or ~25% of Delhi territory at that time).

In early 1970's, Delhi was inhabited by about 3000 pairs of raptors (19.3 pairs/km^2) including ~2400 pairs (16.1 p/km^2) of Black Kite (*Milvus migrans*), ~400 pairs (2.7 p/km^2) of White-backed Vulture (WBV; *Gyps bengalensis*) and ~100 pairs (0.5 p/km^2) of Egyptian Vulture (*Neophron percnopterus*) as well as Shikra (*Accipiter badius*) and Black-winged Kite (*Elanus caeruleus*). However, by late 1980's the kite population decreased by 25-30% while the number of WBV almost doubled. Vultures appeared in great numbers in central and southern Delhi where they had been absent in early 1970's. Nevertheless in February 1996 the number of WBV declined by 25-30% and kites also continued to decrease by 10-20%. Therefore, by late 1980's the total raptor population in Delhi reached a peak of 3000-3400 pairs including 1800-2100 pairs of kites and 1000-1200 pairs of WBV. The crash of WBV occured in early 1990's. In mid 1990's, Delhi was inhabited by 2400-2700 pairs of raptors including 1700-1800 pairs of kites and 700-800 pairs of WBV.

It is vital to know how biodiversity of Indian raptors has changed after the recent crash of WBV populations. To that purpose our data provide a specific quantitative base to assess population changes that have occurred for over forty years. All primary materials concerning number of nesting raptors including field notes and original maps of every sample area with indication of each raptor living nest and breeding site are still available from the authors. Their copies and translation into English will be provided to anybody who expresses willingness to undertake similar raptor surveys within the same sample areas using the same methodology either jointly with us or independently.

PRE-DECLINE POPULATIONS OF THE WHITE-BACKED VULTURE *GYPS BENGALENSIS* AND OTHER RAPTORS IN NORTHERN-CENTRAL INDIA

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In the second half of the XX century, i.e., before the crash of vulture populations throughout the Indian Subcontinent, it was inhabited with a remarkably high diversity and numbers of raptors. They were surveyed in agricultural landscape around Delhi in 1970-1971 within three spot-samples: round Baslanbhi village (20 km^2) near Pataudi, Punjab (~ 40 km south-west of Delhi); near Lahli village (20 km^2) west of Rohtak, Punjab (~70 km north-west of Delhi), and along Eastern Jumna Canal (10 km^2) west of Meerut, Uttar Pradesh (~ 30 km north-east of Delhi).

At the three agricultural sample areas (50 km^2), 112 pairs of 10 species of nesting raptors were recorded. Average density was 2.2 pairs/km^2. The most numerous was the White-backed Vulture (*Gyps bengalensis)* - 70 pairs (1.4 pairs/km^2) which comprised over 62% of all raptors. The Egyptian Vulture (*Neophron percnopterus;* 12 pairs) and Black Kite (*Milvus migrans;* 12 pairs) comprised about 20% of the total number of raptors there. The White-eyed Buzzard (*Butastur teesa*), Black-winged Kites (*Elanus caeruleus)* and other species were uncommon or rare. Human settlements comprised a tiny part of the agricultural sample areas (<5% altogether) while over 30% of all birds of prey (mostly vultures and kites) nested within or near villages where they were never disturbed by tolerant local people. So, it could be presumed that overall raptor populations in agricultural and urban habitats (i.e. nesting also in Delhi and other towns) of Northern-Central India (c.50,000 km^2) at the beginning of 1970's consisted of ca. 120-150 thousand breeding pairs including 70-75 thousand pairs of the White-backed Vulture, 20-25 thousand pairs of Black Kite (most of them live in urban habitats), 12-15 thousand pairs of Egyptian Vulture, and 5 thousand pairs each of Black-winged Kite and White-eyed Buzzard.

A half a century back raptor populations in Northern-Central India appeared to be the highest in the world. Thanks to abundance of high trees for nesting, availability of food mostly provided by people (garbage, dead cattle, traffic kills, etc.) as well as traditional Indian culture that manifests itself as a good-will attitude of people to all living beings, including raptors. After the recent crash of vulture populations it is significant to clarify whether or not they have been replaced by other raptors, for example kites? If so, to what extent? To accomplish this aim our initial data with mapped living nests and breeding areas can be put at the disposal of any researchers who are interested to obtain comparative data on changes of raptor biodiversity within the same sample areas after a lapse of over forty years. Both past and proposed studies could be reliable starting points for assessment of future changes in raptor diversity and populations in Northern-Central India.

IDENTIFYING SOME BIRDS OF PREY IN THE 'KALPADRU KOSHA': 1660 AD.

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A Sanskrit lexicon titled *Kalpadru Kosha* was written by Keshava in 1660 AD. A lexicon is a unique type of literature in Sanskrit where we find important synonyms. There are many references to birds which are presented apparently as synonyms but if they are minutely studied, they suggest different types of birds. For example,
"*shaalmalistho vajratundo garutmaan khagaraat puna*: |
Sumukha: shobhanaasya: syaanmanitundastarakshaka: ||" 11.86
"Shaalmalistha = One who takes shelter on a *shalmali* tree (the silk cotton tree);
Vajratunda = *Vajra* is a name of a mythological weapon made of bones; it means a destructive weapon like a thunderbolt and *tunda* means a beak; it means a vulture or also as a name of an eagle;
Garutmaan = One who has prominent wings; *garut* also means swallowing;
Khagaraat = One who is the king of birds;
Sumukha = One who looks handsome;
Shobhanaasya = One who has beautiful mouth or jaws; *shobhana* means beautiful and *aasya* means mouth or jaws;
Manitunda = One who has jewel-like beak."
It is interesting to note that the descriptive references to some birds of prey documented by the author. There is an attempt to identify the species of birds of prey, their hunting habits and their possible habitats as far as possible. This study gives a documentation of birds of prey seen in 17th in India. It is important to see how many species of these birds of prey are seen in present scenario.

