

ORAL PRESENTATIONS

Monitoring the behaviour of juvenile Powerful Owls *Ninox strenua* in Melbourne, Australia

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The Powerful Owl *Ninox strenua* is Australia's largest owl. Considering their large size they are a very cryptic species, with limited sexual dimorphism, silent flight and a highly camouflaged presence amongst secluded canopy vegetation. These features enable Powerful Owl presence to often go unnoticed and even for the trained eye, extremely difficult to study. Our research has focused on monitoring the behaviour of individual Powerful Owls in urban Melbourne, Australia. The leg banding of Powerful Owls is a somewhat contentious issue in Australia and here we report on the suitability of different types of legs bands placed on the tarsus of juvenile Powerful Owls. There has been some debate over the band size that should be used and the consequent effects bands may pose for the owls as they mature. We also investigate the usefulness of bands as a technique to identify Powerful Owls once they have dispersed from the natal territory. Radio-tracking juvenile Powerful Owls was also undertaken during this study, primarily to determine individual behaviour from post fledging until dispersal. This is the first study in Australia to attempt radio-tracking juvenile Powerful Owls and the results from this research highlight behavioural characteristics, mortality rates post fledging and dispersal movements for the twelve months post fledging. Radio-transmitters were also attached to adult female Powerful Owls to determine breeding behaviour, hunting movements and territory use during and post breeding seasons. Overall we found that aluminium legs bands are a useful tool for individual identification of juvenile Powerful Owls post fledging, however, their presence is somewhat difficult to determine on mature adults as the tarsus feathers tend to cover the band and make vision from the ground difficult. Aluminium leg bands are also useful as an identification tool for deceased birds. Leather leg bands are more suitable than aluminium bands when attaching radio-transmitters as these provide more flexibility and can be removed by the owl if they become irritating. Radio-tracking juvenile Powerful Owls provided invaluable information relating to juvenile behaviour and movements, showing that juveniles actually remain in territories adjacent to their natal territory for the twelve months post fledging. This information is vital for the successful conservation of this species, particularly in relation to habitat conservation and home range modelling.

Breeding ecology of the Javan Hawk Eagle *Spizaetus bartelsi* at Telaga Warna Nature Reserve, west Java, Indonesia

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The Javan Hawk Eagle *Spizaetus bartelsi* belongs to the hawk eagle family and is endemic to Java, Indonesia. This species has been classified as endangered species according to Appendix II of CITES. This paper presents the results of research during its breeding season (December 2004–2005) in Gunung Baud (Mt. Baud) Telaga Warna Nature Reserve (06°41'15.8" S – 106°59'59.6" E). I studied an occupied nest, placed on a primary branch of a tree *Quercus* sp. at the height of 40 m above the ground. The

ecological behaviour recorded were adult pairing, nest territory maintenance, nest construction, egg-laying, incubation, hatching, feeding, chick development, fledgling period and hunting by the adults. The method used to record the behaviour was through visual observations from a blind placed at a height of about 30 m above the ground. The distance to the nest was about 50 m. Observations were conducted twice a week on the pair of hawk eagle.

Factors influencing the abundance and behaviour of Egyptian Vulture *Neophron percnopterus ginginianus* in and around Churu city, Rajasthan, India

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The Egyptian Vulture *Neophron percnopterus ginginianus* preferentially roosts and breeds on cliffs. Unfortunately, the area in and around Churu city of Rajasthan does not have cliffs. It is a semi-arid area having scarce vegetation and sand dunes. Egyptian vulture is quite adaptive to such an adverse environment as the towns of this area have big old vacant buildings, which the vultures used for roosting and nesting. Other sites used for day roosting were high-tension electric poles, boundary walls and vertical stone bars used for fencing agriculture fields. The desert tree Khejadi *Prosopis cineraria* that grow well in the arid zone of Rajasthan, was also used by the vultures for roosting. The population of cattle is scarce due to the shortage of fodder, and therefore, the availability of carcasses is limited. However, one or two dead cattle per week were available for the vultures to feed on. Due to the scarcity of carcasses the vultures sometimes feed on vegetative material. The Egyptian Vulture was observed to feed on fried bread, human excreta and waste at the municipal dumping stations near Churu city, as well as some bone pieces at the cremation centre. We observed a sizable vulture population ranging from 10 to 55 birds in and around Churu city. The population consisted of adults, sub adults and juveniles in the ratio of 3:5:2. A considerable number of sub-adults indicate that the vultures have adapted to this environment. Egyptian Vultures are cliff nesters but in the absence of this preferred nesting site around Churu city, they build nests in todas cavities of old deserted buildings and on old Khejadi trees. We studied two nests built in the cavities of old deserted buildings of Ratan Nagar (Churu). The nest of sticks was lined with rags, fur, cotton wool and was cemented with droppings. Two eggs were laid and incubated for about 46 days by both parents. Only one nestling hatched from the two eggs. The nestling was cared for by the parent for about four weeks. Dead rats, pigeons and crows were seen in the nest for feeding to the developing nestling. The male brought food and left it in the nest, but feeding of the nestling was done by the female. The young fledged after 80 days, but returned to the nest for roosting. The significance of the role of the Egyptian Vultures in scavenging dead animals is discussed, in the light of the catastrophic collapse of Indian White-backed Vulture *Gyps bengalensis* and Long-billed Vulture *Gyps indicus* populations.

Habitat use and breeding ecology of Black Eagle *Ictinaetus malayensis* in northern Taiwan

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Indian Black Eagle *Ictinaetus malayensis* is distributed widely and sparsely in Taiwan. It is adapted to forests with varying degrees of human disturbance. From 2002 to 2005, a study on the ecology of Indian Black Eagle was conducted in three types of forests to survey its habitat use: primary old-growth forest, partly fragmented secondary forest and heavily fragmented forest. Indian Black Eagle could live all year round and breed in the former two forest types, but could live only part of the year and did not breed in the

third forest type. In spring 2004, a nest located in the center of a big fern on a tall tree, was found at Fu-Shan Reserve, northeastern Taiwan, where a single chick was raised. A radio-transmitted charge coupled device camera (CCD camera) was installed near the nest to record the nestling's growth and parental care activity. In 120 hours of video recording, 20 food-prey records were obtained, including Spinous Country-rat *Niviventer coxingi*, Formosan Hairy-footed Flying Squirrel *Belomys pearsonii*, Red-bellied Tree Squirrel *Callosciurus erythraeus*, Formosan Giant Flying Squirrel *Petaurista philippensis*, some reptiles and snakes. By analyzing collected pellets, Spinous Country-rat and Formosan Hairy-footed Flying Squirrel were found to be the main food items. Three pellets containing bird egg shells indicated the nest-robbing behavior of the eagles. During the breeding season, Large-billed Crow *Corvus macrorhynchos* and Formosan Macaque *Macaca cyclopis* were the two most dangerous threats to the nestling. After fledging, the eaglet still relied on food supply from its parents for about three months. In spring 2005 another breeding case was observed at Hsinchu County, northwestern Taiwan. In this case, two eaglets successfully fledged from the nest. This is the first recorded evidence in Taiwan that Indian Black Eagle could raise two eaglets in one brood.