RAPTOR CONSERVATION AND CULTURE IN PHILIPPINES

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The Philippines is a small country in the western rim of the Pacific Ocean about 4,600 miles from India. It is a small country, about twice the size of Nepal, or 1.5 times the size of Gujarat, about the same size as Maharashtra. However, it is not one solid block of land, it is composed of at least 7,107 islands scattered in one small area in the western Pacific.

It is very rich in bio-diversity with about 670 species of birds but no large mammals. So it has evolved to be one of the few areas in the world where the top predator is a bird – the Great Philippine Eagle.

Although the Philippines is an important link in the East Asian Oceanic Migration Flyway, no structured studies and counts have ever been conducted in the Philippines which presents a substantial gap of the Oceanic migration routes, of species and numbers on passage and wintering, ecology, etc.

But there is hope. With the involvement of the Philippines in the projects of the ARRCN, hopefully this "black hole" in raptor migration and conservation in the east will be a source of light for more intensive studies.

CONSERVING GYPS VULTURES IN CENTRAL GUJARAT: CONFLUENCE OF SCIENCE, AWARENESS AND ADVOCACY

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Gujarat, has a considerably good population of *Gyps bengalensis*, estimated at 577 in 2012, is an important state for vulture conservation in India. Ahmedabad and surrounding 100km radius area is one of the major pockets holding almost a third of this population. As the species is known to forage up to 100km from nest or roost site, it is crucial to safeguard the entire area. This is the central idea behind the creation of vulture safe zones (VSZ) of ca. 36,000sq.km, and central Gujarat is one such provisional VSZ proposed by the NGO - SAVE. We have monitored vulture populations in this area since 1999 and established a large volunteer network across all vulture nesting and feeding sites. In the last three years we have rescued 136 Gyps bengalensis in this region. The major problem is visceral gout caused by diclofenac and other toxic drugs, followed by severe injuries caused by string used for kite-flying kite. We have established a state-of-the-art veterinary facility in collaboration with Jivdaya Charitable Trust (NGO working for animal welfare) and State forest department. This facility has been a great help for treating > 100 vultures in the last three years. Through regular monitoring of vulture nests, vulture feeding sites and availability of non-steroidal anti Inflammatory drugs (NSAIDs), awareness programs, interactions with veterinarians, paravets and forest department, we have created an intense multidisciplinary network for vulture conservation. We have also pushed advocacy at state level with the chief wildlife warden, drug commissioner and director of animal husbandry and received support from these stakeholders. We have initiated distribution of vulture-safe drug meloxicam at a subsidized price, to actively phase out the use of human diclofenac formulations in the veterinary sector. Thus through scientific monitoring, awareness and advocacy we are making progress towards the creation of a vulture safe zone in central Gujarat.

FARMER'S PERCEPTION OF CROP DAMAGE BY RODENTS AND ECOSYSTEM SERVICES RENDERED BY OWLS: A SOCIAL SURVEY AND OUTREACH ACTIVITIES

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Farmers in the vicinity of the Kalakad Mundanthurai Tiger Reserve employ a traditional practice by erecting owl perches in paddy fields to rid them of rodents. The practice is in decline in recent times due to apprehensions on the absence of owls and due to availability of manual and conventional methods of rodent control. These methods are either expensive or may lead to secondary poisoning.

In order to understand the aforementioned interactions between forest dwelling owls and rodents in paddy fields, we conducted an ecological study on owl occurrence, their diet and rodent presence. The functionality of perches was evaluated with camera traps and by observing visits by owls. Here, we present the results of a questionnaire that was undertaken to understand the farmer's perception on benefits of owls, utility of owl perches, disservice caused by rodents and cost effective ways to control rodent populations. The questionnaire survey involved more than 100 farmers from the wet and dry cultivable areas. Additionally, outreach activities were organised to communicate the results of the survey.

More than 90% of the respondents reported financial loss due to rodent presence. Crop damage was restricted to a small period during the growth cycle, and, rodenticides were commonly used. A majority of the respondents felt owl perches and owls were partly beneficial, since they had not witnessed preying of rats by owls. Farmers were also more familiar with the smaller owls (owlet) than the larger owls that predominantly feed on rodents. Manual trapping was considered to be most effective since mortalities could be recorded but was considered to be expensive. In an attempt to further the understanding of the advantages of owls we organized a farmers meeting describing the effectiveness of the practice with suitable alternatives. Street plays on owls in paddyfields were perfomed by professional artists at three villages where owl occurrence was fairly common.