Monitoring the breeding behaviour of Javan Hawk Eagle *Spizaetus bartelsi* using camera surveillance (CCTV), at Ciasem-Tangkuban Perahu Nature Reserve, west Java, Indonesia

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One of the important periods in the life cycle of the Javan Hawk Eagle *Spizaetus bartelsi* is its breeding period. However, during this period the eagles are very sensitive to any kind of disturbance from human activities including observation of its breeding behaviour by researchers. To eliminate human disturbance during this period, observation on the breeding behavior of a breeding pair of Javan Hawk Eagle on Panaruban-Tangkuban Perahu mountain in the Ciasem-Tangkuban Perahu Nature Reserve was conducted by using closed circuit surveillance camera (CCTV) method. Two surveillance cameras were installed on a tree adjacent to the nest with each camera located at distances of about 20 m and 50 m respectively, from the nest. Each camera was wire-connected to a monitor screen and recorder at our base camp located 500 m from the nest tree. Electricity to operate the camera surveillance, was generated using an environmentally-friendly electric power in the form of *picohydro* was built using water debit from Ciasem river, near the nest area. The camera installation was carried out on 24-25 May 2003, before the egg-laying period and intensive continuous monitoring was carried out through camera surveillance for three months from May until August 2003.

Habitat use of raptors at Lambir, Niah and Similajau National Parks, Sarawak, Malaysia and implications on their conservation

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Observations on raptors were carried out during an interdisciplinary survey of wildlife and birds at the Lambir, Niah and Similajau National Parks in Sarawak, East Malaysia (Borneo) from 8 July to 30 August 2002. A total of 12 species of raptors were recorded in various types of forests. The habitat types in which these raptors were found is discussed. Of particular interest and concern are three raptor species, Lesser

Fish-eagle *Ichthyophaga humilis*, Grey-headed Fish-eagle *I. ichthyaetus* and Wallace's Hawk Eagle *Spizaetus nanus*, two of which were found to utilise both protected contiguous forest inside, as well as degraded forest outside two National Parks. A preliminary assessment on the threats to the raptor species is presented. Although *S. nanus* utilised degraded and modified habitats in both protected and none protected forests at two of the areas during the day time, it was found to return to contiguous habitats in the evening. The presence of Wallace's Hawk Eagle juveniles, suggests that this species uses the protected lowland forest for breeding and roosting purposes. Implications on the long-term utilisation of unprotected habitats by raptors outside the National Parks, and on their continued survival are discussed. Some measures are suggested for the conservation of these raptors.

Workshop 1: Raptor Migration Study Technique

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Raptor Migration Study Techniques: the surface watch

What is Raptor Migration?

What spurs migration?
Migration types
Timetable for migration
The tactic of raptor migration
Raptor migration in Asia

The Study of Raptor Migration

Two main aims: Monitoring & Tracking
Monitoring: to understand the species and their population scales
Tracking: to understand the routes they utilize
The Study Techniques: surface watch, aerial tracking, radar detection, banding & marking, radio tracking, satellite tracking, biochemical analysis, etc.

Surface watch: the most popular method

Fundamental requirement: good sites, man power, available time
Advantage and drawback
Extra benefit: best place for public education

Surface Watch Technique: preliminary works

How to find good sites: map judgments, test survey, approaching the best ones
Organising your local investigation team; Scheduling your observations
Designing your investigation method and recording form

Surface Watch Techniques: equipments and tools

Binoculars, telescope, digital camera with long lens, DV, etc.
Field guides, sunglasses, appropriate dress, hat, sun lotion, insect repellent, etc.
Handheld counter, compass, handheld transceiver, mobile phone

Surface Watch Techniques: field investigation

How to search raptors
The first step, when you find a raptor
How to identify the raptors, how to count the raptors; how to record your observations, weather factors: wind, cloud, etc.

Surface Watch Techniques: post-investigation works

Data compilation and analysis

Broadcast your result, exchange data with other teams
Building a nationwide cooperative network
Link to the international world

The nocturnal hunting behaviour of a diurnal raptor, the Peregrine Falcon, in southern Taiwan

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This is the first report of the nocturnal hunting activity of a “diurnal” raptor. From December 2004 to May 2005, we monitored the top of a bridge tower 183.5 m high in southern Taiwan that was used by Peregrine Falcons *Falco peregrinus* as a plucking and feeding site. Using four camcorders running continuously to cover all four sides of the tower, we obtained 140 hours of recordings containing Peregrine Falcons and their prey. The time of day Peregrine Falcons returned to the tower showed a bimodal frequency pattern, one peak between 05h00 and 09h00, the second one between 19h00 and 23h00. The tower also served as a storage site where Peregrine Falcons returned to consume left-over prey previously brought back. During the 140 hours, at least three Peregrine Falcons brought back 44 prey, 79.5% of them were between 19h00 and 22h00, while only 20.5% were brought back during day-light hours. The prey items were usually either alive or freshly killed when they were brought back. This shows that these Peregrine Falcons in southern Taiwan were actively hunting during the day and especially at night. There was an apparent shift of the peak prey capture time from day-light hours to evening hours by these Peregrine Falcons. This was probably an adaptation to the artificial lighting along the bridge throughout the night, plus the advantage of the semi-darkness which very likely decreased the detection of the Peregrine Falcons by their prey.

Observations on the Black Eagle *Ictinaetus malayensis* in Plawangan-Turgo Nature Reserve, Gunung Merapi mountain, Indonesia

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Plawangan–Turgo Nature Reserve, located at the Gunung Merapi mountain in Java, supports more than 100 species of birds including seven resident raptors. Similarly, Plawangan–Turgo Nature Reserve faces potential threats such as habitat destruction and hunting. A pair of Black Eagle *Ictinaetus malayensis* was monitored on May 2004 and the pair was seen taking care of a chick, estimated to be about 28 days old. Previous observations by students from Gadjah Mada University began in 2000, reported that three chicks were stolen from the nest. We held regular nest observations to guard and prevent the chick from being stolen and at the same time collect ecological information about the species. Nesting information collected from this activity can support the conservation of this species as well as other raptor in the Plawangan–Turgo Nature Reserve. Regular observations by volunteers were conducted using binoculars and monoculars from a vantage point and information recorded in standardised data sheets. A total of 53 days were spent in field observing its nesting ecology and the chick’s activities.