RESCUE AND REHABILITATION OF RAPTORS IN URBAN LANDSCAPES

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Raptors and other avian species are being constantly threatened by uncontrolled Urbanisation. During our work at an Ahmedabad based Bird Hospital, Jivdaya Charitable Trust, we found interesting similarities and trends in injuries and diseases among urban raptors. Frequently observed problems in raptors were; a) Head trauma, from vehicular accidents or by flying into glass panes, b) Secondary Poisoning from rat poisons and pesticides, c) Injuries by Kite-flying d) victims of Black magic, e) Electrocution. Winter is the breeding season for resident species and migratory season for many raptors. This coincides with a kite flying festival in Gujarat (14-15 January) wherein birds often get cut by glass-coated kite strings. During treatment of injured raptors in captivity, we have encountered diseases ranging from Fungal infections (Aspergillosis, Candidiasis), Bacterial infections (E. coli, Pseudomonas), Bumblefoot and Parasitic infestation (Serratospiculum, Coccidiosis,Capillaria, Trichomoniasis). Raptor species treated include 23 different species: White-rumped Vulture, Long-billed Vulture, Egyptian Vulture, Aquila eagles(4 species), Owls(6 species), Falcons(3 species), Kites(3 species), Buzzards(2 species), Shikra ,Eurasian Marsh Harrier.

A few of the case studies :

Treatment of Bumblefoot in a Peregrine Falcon: A Peregrine Falcon grounded by extensive damage to the left propatagium, developed stage 3 bumblefoot, after surgery and supportive treatment by new medication, the bird recovered from the Bumblefoot.

Successful restoration of the Right Patagium in an Indian Spotted Eagle: Severe damage to the patagium after being cut by kite-strings. The patagium was sutured back together. After 2 months of recuperation and physiotherapy the bird was released.

Treatment of Head Trauma/ Poisoning in a Common Buzzard: Common Buzzard with paralysis and head trauma, treated for poisioning,neurological and physiological problems. Recovered after 2 months of physiotherapy and flight excercises. Released back into the wild.

RELATIONS BETWEEN VULTURE AND PEOPLE IN THE WEST OF CHINA

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Vulture or Griffon (*Gyps fulvus*) is a gentle and low-profiled bird species in the world. Although it belongs to the raptors, it is unlike most other species in the same family in that it scavanges. It is highly respected in Buddhist culture, and is called the scavenger of nature – carrying out the sacred and noble duty of cleaning up nature every day. But from many decades in Tianshan, there has been over-gazing, marmot poisoning, extensive mining, poaching and egg-collecting by local people. This has adversely affected the breeding and roosting areas, and the population size of large vultures has declined sharply. We know Mongolians shepherds are highly influenced by Tibetan culture and Buddhism. In the past they practice sky burial when people died. When Tibetans moved out gradually, this practice also faced change. There were more and more ground burial and cremation. This affected directly the life of large carrion feeding birds such as vultures. We also observed that vultures appeared shortly after Yaks were killed by wolves, and shared the feast. Human population has increased and their activities have adversely affected wild ungulate habitat . In Xinjiang, the Islamic culture is against eating animals that are not slaughtered according to their ritual and do not eat animals that die naturally. This had helped the vultures in the past. Since the price of meat has increased sharply, Chinese people collect animals that died naturally. Some Han people that had no religious belief or moral standard would process these dead bodies into dry spicy meat for sale illegally. All these factors have reduced the food source directly and we found very few carcasses in the wild. One adult dead horse or yak can be eaten completely by vultures in less than a day. Due to competition, there will be nothing left for vultures to eat if they decide to wait until the carcasses decay. We have seen juvenile vultures fed mostly with fresh, still bloody meat and decayed meat was no longer included.

RAPTOR AND OTHER AVIAN ELECTROCUTIONS IN WESTERN RAJASTHAN, INDIA

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Providing electricity to communities in rural India is a government priority and in December 2011 we visited 11 kV distribution pole line sections in western Rajasthan to assess avian electrocutions. We visited 10 line sections consisting of 495 rural poles located south and west of Bikaner servicing farms and rural villages. These concrete poles were constructed with grounded metal crossarms and grounded pole top pin supports. We detected 159 bird carcasses under 103 structures, including 14 raptors consisting of Common Kestrels Falco tinnunculus (n=5), White-eyed Buzzards Butastur teesa (n=4), Tawny Eagles Aquila rapax (n=2), and three owl species. Although burn marks were visible on some birds, we did not conduct necropsies. During inspections 59 House Crow Corvus splendens carcasses were noted under 48 poles. Due to reports of H5N1 virus responsible for mass death of crows in Jharkhand, India, (1500km from our study sites) we inspected 131 poles in similar habitat without energized wires to help rule out disease as a significant causal factor. Only one carcass was discovered under these unenergized structures, a House Crow. This compares to one or more crows found under every 10.27 energized poles. A chi-square test confirmed our hypothesis that carcasses were more likely detected under energized lines ($X2 = 25.04$, $df = 1$, $P < 0.001$). Using AICc modeling, the number of jumpers and the height of the center insulator effectively predicted electrocution risk. Specifically, electrocution risk increased with an increasing number of jumpers, and increased when tangent structures had their center pins mounted lower to the grounded pole top.

ASSESSING COLLISION RISK IN WHITE-TAILED EAGLES HALIEAAETUS ALBICILLA USING LASER RANGE-FINDER TECHNOLOGY.

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Collision with power lines and wind turbines is a demonstrated cause of mortality in eagles. Appropriate siting and strategies to mitigate the effects of these developments in areas used by eagles' benefit from conservation advice based on accurate 3-dimensional flight-path monitoring of birds using the area over time.

To achieve this at a proposed wind farm site in Sweden we have employed a technique using binoculars fitted with laser range-finding and data storage capabilities to obtain flight location and height information along the flight routes of white-tailed eagles Halieaaetus albicilla and used the data to obtain turbine-specific collision risk estimates.

Here we describe; the field method used to obtain flight path and flying height information, how the field data was prepared for collision risk modelling, and explore the advantages and limitations of this technique and the range of situations where it could be effectively used.

CESTODE (PHYLUM: PLATYHELMINTHES) PARASITES OF INDIAN RAPTORS

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Cestoda or Cestoidea is the name given to a class of parasitic flatworms, commonly called tapeworms, of the phylum Platyhelminthes which are important internal parasites of vertebrates.

Its members live in the digestive tract of vertebrates as adults, and often in the bodies of various invertebrates as juveniles. All tapeworms spend the adult phase of their lives as parasites in the gut of a vertebrate animal (called the primary host). Most tapeworms spend part of their life cycle in the tissues of one or more other animals (called intermediate hosts) which may be vertebrates or arthropods. The cestode infection is a major cause of morbidity among host. The pathogenic effect of cestodes on animals is diverse as the parasites absorb a considerable amount of nutritive substances from the body of the host through their body surface.

Tapeworm infection is a major problem in birds. Heavily infested birds usually show impaired general conditions and are listless, apathetic with dull, ruffled plumage, loss of weight, anaemia and leg weakness. Cestode infections are responsible for significant chronic mortalities and poor growth that is reflected in low survival in affected birds.

In this paper, based on literature studies, we report the presence of 26 species of cestode parasites from three families of birds of prey from different states of India. The raptors harbouring the cestode parasites are represented by families such as Accipitridae, Falconidae and Strigidae. The tapeworm parasites are reported from *Milvus migrans, Circus assimilis, Hieraaetus pennatus, Gyps indicus, Neophron percnopterus, Torgos calvus, Butastur teesa, Accipiter badius* (Accipitridae); *Falco tinnunculus,Falco jugger* (Falconidae) and *Ketupa zeylonensis* and *Asio flammeus* (Strigidae). All the parasites were reported to be collected from the intestine of the host. We discuss in the Indian context, the importance of cestode infections in conservation management of raptors.

DETECTION OF AVIAN MALARIA BY *PLASMODIUM* LOOP-MEDIATED ISOTHERMAL AMPLIFICATION OF CONFISCATED HAWK-EAGLES IN THE YOGYAKARTA, INDONESIA

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Javan Hawk-eagle *Nisaetus bartelsi* and Changeable Hawk-eagle *Nisaetus cirrhatus* are illegally trapped and traded as pet birds in Indonesia. As part of law enforcement, birds are confiscated and released in the wild when possible.

We applied molecular identification to detect avian malaria in the confiscated raptors, which prior to release were kept in at the Natural Resource Conservantion Agency (Balai Konservasi Sumberdaya Daya Alam/BKSDA) Yogyakarta and Wildlife Rescue Center Yogyakarta . We used loop-mediated isothermal amplification (LAMP) to detect Plasmodium in the blood of the raptors. DNA samples were obtained from the blood of two Javan Hawk-eagles and four Changeable Hawk-eagles. The primers and the condition of the LAMP reaction followed the protocol for amplification of genus specific Plasmodium for human malaria. The incubation was run using water bath, in 60°C for 60 minutes. The amplicon was separated in 3% agarose gel and visualized under UV light. The visualization of the amplicon indicated that a Javan Hawk-eagle and a Changeable Hawk-eagle were positively infected.

Since naturally the mountain raptors are not infected by the avian malaria, a low-land disease, further clinical examination for the infected bird is required. The released bird may introduce new diseases into the wild population; hence such studies are necessary to prevent further spread of the disease in wild populations.

The result of the study also suggested that LAMP may provide a simple, reliable and economical tool to screen or detect for avian malaria, in comparison with nested PCR or microscopy assay.

POTENTIAL THREATS TO THE BARN OWL (*TYTO ALBA*) IN YOGYAKARTA PROVINCE, INDONESIA

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In Indonesia, especially in Yogyakarta Province, it has become difficult to find the Barn Owl (***Tyto alba***) living amongst humans. The species plays an important role in ecosystems by controlling populations of rats, which are an agricultural pest and a vector of leptospirosis epidemic. In urban areas, the Barn Owl occupies cavities in buildings. But unfortunately, its ecological roles are not well understood. Consequently, people hunt the birds and renovate existing buildings regardless of their presence in the building. This research focused on the characteristics of the species, behavior, and the impact of renovation on their lifecycle.

Methods used during this research were direct observation, literature search and interviews. I found that: 1) Barn Owls build their nests in broken ceilings, 2) the birds choose strategic places to choose nests, 3) renovation negatively impacts the species and could potentially affect its population, and 4) from our interview, most people (60%) are not aware of the importance of their ecological role. Nest-boxes can be a solution to this problem.

Hence, we conducted a workshop for farmers in the Yogyakarta Province to demonstrate how to prepare and set up nest-boxes.