Workshop 2: Raptor Migration and Satellite Tracking

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Satellite-Tracking the Migration of Hawks in East Asia

3 A study was carried out to track the migration of Grey-faced Buzzard *Butastur indicus* and Oriental Honey-buzzard *Pernis ptilorhynchus* via satellite. To relay bird locations, platform transmitter terminals (PTTs) were employed in combination with ARGOS satellites. Location data were then used in a variety of applications, from determining migration routes, stopover patterns and wintering sites, through habitat use, differential migration patterns between adults and juvenile birds, and climatological effects on migration. The migration route of Oriental Honey-buzzards differs from that of Grey-faced Buzzards. In autumn, Grey-faced Buzzards migrated through the South-west islands of Japan down to Taiwan and the Philippines. Honey-buzzards on the other hand, take remarkably detoured migration routes to reach Indonesia or the Philippines. Moreover, their migration routes are largely different between autumn and spring (see figure on left). The reasons for the migration routes differences between the two buzzard species are not well known. Differences in food habits (amphibians and reptiles in Grey-faced Buzzards and wasps and bees in Honey-buzzards) may be involved. Wasps and bees are scarce in the south-west islands of Japan, which are avoided by Honey-buzzards. It will be interesting to compare the distribution and abundance of wasps and bees in the south-west islands of Japan and along the migration routes of Oriental Honey-buzzards.

Fracture fixation technique using Intramedullary Pin-External Skeletal Fixator (IM-ESF) tie-in in raptors: the Minnesotan experience, what we can learn from it

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The IM-ESF tie-in is a combination of an intramedullary (IM) pin linked to an external skeletal fixator (ESF) connecting bar. A conventional IM pin is selected to fill an estimated 50% to 60% of the marrow cavity, and two or more positive-profile threaded ESF pins are linked to the IM pin by metal or acrylic connecting bar. This technique has been used as a standard technique for treatment of long bone fractures in various North American raptors at The Raptor center University of Minnesota. This paper evaluates the success IM-ESF tie-in method in the healing of fore limb fractures in six wild raptors. Six fractures in five species of traumatized wild raptors were repaired surgically using the IM-ESF tie-in technique. Five of these cases involved humeral fractures and one bird had bilateral ulnar fractures. All the fracture healed within 4 to 6 weeks, but only four birds could be released back into the wild. Two birds were released in captivity and used for educational purposes. No additional external stabilization, such as a figure-of-eight bandage, was needed to support the affected wing. This technique provides a means of fracture stabilization that minimizes complications, yields shorter healing times and provides a higher rate of success than previously realized. The Minnesotan experience in treating various fractures and its rehabilitation program may provide an input for our Asian raptor species.

A non-invasive sampling strategy for mapping the genetics of Powerful Owls *Ninox strenua* in Australia

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The Powerful Owl *Ninox strenua* is endemic to Australia, being resident in the three eastern mainland states and the Australian Capital Territory. It is classified nationally as of conservation significance and vulnerable in the state of Victoria. The elusive nature of this owl, along with its dispersed distribution, low population density and difficulty in identifying individual birds, limit the collection of ecological data. Molecular methods can be used to obtain crucial ecological information, essential for Powerful Owl conservation. The challenge however, is obtaining genetic material (DNA) from individuals across the species range, which is quick, reliable and affordable. Non-invasive sampling is a relatively new method used for obtaining genetic material from free-ranging animals. This type of sampling however, is generally overlooked as a potential DNA source. Shed hair and feathers, faeces, urine, skins and eggshells are all potential sources of DNA. Non-invasive sampling regimes may be the only alternative for the genetic analysis of endangered and/or elusive species that are difficult to sample otherwise. Powerful Owl moulting each year is protracted, beginning in August-September with the ventral body tracts and finishing with the wings and tail in January-February. Shed feathers therefore, can be collected from under roosts throughout most of the year. Feathers collected provide DNA that is unique to the individual and can be used for subsequent genetic analysis and hence additional ecological knowledge of the species. In this study we collected shed Powerful Owl feathers during 2003 and 2004. In order to obtain samples from across the owl's large distribution, public awareness about the project via the way of flyers, mail-outs, media sources (radio, newspapers and magazines), email lists and public seminars was initiated. Overall, the collection strategy was very successful with over 500 Powerful Owl feather samples being collected. Genetic information obtained from the analysis of DNA from feathers can enable a more rigorous assessment of population viability of the Powerful Owl. Specifically designed molecular markers will facilitate unequivocal identification of individual birds ("DNA fingerprinting"). Through the application of molecular techniques we can collect ecological information about the Powerful Owl such as, genetic divergence, population structure, dispersal patterns, migration and inbreeding. These questions can not be addressed via traditional data collection and will contribute significantly to the successful conservation of the Powerful Owl and potentially other raptor species.

Development of RAPD markers of the White-bellied Sea Eagle *Haliaeetus leucogaster* in Malaysia – implication towards conservation

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The development of DNA-based genetic markers has had a revolutionary impact on animal genetics. With DNA markers, it is theoretically possible to observe and exploit genetic variation in the entire genome. Popular genetic markers in the animal community include allozymes, mitochondrial DNA, RFLP, RAPD, AFLP, microsatellite, SNP, and EST markers. In this research, Randomly Amplified Polymorphic DNA (PCR-RAPD) analysis was used to estimate genetic variation within five captive individuals of White-bellied Sea Eagle *Haliaeetus leucogaster* collected from Malacca Zoo. Twenty-two primers were tested in the primary screening (Operon Technologies Kits A and B). Of these, six were chosen for their ability to provide consistent amplification. These primers were OPC-02, OPC-06, OPC-09, OPF-04, OPF-14 and OPF-16. This method clearly differentiated the five individuals with each showing different RAPD patterns for each primer used. As expected, the genetic variations within a population of *H. leucogaster* were very low; six primers generated a total 34 scorable loci of which only two

were polymorphic. Our study revealed the potential of RAPDs as useful genetic markers for assessment of genetic variability of the White-bellied Sea Eagle and discusses the implication of the results for improving and conservation strategies and future wildlife programme.

Behaviour of Javan Hawk Eagle *Spizaetus bartelsi* during egg incubation at Ciasem-Tangkuban Perahu Nature Reserve, west Java, Indonesia

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A study was conducted on the incubation period of a breeding pair of Javan Hawk Eagle at Ciasem-Tangkuban Perahu Nature Reserve by direct observation and using a closed circuit surveillance camera (CCTV) method. Observations were carried out to study the eagles' behaviour during incubation and the proportions of daily activities during the incubation period. The incubation period of the breeding pair started when an adult laid an egg on the nest on 1 July 2003. The eaglet was seen for the first time on 17 August 2003, and thus the incubation period lasted for a total of 47 days. There were two main categories of behaviour on the active nest during the incubation period. The total time for the incubation of the egg by both the adults accounted for 86.41% and non-incubating behaviour was 13.59%. Activities such as nest repairing, feeding, defecating and other activities accounted for 13.59% of the total time. The proportion or total time of incubation in each day during the incubation period of 47 days was between 68.27% - 97.24%, within the observation period between 06h00 until 18h00 or 12 hours per day.