ENVIRONMENTAL CONTAMINANTS IN RAPTORS AND REPORTED MORTALITIES: A LOOK AT THE SAARC SCENARIO

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Post Minamata episode, "Silent spring" and incidences of egg shell thinning, assessing environmental contaminants in wild species were felt strongly required by the scientific community across the world. Subsequently laboratory works bloomed, followed by residue analysis in wild specimens. Though fishes have been favourable test organisms for such research works in laboratories, especially bioassays, birds also have been gaining momentum due to their position in the food chain and the likely transport of chemical residues to them through the various trophic levels. Raptors are good indicators because they often hunt for injured or sick prey in farms and fields, where applications of agro-chemicals occur. There have been some classical studies across the world in which certain raptor species population crashed due to environmental contaminants; for example Bald Eagle due to DDT, and the California Condor partly due to lead poisoning; poaching and habitat destruction being the other reasons.

The present attempt is to collate studies on various environmental contaminants in different raptor species reported from SAARC (spell out first time) countries, and make a critical analysis of the present state of knowledge and information on reported level of environmental contaminants in various raptor species, and reported mortalities. Papers published from SAARC countries include those from India, Pakistan, Vietnam, Nepal and Bangladesh on various raptor species; Bald Eagle (*Haliaeetus leucocephalus*), White-backed Vulture (*Gyps bengalensis*), Long-billed Vulture (*Gyps indicus*), Egyptian Vulture (*Neophron percnopterus*), Griffon Vulture (*Gyps fulvus*), Indian Eagle Owl (*Bubo bengalensis*), Himalayan Grey-headed Fishing Eagle (*Ichthyophaga humilis plumbeus*), Common Kestrel (*Falco tinnunculus*), Peregrine Falcon (*Falco peregrinus*) and Spotted Owlet (*Athene brama*) are the prominent ones. The contaminants studied in species are non-steroidal anti-inflammatory drugs (NSAID) Diclofenac, several Persistent Organic Pollutants (POPs), and heavy metals (e.g. Pb). While much emphasis has been given in assessing the levels of drugs such as Diclofenac, relatively lesser emphasis was given in measuring levels of other environmental contaminants, POPs etc. Of all the nations that recorded raptor mortality, India has witnessed largest number of reported scientific investigations. Persistent Organochlorine Pesticide residues in tissues and eggs of White-backed Vultures from different locations were reported.

The catastrophic decline of Gyps vultures in last three decades is one of the most important examples of how a simple drug can drag species to extinction levels. The identification of the causative agents for the decline also brings out the intricate, but subtle, relation between human activities and wild species that rarely has obvious and explicit direct interaction with humans; the insidious exposure through food chain. Three species of Gyps vultures namely *G. bengalensis, G. indicus* and *G. tenuirostris* suffered a 99% population fall in Indian sub-continent since 1990s due to exposure to Diclofenac, which resulted in kidney failure and subsequent death. Other NSAIDs were also found to be toxic, to *Gyps* as well as other birds such as Storks. During 2000 to 2007, annual decline rates in India averaged 44%. Similarly, among Persistent Inorganic Pollutants (PIPs) reported from Pakistan, feather samples had shown significantly higher levels of Cd, Zn, Ni, and Pb suggesting higher ability of falcons to accumulate metals from the environment through the food chain. A study of opportunistic carcasses of several bird species in south India showed spotted owlet (*A. brama*), contained considerable concentrations of PCBs compared to other non raptor species suggesting need of further studies on OC contamination with special reference to raptorial birds. Though there have been several cases of reported mortalities, and catastrophic declines of raptor species, lack of an organized and comprehensive compilation gave us the impetus for such a collation and discussion in this larger platform. The need for greater emphasis on assessing the levels of other residues of Persistent Inorganic Chemicals (PIPs) and POPs is also felt.

CONFERENCE FOR STUDENTS

GLOBAL RAPTOR CONSERVATION IN THE 21ST CENTURY: LESSONS FROM THE PAST, CHALLENGES AHEAD

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The Peregrine Fund has conducted raptor conservation projects worldwide for over 40 years. Key to success is a scientific understanding of the species' status and factors limiting its distribution and abundance. This requires quantitative study of the species' population ecology and behavior which typically precede conservation intervention. If the species is in decline, the cause should be resolved before conservation can be successful but, in some cases, experimental restoration may be initiated even before the cause is known and reintroduced birds studied to learn what factors limit their survival. A well-defined and achievable conservation goal helps to focus effort on conservation actions that will make a difference. Actions must be adapted to the goal, and have usually involved restoration through captive breeding and release of critically endangered species, habitat protection, and public awareness to change human behaviors such as shooting and misuse of pesticides, poisons, or drugs. Sufficient funding over time is one of the most important resources needed, but talent and skill are just as important and often overlooked. Talent includes people with the knowledge, experience, passion, drive, and determination to be successful. Developing skill locally is important, but finding the right mix of knowledge and passion is often difficult. Other useful elements include organizational support, a method for annually evaluating results, and a strategy that includes adaptive management of the project as new information is gained. We have found that working collaboratively with people who may be responsible for the species' demise produces better, long-term results than confrontation and litigation, and a cooperative philosophy also appeals to land owners and financial donors whose support is often needed. Laws can be detrimental to conservation results, even if they were intended to be beneficial. I conclude with an evaluation of raptor conservation challenges ahead to help guide new conservation and research efforts.