Winter ecology, behaviour, and conservation needs of the Eurasian Marsh Harrier *Circus aeruginosus* in and around Keoladeo National Park, India

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Eurasian Marsh Harriers *Circus aeruginosus* were studied during the non breeding season in 1996-2000, and briefly in 2005, in Keoladeo National Park and its vicinity in India. The wetlands of the Park served as harriers' core wintering area, and they occurred there for more than eight months, from August through April. Harriers foraged solitarily in the daytime, however, they roosted communally during night time. Tall grasslands in the Park were the preferred roosting habitat, and roost flocks of as large as 132 birds were formed. Harriers were consuming mainly birds, rodents and reptiles as their winter diet. Scavenging was the major tactics of harriers for obtaining food in the Park. The increase in roosting population was observed in good rainfall years, but anthropogenic factors mainly grass cutting at the roost site and its inundation affected them adversely. Infestation of the roosting habitats with woody plant species is also a cause of concern for long-term harrier conservation. Besides a long-term monitoring of roosting harriers and its habitat, research should also be conducted to assess the impact of pesticides on harriers.

Effects of habitat disturbance on the raptor communities in monsoon forests and savannahs of east Java, Indonesia

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In Indonesia, few studies have been made on the impact of human disturbance on raptor communities in habitats other than the tropical rainforest. A two-month study was conducted on the raptor community in Baluran National Park and its surrounding areas in east Java, Indonesia. The area is characterised by monsoon forests and savannahs. The objectives were to assess the relative abundance and species richness in the two different habitat types and to quantify the effects of human disturbance on the raptor communities in the region. General raptor surveys and point counts were used in this study. The study area was divided into three disturbance zones i.e. high, medium and low. For point counts, 23 plots were made and measurements were undertaken to survey the vegetation composition and degree of disturbance. Nine raptor species were present in the study area. Results from general surveys showed that the abundance and species diversity were higher in the low and medium disturbance zones compare to high disturbance zone. The Crested Serpent-eagle *Spilornis cheela* was the most common species and had the highest abundance in all zones. Meanwhile, Short-toed Eagle *Circaetus gallicus* was the rarest species in the study area with only one record in the survey. Results based on point counts showed that the overall raptor distribution was not equal between habitats. The beach forest was significantly preferred by raptors whereas the human-dominated habitat was strongly avoided. The total time of time spent in plots by raptors also not equally distributed among the monsoon forest and beach forest and showed strong avoidance for human-dominated areas. Multiple linear regression models showed that the decreasing number of three big raptors i.e. Crested-Serpent Eagle *Spilornis cheela*, Black Eagle *Ictinaetus malayensis*, and Changeable Hawk Eagle *Spizaetus cirrhatus* was affected by human-dominated habitat. From this study, it can be concluded that habitat disturbance has a strong effect on the abundance and species richness of raptors in the arid habitat of east Java.

Birds of prey in the dry zone of central Myanmar

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The plains of central Myanmar represent a distinct ecosystem with a variety of natural and man-made habitat types, a consequence of over 2,000 years of habitation and resource use. This unique region is called the dry zone because of its climatic environment, creating a desert environment surrounded by forest-clad mountain ranges. The dry zone supports a high diversity of resident and migratory birds of prey, worthy of global conservation attention. The results of surveys conducted in the dry zone between 2000 and 2003 are presented and discussed here. Thirty species of raptors were recorded, and their distribution and habitat use within the dry zone is discussed. Four broad habitat categories are defined: vegetated marshlands, rivers, forests and open country. The utilization of these habitats by birds of prey is described and discussed, highlighting the significance of rivers for both resident and migratory raptor populations.

Current status and distribution of raptors in Thailand

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Fifty-six species of diurnal raptors have been reliably recorded in Thailand. Nine species are resident, eight are complete migrants, thirty-one are partial migrants, and eight are irruptive or local migrants. The present status of these raptors is poorly known but is generally considered to be endangered owing to the deleterious changes in the environment, especially habitat loss. The distribution, abundance and status of Thai raptors are presented based on the information obtained from the past to present time. Based on the current global conservation status, ten species are near-threatened while five are vulnerable. The most serious threats to raptors in Thailand are hunting, deforestation, trade and use of pesticides.

Raptor research and conservation in Indonesia: recent initiatives

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Based on literature reviews and interview with key relevant persons, we present a provisional overview on raptor research and conservation initiatives in Indonesia, during this decade. Members of genus *Spizæetus* in Indonesia, include the Javan Hawk Eagle *Spizæetus bartelsi*, Sulawesi Hawk Eagle *S. lanceolatus* and Changeable Hawk Eagle *S. cirrhatus*, have become species of conservation concern in this recent decade. To date, studies on the Javan Hawk Eagle have gathered the most comprehensive data on its status, biological and ecological aspects as compared to other raptor species. Taxonomically, four new species have been described and reviewed, which included the Sangihe Scops Owl *Otus collari* (1998), Cinnabar Hawk-Owl *Ninox ios* (1999), Little Sumba Hawk-Owl *N. sumbaensis* (2002), Togian Hawk-Owl *N. burhani* (2004), and Flores Hawk-Eagle *Spizæetus floris* (2004). The latter was formerly considered as the race *floris* of the Changeable Hawk Eagle. Efforts in raptor conservation especially for the Javan Hawk Eagle have culminated in an Action Plan for the species and built good partnerships between the Indonesian and foreign stakeholders. The establishment of animal rescue centres in Indonesia recently supported the law enforcement's effort in curbing illegal wildlife trade including raptors. The centres also promote the release programme of confiscated raptor species such as the White-bellied Sea-eagle *Haliaeetus leucogaster*, Changeable Hawk Eagle *Spizæetus cirrhatus* and Brahminy Kite *Haliastur indus*. It is worth mentioning that the current raptor research and conservation related initiatives, in conjunction with increasingly popular birdwatching activities, have made an impact in the promotion of biodiversity conservation work in Indonesia.

A raptor survey in the extension areas of Gunung Halimun–Salak National Park, west Java, Indonesia

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Gunung Halimun National Park (GHNP) has been expanded since June 2003 from 40,000 ha to 113,357 ha, to cover Gunung Salak, Gunung Endut and other adjacent areas. The extension of the national park provided additional protection for the endemic Javan Hawk Eagle *Spizæetus bartelsi* and other important wildlife. Gunung Endut is located west of Gunung Halimun-Salak National Park (GHSNP). It is connected to the other GNHP areas by a forest corridor. However, there is a lack of data on raptors in this forest corridor and Gunung Endut. In collaboration with Gunung Halimun-Salak National Park Management Project (GHSNPMP)-JICA, we conducted a raptor survey in the area, to assess its raptor diversity, abundance, distribution and threats. Long observations were used in the survey. Additional data

on threats to raptors in the area were collected by direct observations and unstructured interviews of some local people and rangers. Six raptor species were recorded in the survey areas including one migratory species; the Oriental Honey-buzzard *Pernis ptilorhyncus* and five resident species; the Crested Serpent-eagle *Spilornis cheela*, Black Eagle *Ictinaetus malayensis*, Rufous-bellied Eagle *Hieraeetus kienerii*, Changeable Hawk Eagle *Spizaetus cirrhatus* and Javan Hawk Eagle. A Changeable Hawk Eagle's nest was found and a pair of Black Eagle was also seen collecting nest material to their nest tree. Threats identified included illegal logging, mining, encroachment and poaching.