SUBURBAN RED-SHOULDERED HAWKS: REPRODUCTION, SURVIVAL, AND BEHAVIOR

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Red-shouldered Hawks (*Buteo lineatus*) inhabit the suburban areas surrounding the city of Cincinnati, Ohio, U.S.A. We used banding (ringing) to study the reproductive rate and survival of this population for 17 years. In 2011-2012, we also used time-lapse video cameras to record behavior from egg-laying to fledging. We found that reproductive rate of the suburban birds was relatively high, 1.5 ± 0.2 young per active nest, not significantly different from a population of Red-shouldered Hawks in a typical, forested rural habitat near Cincinnati. Using video-recording, we found that egg-laying interval between subsequent eggs was 2.9 ± 0.1 d. Hatch interval was 0.56 d between the first and second young hatched, 1.24 d between the second and third hatched, and 2.42 d between the third and fourth hatched. The differences between laying intervals and hatching intervals were influenced by incubation behavior: most birds incubated part of the time after the laying of the first egg and started full incubation with the laying of the penultimate egg. We also found that nestling behaviors in the second and third week after hatching differed by hatch rank. First-hatched young were significantly more aggressive and consumed more food than their younger siblings. No nestlings were directly killed by siblings, but several last-hatched young starved, and predators including Great Horned Owls (*Bubo virginianus*) and raccoons (*Procyon lotor*) reduced reproductive success at other nests.

POSTERS

A FIELD STUDY ON THE WINTERING ECOLOGY AND BEHAVIOUR OF HARRIERS IN PENINSULAR MALAYSIA.

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A field study on the ecology and behavior of harriers wintering in Changkat Lada (N 4.0789°, E 100.9233°), Perak state, Peninsular Malaysia was conducted from 10 December 2011 to 8 April 2012. Changkat Lada is located in the Seberang Perak agricultural estate of mixed croplands that includes 4,700 ha of paddy *Oryza sativa* fields. The study aimed to investigate the characteristics of the harrier roost and the species utilizing it, their behavior and the threats they face at the study site. The roost was bordered on the east and south by roads and on the west by irrigation canals and an oil palm *Elaeis guineensis* plantation. The roost habitat was paddy fields at progressive stages of the crop cycle and oil palm plantation. Harriers shifted their roost site in response to the paddy planting activities and chose to roost in the undisturbed fields and oil palms when harvesting and burning took place. Eastern Marsh-harrier *Circus spilonotus* and Pied Harrier *C. melanoleucos* roosted communally in one main roost, with secondary roosts of small numbers of harriers sometimes present nearby. Arriving harriers initially gathered and circled around until almost dark when they would finally fly into the roost. Counts of all harriers at the roost recorded a maximum of 178 harriers, establishing this roost as the largest currently known in Peninsular Malaysia. Intra-specific and inter-specific aggressive behavior, involving mostly pursuits for prey items and disputes over hunting territory and perches, were observed in both harrier species. Similar antagonistic behavior was also noted between harriers and other migrant and resident raptors present in the area. Harriers were seen feeding on dead rodents and thus may potentially face the risk of secondary pesticide poisoning.

WHAT IS NEW IN (ASIAN) RAPTOR TAXONOMY?

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The dramatic increase in data on phylogenetic relationship by techniques that directly compare DNA sequences led especially during the last decade to a largely final classification in birds. The interpretation of genetic data for implementation into a classification is a rapidly evolving field. Since the publication of the "Handbook of birds of the world" several markedly changes in birds of prey systematics and taxonomy happened. After many years of uncertainty about higher-level relationships among birds of prey, DNA-based research has brought some clarity. Well supported is that the falcons are not related to the traditional order Falconiformes, but rather to the song birds (Passeriformes) and parrots (Psittaciformes). The falcons now form an own order (Falconiformes), whereas all the other birds of prey (eagles, hawks, buzzards etc.) belong to the order Accipitriformes. Within this accipitriforms, the osprey and secretary-bird are the sister groups of all the remaining accipitrids. On fine-taxonomy-level remarkable changes were conducted, for example within the booted eagles, the snake-eagle group and the buzzards. However, still widely unresolved are the relationships within the accipiters. Not only changes in scientific names on genus and species level were concerned, but also their position within the systematical order. An overview about these changes is given and discussed under special consideration of Asian taxa.

GENETIC STRUCTURE AND PHYLOGEOGRAPHY OF THE GOLDEN EAGLE (*AQUILA CHRYSAETOS*).