Asian Raptor Migration Project in Taiwan: 2003-2005

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Taiwan is located off the southeastern coast of the Eurasian continental landmass, in the central part of the West Pacific island chain. To the west of Taiwan is China, to the northeast are Yonaguni-jima, Ishigaki-jima, and Miyako-jima islands of Japan, and to the south is the Philippines. Therefore, Taiwan is situated at the major crossroads for raptor migration in East Asia. Since 2001, the Raptor Research Group of Taiwan (RRGT) has participated in the Asian Raptor Migration Project. Besides maintaining the traditional observation sites during the survey, we were keen to find the new observation sites by 2005. There are now nine observation spots being monitored in spring and 12 in autumn. From 2003 to 2005, four families and 27 species of raptors were recorded, including the Upland Buzzard *Buteo hemilasius* (a new species record for Taiwan), Greater Spotted Eagle *Aquila clanga* and Imperial Eagle *Aquila heliaca* which are listed in the Threatened Birds of Asia: the BirdLife International Red Data Book. The highest numbers of migratory raptors were the Chinese Sparrowhawk *Accipiter soloensis* and Grey-faced Buzzard *Butastur indicus*. In the autumn of 2004, there were two new raptor count records at Kenting: 23,140 Grey-faced Buzzards and 221,320 Chinese Sparrowhawks. Both counts were the largest number recorded since the 1980's. Prior to this, 22,799 Grey-faced Buzzards were recorded at BaGuaShan in spring 2005 while 33,050 Chinese Sparrowhawks were recorded at FongShan Reservoir in 2004.

A study on migratory raptors in Sumatra, Kalimantan, Java, Bali and Nusa Tenggara, Indonesia: 2001-2004

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From 2001–2004, 45,830 records of raptor migration were collected from a number of observation sites in Sumatra, Java, Bali, Kalimantan and Nusa Tenggara and at least 25 institutions were involved in this programme. Few sites have been regularly observed since 2001. These sites are located in West Java: Puncak (near Gede-Pangrango National Park) and Panaruban (north Bandung) and Gardu Pandang (Jogjakarta, Central Java). In all sites, the Chinese Sparrowhawk *Accipiter soloensis* was the most frequently observed (80%) followed by the Oriental Honey-buzzard *Pernis ptilorhyncus* and Japanese Sparrowhawk *Accipiter gularis* (approximately 20%). Other raptors observed were the Common Buzzard *Buteo buteo*, Jerdon's Baza *Aviceda jerdoni*, Peregrine Falcon *Falco peregrinus*, Black Kite *Milvus migrans*, Common Kestrel *Falco tinnunculus* and harriers. In Java, the Chinese Sparrowhawk, Oriental Honey-buzzard, Japanese Sparrowhawk, Peregrine Falcon, Common Buzzard and Common Kestrel were recorded from 2001 to 2004. Meanwhile, in Bali and Nusa Tenggara, the Chinese Sparrowhawk, Japanese Sparrowhawk, Oriental Honey-buzzard and Common Kestrel were seen from 2001 – 2004. In Sumatra, the Chinese

Sparrowhawk, Oriental Honey-buzzard, Japanese Sparrowhawk, Jerdon's Baza, Black Kite and Peregrine Falcon dominated the sightings In Kalimantan, however, a one-year observation (2002–2003) reported the Chinese Sparrowhawk, Japanese Sparrowhawk, Oriental Honey-buzzard, Black Kite, Northern Marsh Harrier *Circus aeruginosus* and Osprey *Pandion haliaetus*.

Raptor migration at the Strait of Bosphorus in spring 2005

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The Bosphorus Strait, located in northwest Turkey, is one the most important bottlenecks for raptor migration in the western Palearctic. Every year, a large number of birds of prey cross this location while traveling between Europe and Africa. Many raptors that winter in Asia also pass this site traveling from Europe. Historical records of raptor numbers at this site were sporadic and more accurate counts were desired. Recognizing this fact, Doga Dernegi (a national nature conservation NGO), in cooperation with the Istanbul Birdwatching Society, recently began official migration counts. In the spring 2005, counts were conducted for 20 days based on an estimated 60-day migration period. A total of 13,687 individual migrants including 7,950 raptors were recorded. Two *Ciconia* spp. and 21 raptor species were observed. The 39.3% of the migratory raptors were *Buteo* spp., 48.2 % *Aquila* spp. and 5.1% *Accipiter* spp. These counts confirmed the significance the Bosphorus Strait for raptor migration. Efforts are currently being organised to carry out more complete counts in the autumn of 2005. The autumn counts may yield higher numbers based on our previous experience. This data is greatly needed to promote conservation in Turkey and vital for encouraging funding for further research, along with the participation of local and foreign bird watchers in assisting yearly counts.

Raptor migration survey in north Vietnam during autumn 2004 and spring 2005 migration seasons

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Raptor migration surveys were conducted at four areas Tam Dao, Xuan Thuy, Cuc Phuong and Vu Quang National Parks in north Vietnam, during the autumn 2004 and spring 2005 raptor migration seasons. Observations were carried out over a period of 55 days. Surveys were carried out on 16 days in 2004 and 15 days in 2005 at Tam Dao, three days in 2005 at Xuan Thuy, four days at Cuc Phuong and 17 days at Vu Quang National Parks. Three of these sites were surveyed for raptor migration for the first time. A total of 1,984 raptors consisting of 21 species were recorded. Two of the raptor species, Greater Spotted Eagle *Aquila clanga* and Imperial Eagle *Aquila heliaca* are listed in the *Threatened Birds of Asia* as 'Vulnerable (Vu)'. The status of Jerdon's Baza *Aviceda jerdoni* as a migrant raptor was recorded for the first time. In particular, Tam Dao National Park was identified as a new important site for raptor migration in north Vietnam. The total number and species of raptors recorded on migration at Tam Dao NP were higher than other sites that we have previously surveyed in north Vietnam. Additionally, several sites found here are considered to be very good sites for raptor migration observation in Vietnam.

Birds of prey migration watch in Jogjakarta, Java, Indonesia: 2004

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Jogjakarta town is one of many sites for the Birds of Prey Migration Watch (BPMW) 2004 project by RAIN (Raptor Indonesia) on Java island, Indonesia. This is where global raptor migration research events take place. This event was coordinated by Kelompok Studi Satwa Liar (KSSL) Wildlife Study Club at the Faculty of Veterinary in Gadjah Mada University. KSSL collaborates within and outside the university including NGOs and RAIN (Raptor Indonesia) throughout Jogjakarta to compile and integrate raptor related information, which is the vision of the Asian Raptor Research and Conservation Network (ARRCN). Observations were carried out for two months from 5 October to 23 November 2004 daily, from 07h00-13h00. BPMW 2004 was held at two main locations in Jogjakarta; Turgo Hill and Gardu Pandang Sungai Boyong. The latter was at the Boyong River watch tower on the foothill of the volcanic Mount Merapi. Boyong River lies between the two locations, where dry sandy and stony river conditions provide the updraft and thermals needed by migrating raptors. A total of 1,923 raptors were counted, consisting of 124 Oriental Honey-buzzard *Pernis ptilorhynchus*, 538 Chinese Sparrowhawk *Accipiter soloensis* and 1,002 Japanese Sparrowhawk *Accipiter gularis*. Other species reported were Besra *Accipiter virgatus* and Osprey *Pandion haliaetus*. Both of these species were reported in many places outside the two main observation locations both in and nearby Jogjakarta during the two-month period of this event. The raptor migration map which resulted from this event showed that the migration over Jogjakarta were scattered. There is a need for further studies at Jogjakarta in order to understand both, raptor migration patterns, and for their conservation.

Workshop 3: Raptor Home Range, Habitat Use and Data Analysis for Conservation Application

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Home range sizes of raptors are large compared to non-raptors of the same size, but the whole area is not used uniformly. It is important to have an idea to share natural resources with raptors for establishing adequate and concrete conservation models of them. A home range includes a nesting site, a territory during the breeding period, a hunting area, a core area and etc. Therefore, it is necessary to classify the structure of the home range by the frequency of use and the function for the protection and the management of raptors. Moreover, since raptors usually require specific habitats for nesting and hunting according to the species, it is also necessary to analyze habitat use for conservation of raptors. In this workshop, we discuss methods for the analysis of the home range structure and habitat use for conservation application. Also, we refer to the field survey used to analyse the home range and the procedure for analysing the accumulated data using a computer.

The following are the contents of this workshop:

- Home range & habitat use of the Javan Hawk Eagle
- Importance of ecological information to conserve raptors
- Methods of field survey to analyse home range
- Procedure for accumulation of data
- Analysis of home range structure

POSTER SESSIONS

Phylogenetic re-examination of Asian raptor species based on molecular studies and its consequences for conservation

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Molecular techniques such as DNA analyses provide useful phylogenetic information that can give valuable insights into the evolution of birds by challenging conventional taxonomy. The re-examination of raptor species and subspecies is important for conservation since the level of conservation concern depends heavily on taxonomic decisions. Although phenology and external morphological characters are good tools to discriminate taxa, they often do not resolve phylogenetic relationships sufficiently. Therefore, in our investigations of raptor phylogenies we used mitochondrial DNA sequences (e.g., *cyt-b*, control region, pseudo-control region, *nd6*) as well as nuclear markers (microsatellites). We present our results obtained with selected groups of raptors where the molecular genetic investigation revealed different levels of species divergence. For some of the taxa the chosen species concept, the size of the distribution range and the estimated population size will have implications on the conservation strategies. Low genetic variability suggests that the “desert falcons” of the Hierofalco-complex (Lanner Falcon *Falco biarmicus*, Saker Falcon *F. cherrug*, Gyr Falcon *F. rusticolus*, Laggar Falcon *F. jugger*) as well as the Palearctic *Buteo* buzzards each result from a very young radiation. Glacial and post-glacial history may be responsible for rapid morphological differentiation as adaptation to different environmental conditions. The influence of hybridization is revealed by the molecular data. From the taxonomic point of view superspecies status has to be postulated for both hierofalcons and buzzards. Among the buzzards only the East Palearctic Japanese Buzzard *Buteo japonicus* as well as the Himalaya Buzzard *B. refectus* – formerly described as subspecies of *B. buteo* – can be treated as clearly distinct species. Older than the previous groups, according to their higher interspecific divergence, are the Honey-buzzards of the genus *Pernis*. Within *Pernis* the two migrating species (Western Honey-buzzards *P. apivorus*, Eastern Honey-buzzard *P. ptilorhyncus*) form well differentiated monophyletic groups. *P. ptilorhyncus* is divided into two groups: one containing the subspecies *orientalis*, *ruficollis* and *philippensis*, and the other one consisting of *ptilorhyncus*, *torquatus* and *palawanensis*. Furthermore, the data suggest that the remaining island taxa should be classified as distinct species (Sulawesi Barred Honey-buzzard *P. celebensis*, Philippine Barred Honey-buzzard *P. steerei*). Certain plumage characters, migratory behaviour and seasonal habitat shifts apparently evolved multiple times in raptors breeding in temperate Asian environments. Our investigations on New and Old World hawk-eagles (genus *Spizaetus*) proved that they represent a paraphyletic assemblage. Their similarities are mainly based on plesiomorphic or convergent traits. Therefore the genus *Spizaetus* should be split up into different genera: *Spizaetus* for the species of Central and South America only, *Hieraaetus* for Central Africa and *Nisaetus* for the Southeast/East Asian clade. The Asian species are divided into two subclades consisting of Changeable Hawk-eagle *N. cirrbatus*, Sulawesi Hawk-eagle *N. lanceolatus*, Philippine Hawk-eagle *N. philippensis*, and Pinsker’s Hawk-eagle *N. pinskeri* (should be treated as distinct species) on the one hand, and Mountain Hawk-eagle *N. nipalensis*, Javan Hawk-eagle *N. bartelsi*, Blyth’s Hawk-eagle *N. alboniger*, and Wallace’s Hawk-eagle *N. nanus* on the other hand. Some of the subspecies do not cluster according to geographic affinities.

Population structure and phylogeography of Hierofalcons

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The phylogeographic history and the phylogenetic relationships among Old World Hierofalcons (Lanner Falcon *F. biarmicus*, Saker Falcon *Falco cherrug*, Laggar Falcon *Falco jugger*, and Gyr Falcon *Falco rusticolus*) were investigated using mitochondrial (mt) DNA sequences. Of the two non-coding mt sections tested, the control region (CR) appeared more suitable as phylogenetic marker sequences compared to the pseudo control region (PC). For the comprehensive analysis, more than 200 samples from a broad geographic range representing all four “desert falcon” species and their currently recognised subspecies were included. Moreover, samples of the American Prairie Falcon *Falco mexicanus* were analysed to elucidate its phylogenetic relationships to the Hierofalcons. The sequence data indicate that this species is more closely related to Peregrine Falcon *Falco peregrinus*, than to the Hierofalcons. In the DNA-based trees and in the maximum parsimony network all Hierofalcons appear closely related and none of the species represents a monophyletic group. The close relationships among haplotypes suggest that the Hierofalcon complex is an assemblage of morphospecies not yet differentiated in the genetic markers used in our study and that the radiation of the four Hierofalcon species took place rather recently as also fossils attest. Based on the high intraspecific diversity found within *F. biarmicus* we assume an African origin of the Hierofalcon complex. The observed pattern of haplotype distribution in the extant species may be due to incomplete lineage sorting of ancestral polymorphisms, and interspecific gene flow through hybridisation.