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The Golden eagle (*Aquila chrysaetos*) is one of the most emblematic and charismatic raptor species. It is also among the most widespread birds of prey, covering basically the whole Palaearctic from Europe and North-Africa through Asia until Japan, to the North-American continent. Although, largely due its wide distribution, not endangered as a species (IUCN-status: Least Concern), Golden eagles have undergone local anthropogenic extirpation and bottlenecks in the 19th and early 20th centuries. Yet, only few studies have addressed the species' genetic structure and the consequences of its demographic history so far, and none of them have covered larger areas of the distribution range. Our present study aims at closing this gap. Based on more than 400 samples (mostly feathers collected in the field or from museum collections) across the species' distribution and ranging back in time to the first half of the 19th century we want to uncover the phylogeography of the Golden eagle, but also to investigate possible genetic consequences of the species' bottleneck(s) by comparing genetic diversity of historical and modern Golden eagle populations using DNA sequences of the mitochondrial control region. The analyses are ongoing, but first results based on some 140 sequences (which yielded 18 haplotypes) suggest a phylogeographic split between two groups, one comprising mainly samples from Asia, northern Europe, and North America and the other one those of central-southern Europe. Comparison of old and recent samples has shown that single haplotypes may have been lost in the wake of the above-mentioned bottlenecks, but the majority of haplotypes found in historical samples is still present in the Golden eagle's extant gene pool.

AMUR FALCON AT DOYANG, NAGALAND WHERE HUNTING IS NOW HISTORY!

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The Amur Falcon (*Falco amurensis*) breeds in south-eastern Siberia and Northern China along the banks of Amur River and winters in Southern Africa. They roost in Pangti, Ashaa and Sungro villages near Doyang river dam, Wokha district of Nagaland, in North-East India for a month before proceeding to Africa. It is an elliptical migrant, with the southbound route over the Arabian Sea and the return route largely over land, with the total distance of 22000 kilometers!Every year, more than 100,000 Amur Falcons were hunted for food at Nagaland during passage. They were either captured with nets or killed and sold in the markets for Rs 30 per bird at Wokha town to Rs 60-100 in Kohima and Dimapur markets.
Mr. Rokohebi Kuotsu , who was conducting the Amur falcon census informed that this year the falcons had arrived in October. 50-60 birds were sighted initially and their numbers had gone up to a hundreds of thousands. Following reports of persecution and slaughter of the falcons in large numbers in 2011-12, a Rapid Action Project (RAP) was created by the Natural Nagas and WTI (Wildlife Trust of India) to assist the state Forest Department to protect the falcons. Amur Falcon Protection Squad (AFPS), a group of former hunters assisted the Nagaland Forest Department staff in patrolling. In Assam, the NGO's Wild Flowers and Green Guard were working to protect the falcons. NWBCT (Nagaland Wildlife & Biodiversity Conservation Trust) and Conservation India were running eco clubs in local schools. The students had pledged not to hunt or kill wild animals and became "Amur Ambassadors". Ronchamo Shitiri, Chairman of the Pangti village council proudly said, "The village councils have declared hunting of Amur falcons illegal in their jurisdiction, imposing a fine of 5000 rupees on offenders".

Amur Falcon is an insectivorous raptor, devouring up to 200 termites and locusts in an hour, which are found in plenty around the dense forest around Pangti, hence the falcons actually protect the local crops, a point that was used for conservation education. T Lotha, Chief Wildlife Warden, Nagaland has declared, "Nagaland is a safe haven for Amur falcons, This year too, millions have Amur Falcons had arrived in the Doyang roosting area, and working together with local communities, police, administration, Forest Department and NGOs, we ensured that no killing takes place. We shall continue our efforts to improve the economic status of the local people, for long term protection of the falcons".

IMPACT OF HUMAN ACTIVITIES ON VULTURES IN UTTAR PRADESH AND MADHYA PRADESH, INDIA

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Homo sapiens, the most civilized of all animals has left no living species unaffected. Despite the legal protection given to vultures by the Wildlife Protection Act, The Action plan for vulture conservation and the many awareness generation measures, the Skylords still fail to have a concerned heart in their fight for survival. The impact of human activities on vultures was studied in Uttar Pradesh and Madhya Pradesh since 2008 and the same is in continuation. There had been various incidences when the Nature's cleaners paid the price for human negligence. There was a gradual drop in the breeding success of vultures in Tikamgarh (M.P.) in 2009-2011. The reason for such a fall was the maintenance of monuments that started with the start of breeding season. Moreover the disturbance caused during the shooting of the Hollywood movie Singularity in April 2011 added to the threats to the critically endangered vultures. The superstitions also disturbed the scavengers. During the festive season the anthropogenic activities increase disturbances. On 17th February 2010 in Uttar Pradesh in Laxmipur range of the Maharajganj forest area, in a train accident, 30 Oriental White-backed vultures lost their life. The sites in Lalitpur on the other hand are being disturbed due to the encroachment of cliffs by *sadhus* (saints). The site is disturbed due to the collection of wood for cooking as well as the smoke that arises due to cooking. Logging and mining are two major reasons for deforestation. The areas dotted with densely forested hills are now left with just barren and badly bruised mounds. Stone mining and blasting; not only scares vultures, but other birds too. Monitoring the existing vulture sites with co-ordination between various departments is extremely significant. Conducting population surveys and reviewing them periodically is also vital to know if these populations are self sustaining or not. The ongoing population estimation studies along with ranging patterns, foraging movements and protection of existing colonies will ensure breeding success in the wild. People need to be made more aware of the ongoing crisis and the steps they need to take for conservation.

NYLON KITE STRING ... AN EMERGING THREAT TO RAPTOR CONSERVATION IN INDIA

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Society for Wildlife Conservation, Education and Research (Wild-CER) is a registered conservation organization located in Nagpur, Maharashtra. Being mainly involved in the rescue and rehabilitation of the wild animals for more than one and half decade, we are trying to resolve the man animal conflict issues in and around Nagpur, India.