Hematology and blood chemistry values of the Japanese Mountain Hawk Eagle *Spizaetus nipalensis orientalis*

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The hematology and blood chemistry values of the Japanese Mountain Hawk-Eagle were determined from the area in the Suzuka Mountains, Japan. Blood samples were obtained from ten feral adults (four males and six females), seven nestlings (approximately 60 days of age, two males and five females), three juveniles (one male and two females) and five immature (one male and four females). Some birds were recaptured and blood samples were taken several times. Red blood cell (RBC) and hemoglobin (Hb) were measured by the automatic hematology analyzer. The hematocrit was estimated by using microhematocrit capillary tubes centrifuged at 12,000g for five minutes. Other values of blood chemistry were obtained by dry chemistry analyses. Two data of one adult female were excluded for analysis because the bird was caught in critical condition. (How do we summarise this? It's better to be presented in a table but Abstracts don't show tables.) The hematocrit values (%) were 37.56 ± 2.83 for adults, 39.8 ± 3.16 for immatures and 33.46 ± 2.44 for nestlings. RBC ($\times 10^{12}/l$): 2.1150 ± 0.2543 for adults, 2.2025 ± 0.2055 for immatures. Hb (g/dl): 18.84 ± 2.36 for adults, 19.58 ± 2.25 for immatures GOT (U/l): 211.65 ± 67.54 for adults, 243.33 ± 56.79 for immatures, 126.00 ± 15.79 for nestlings. GPT (U/l): 20.84 ± 8.80 for adults, 23.50 ± 16.21 for immatures, 13.50 ± 9.61 for nestlings. TP (g/dl) : 3.07 ± 0.43 for adults, 2.98 ± 0.39 for immatures, 3.18 ± 0.26 for nestlings ALP (U/l): 294.67 ± 215.45 for adults, 117.67 ± 37.38 for immatures, 1273.75 ± 408.06 for nestlings ALB (g/dl) : 0.91 ± 0.37 for adults, 0.83 ± 0.21 for immatures, 0.98 ± 0.13 for nestlings CHO (mg/dl): 153.79 ± 61.79 for adults, 189.20 ± 32.88 for immatures, 216.60 ± 57.31 for nestlings Ca (mg/dl): 7.15 ± 1.31 for adults AMYL (U/l): 164.75 ± 60.24 for adults, 163.50 ± 44.18 for immatures, 174.83 ± 79.21 for nestlings TG (mg/dl): 136.64 ± 78.23 for adults, 104.00 ± 25.12 for immatures. Although there was significant difference in ALP between nestlings and adults, the ALP values of fledglings were same levels as adults. The values of RBC, Hb, PCV and ALP were low in the one sick female whose physical condition was critical. Hematological and blood chemistry parameters varied in individuals. Even from one sample to the next in the same individual and in short interval

periods parameters varied. Although the establishment of normal ranges of hematology and blood chemistry is very important, it is difficult to estimate the physical condition of health from only one blood examination. On the other hand, if the results of each blood examination are found to be obviously abnormal, they indicate that the bird is critically ill and therefore we should not release rescued birds into the wild.

Spring raptor migration at Rupert Island, south-eastern Sumatra, Indonesia

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Many raptors migrate between breeding grounds in north-east Asia and wintering areas in south-east Asia. During autumn, raptors funnel down Peninsular Malaysia and cross the Straits of Malacca to Sumatra and the other islands of the Indonesian archipelago. During spring, on the return passage, these raptors again make the 40 km sea-crossing, with thousands converging at Tanjung Tuan, a cape in Peninsular Malaysia situated at the narrowest part of the Straits of Malacca. Spring raptor migration at Tanjung Tuan is well documented but on the other side of the straits, in Sumatra, very little such information is available except for the belief that Rupert Island, the closest Indonesian land mass to Tanjung Tuan, may be a key raptor migration site. In February 2005, we visited Rupert Island and carried out a raptor migration survey. On 18 February, 110 Oriental Honey-buzzards *Pernis ptilorhynchus* were counted and on the following day, another 1,016 more. Results indicate that Rupert Island is on the spring migration route for Oriental Honey-buzzards returning and passing through during passage, from Indonesia to Peninsular Malaysia and northern Asia. Teluk Rhu, on the northern coast of the island, appeared to be a major staging point for Oriental Honey-buzzards as they take off and head for Tanjung Tuan.

The contribution of radio-tracking to the conservation of Asian raptors and important analysis principles

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Radio-tracking can contribute much to the conservation of Asian raptors, provided it is used wisely. The primary advantage is its ability to supply less biased results than visual tagging and surveys. Here we use radio-tracking data from Common Buzzards *Buteo buteo* to investigate habitat use, a frequent aim, to show how sufficient sample sizes can be collected and analysed efficiently. In the process we highlight and provide solutions for widespread errors that we commonly encounter such as pseudo-replication and incorrect statistical assumptions.

The nest, habitat structure and physical variation characteristics of three raptor species at Gunung Tangkuban Perahu, west Java, Indonesia

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A study on the characteristics of the nest, vegetation structure and physical variations around the nesting trees, was carried out at the nests of Changeable Hawk Eagle *Spizaetus cirrhatus*, Javan Hawk Eagle *Spizaetus bartelsi* and Black Eagle *Ictinaetus malayensis* between September 2003 and February 2004 at Gunung Tangkuban Perahu (Tangkuban Perahu Mountain), west Java. The methods of research used included surveys to collect data and descriptive analysis to analyse the data. Results of the study showed that the three raptors were not especially selective of the tree species for nesting, but all nests were particularly placed on emergent trees. Three nests have been placed on the main forks of the trees near the top of open canopy. All the trees, in which nests were found, were growing on slope forest and were located not far away from the river.

Current status of the main wintering sites of the Cinereous Vulture *Aegypius monachus* in South Korea

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A study was conducted to investigate the current status of the main wintering sites of the Cinereous Vulture *Aegypius monachus* in South Korea. To study the status of the Cinereous Vulture in South Korea, we collected extensive literature on the vulture's records. During the winter seasons from 2003 to 2005, we counted the number of vultures on a monthly basis at their main wintering sites in Cholwon (Gangwon province) and Paju (Gyeonggi province). The Cinereous Vulture has been documented in South Korea since 1912, but by the end of the 1990's less than 10 individuals were recorded. After the late 1990's, the number of vultures has increased rapidly to more than hundreds of individuals in a nationwide census by the National Institute of Environmental Research (NIER). An estimated total of 837 and 1,236 vultures were recorded at their main wintering sites by NIER in 2000 and the Cultural Heritage Administration (CHA) in 2002, respectively. The reasons for the increase in population numbers have not been identified accurately, but the main reason seems to be an increase in food supply for the vultures at Cholwon and Paju from 1997. Another reason may be due to changes in the environment of other wintering areas in China and Mongolia. Vultures were also able to migrate locally in South Korea to look for food. As a result of surveys we conducted at their main wintering sites from 2003 to 2005, the maximum vulture numbers found were 148 individuals in Paju and 107 individuals in Cholwon, from November 2003 to March 2004. Maximum numbers were recorded in December at Paju and in February at Cholwon. Due to the increasing numbers of wintering Cinereous Vulture, there is a need to investigate the reasons for the population increase, their routes and patterns in regional movement and international migration.