In 2012, Wild-CER rescued 25 raptors involving 10 species which included Shikra (*Accipeter badius*) 44%, Barn owl (*Tyto alba*) 16%, Black kite (*Milvus migrans*) 12% and Indian Eagle Owl (*Bubo bengalensis*) 4% etc. The most common reason for the rescue was nylon kite string (36%) followed by nest fall (24%), starvation (8%) and unknown reasons (8%). Human induced injuries contributed 64% while 36% cases were due to natural reasons. Out of all the species rescued, 60% species were affected because of the nylon kite string popularly known as Chinese *manja* in India. Rescue calls arrived before the beginning of the kite festival (Mid January), when they peaked but continued throughout the year when they again peaked in the monsoon. The festival of Makar Sankranti is celebrated widely throughout India as Kite Festival on 14th January every year. Low price and easy availability of nylon kite string has made it a popular instrument for the kite festival. Nylon kite string does not decompose easily and hangs on the trees and eventually causes fatal injuries to the birds, many times resulting in their death due to strangulation or starvation.

Out of all the rescued raptors, 64% were released in the wild while 36% succumbed to their injuries.

NESTING BEHAVIOUR OF BLACK KITE (*MILVUS MIGRANS*) IN URBAN AND SEMI-URBAN HABITATS IN AND AROUND PUNE CITY.

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Black Kite (*Milvus migrans*) is one of the commonest raptors found in urban habitats. It is a scavenger as well as a hunter and is usually seen on the garbage dumps in cities. Even though Black Kite is widely present all over India, very little is known about its nesting ecology. We conducted a study based on line transects to understand the basic nesting ecology of this raptor. During this study 27 line transects of 1 km length were carried out over two breeding seasons. Out of 27 line transects, 21 were conducted in urban while 6 were conducted in semi-urban habitats in and around Pune city to record the nests and their features. Urban habitats with water-body showed maximum number of nests as compared to the other habitats. On an average 2 to 3 nests were reported in a transect. The distance between adjacent nests varied with the number of nests within a transect. Black Kites were observed to build their nests on the trees, mobile towers as well as on the street light poles. They were also found to re-use the same nest for subsequent breeding seasons. Nests were found on various tree species, the most common nesting tree being *Ficus religiosa* (36.5%).

Preliminary findings from the nest monitoring of the cliff nesting Indian Vulture *Gyps indicus* using motion sensing camera: The First Asian Study.

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Indian Vulture *Gyps indicus* is a cliff nesting species. Their populations have globally crashed by 95 to 99 % in the past decade. However, there are some sites in Maharashtra where these vultures continue to breed till date. No data for this species is available on the behavior of the parents and the nestling during the breeding period. Their nests are on high ledges in cliffs on vertical surfaces of mountains like the Western Ghats and hence the nests are not easily accessible.

In order to understand their behavior while the chick is in the nest, we deployed a motion sensing camera over two different nests in a cliff face in Pune district, Maharashtra, India with the collaboration of the Maharashtra State Forest Department. The cliff was accessed with the help of mountain climbing experts and the camera was fitted when the parent vulture was not in the nest. More than 80,000 photographs were obtained. The data was stored in a digital card within the camera.

The preliminary results from this monitoring conducted over a period of two years (2011-12 and 2012-13) are presented in this poster. This is probably the first such study for this species in Asia. The behavior of the nestling (preening, standing, eating, interacting with parents, wing flapping, resting and sleeping, etc.), the behavior of the parents (sentinel, feeding, self preening, preening the chick, perching, etc.), the day and night variations in the temperature, vultures' response to sunlight, nocturnal and diurnal activity will be photographically presented. This ethological data will be useful for scientific management of the conservation efforts.

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INVITATION

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Chumphon province, near the Isthmus of Kra, Southern Thailand has, since 2001, been recognized as major center for bird watchers, nature lovers, wildlife photographers and conservationists.

Its main attraction is provided by the spectacular diurnal migration of over a quarter million raptors of at least 25 species that takes place each spring and autumn along the Thai-Malay Peninsula. Additionally, the site is increasingly recognized, through banding studies, as an important observatory for a much wider range of land bird migrants, including warblers, flycatchers and others.

The principal observation site is a 310 meters elevation ridge, less than 1 km from the coast, on the steep mountain of Khao Dinsor, where many birds pass at eye-level. Chumphon Provincial Government recognizes the site's significance, and thanks to the dedication and commitment of Chukiat Nualsri, the local official who first discovered the flyway, has funded the construction of a Bird Migration Research Center, where both Thai and visiting overseas researchers, and thousands of visitors, come to study the migration.

Migratory birds play a major role as global ambassadors for international cooperation since their conservation depends upon collaboration among flyway countries. Their survival is a delicate balancing act-they make annual, continent-spanning round trips of thousands of km, and fit their remarkable journeys into an annual cycle that encompasses breeding and molt, dodging the many hazards as they go. Populations of many migratory birds are declining due to an increasing range of threats: hunting, habitat destruction and global climate change caused by the expanding human population. Their study and conservation therefore assumes added urgency.

We thank 2014 ARRCN International Symposium Organizing Committee for providing us the time to invite you to join us for the next ARRCN International Symposium in October 2015 in Chumphon, Thailand.

Y. Nitani

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