Distribution and population status of Sulawesi Hawk Eagle *Spizaetus lanceolatus* (Temminck & Schlegel, 1844) at Rawa Aopa Watumohai National Park, south-east Sulawesi, Indonesia

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Sulawesi Hawk Eagle *Spizaetus lanceolatus* (Temminck & Schlegel, 1844) is endemic to Sulawesi island and the Sulawesi sub-region, Indonesia. Although the species is considered widespread all over Sulawesi island, basic data on its distribution and population status, as well as threats to its population at Rawa Aopa Watumohai National Park, south-east Sulawesi is lacking. A survey was conducted at four locations namely Tobu Hukaea-Laea, and around the base areas of Mt. Watumohai, Mt. Mendoke and Mt. Makaleleo from 23 March to 31 May 2005. The surveyed areas covered savannah and hill forest which were located between 0 and 400 m altitude a.s.l.. The results showed that the Sulawesi Hawk Eagle was not common at Rawa Aopa Watumohai National Park, since its habitat was heavily destroyed by encroachment, land conversion for agriculture and housing and exploitation of timber and non-timber forest products. The species was often encountered in savannah at 50 – 100 m altitude and in hill forest at 100 – 200 m altitude. The survey recorded 11 individuals consisting of 10 adults and one immature.

The moulting period of the juvenile Japanese Mountain Hawk Eagle *Spizaetus nipalensis orientalis*

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The moulting period and conditions of the Japanese Mountain Hawk Eagle after leaving the nest was investigated. Moulting conditions of the flight and tail feathers of an individual Japanese Mountain Hawk Eagle-1 was examined twice a year until 542 days after its birth. The individual was presumed to have hatched on 19 May 2000. It was then captured at the nest on the 58th day (15 July 2000) and fitted with a radio transmitter and wing markers. When the individual was re-captured to be fitted with a new radio transmitter, its moulting condition was again examined. The bird was captured at 19 and 32 months after hatching. The moulting condition was not examined at 19 months (second year) after it hatched, therefore the moulting rate was recorded as 0%. At 32 months, the individual was moulting into its second plumage, as seen in its flight and tail feathers. Eight left wing feathers (P1-4, S1, S5, S11, and S12), nine right wing feathers (P1-5, S1, S5, S11, and S12) and six tail feathers T1, T2, and T6, (both left and right) were found in moulting condition. The moulting rate of its second plumage was 39% for the flight feathers and 50% for the tail feathers. The combined moulting rate for both the flight and tail feathers was 41%. A comparison with the Golden Eagle *Aquila chrysaetos*, a similar large-sized raptor in Japan, showed that the moulting cycle of the Japanese Mountain Hawk Eagle requires a longer period.

“Digiscoping” photography technique as a tool in the study of raptors

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“Digiscoping” is a photography technique that combines the use of a field spotting scope and a digital camera to capture the image of a bird or other objects in view. The technique was first discovered and developed by a Malaysian birdwatcher, Laurence Poh Soon Pin in February 1999, when he took his first bird photograph using this combination. The digiscoping technique has now been popularised world wide among the bird watching community as an alternative method to photograph birds. One of the key advantages of digiscoping technique is its ability to capture bird images from a much further distance, as

compared to conventional cameras with telephoto lenses. It has become an important and viable tool to visually record raptor features and behaviour especially during courtship, nesting, feeding, and other habits, from a greater distance. This reduces and may even eliminate stress to raptors, particularly in the absence of a bird hide and when studying raptors on a difficult terrain which restricts closer access or limits the viewing angle of the subject under study. Photographic evidence consisting of a series of raptor nesting records taken with digiscoping technique is presented. Standard digiscoping equipment which includes a spotting scope, camera and other accessories, will also be set up to explain and demonstrate how such a technique can be used as a tool in the study of raptors.

Species assesment of the White-bellied Sea Eagle *Haliaeetus leucogaster* for the release program in Jogja Animal Rescue Centre, Indonesia

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Since the establishment of Jogja Animal Rescue Centre in 2003, the number of confiscated animals have reached 961 individuals. Ten of the 72 protected species were White-bellied Sea Eagles *Haliaeetus leucogaster*. The rescue centre applied the following procedures in handling the animals: quarantine and medical general treatments or examination for their first arrival. The medical treatments or examinations included i) anamnesis, ii) physical general check-up, iii) parasitological examination, iv) blood sampling, v) diagnoses and prognoses, vi) treatments or therapy and vii) recommendations. After the quarantine period and based on medical treatment especially on physical examinations of anatomic and physiologic aspects, the sea-eagles were placed into several types of cages for observation and captivity. Jogja Animal Rescue Centre has the following facilities for the sea eagle: i) 24 observation cages and fishing pond, ii) rehabilitation cages includes three dome cages and one dome cage. During this period, the eagles have been observed behaviourally, mainly based on i) general behaviours such as perching and flight behaviour ii) social behaviour (interspecific, intraspecific and interaction with human, then iii) hunting behaviours or hunting skill. Nine out of 10 individuals of White-bellied Sea Eagles were medically fit but only four were behaviourally selected and released.

A release and monitoring programme of White-bellied Sea Eagle *Haliaeetus leucogaster* at Karimunjawa Island, central Java, Indonesia

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The release of confiscated raptors is one of the priority programmes of the Jogja Animal Rescue Center (PPSJ). In August 2005, PPSJ released four White-bellied Sea Eagles that were selected based on their health and behaviour, at Karimunjawa Island, Indonesia. The birds were released in several selected locations: an adult male and a young male at Ujung Gelam, a second adult male at Tanjung Kemloko and a third adult male at Legon Boyo. This release process included a habituation period of 3-5 days before release, and this was followed by monitoring of post-release birds to study behavioural development, survival rate and the degree of adaptation to their new locations. Post-release monitoring was conducted intensively for one month from August to September 2004, and was continued regularly by volunteers from several organisations around Jogjakarta, Semarang and Bandung in collaboration with National Park rangers and local people. During monitoring, we recorded the daily activities, unusual behaviour, home range development and frequency of habitat use preferred by each released eagle. Several training methods were carried out for the eagles to increase their survival rate, hunting skill and prey identification.

Habitat assessment of potential locations for the release programme of White-bellied Sea Eagle *Haliaeetus leucogaster* at Karimunjawa Marine National Park, Indonesia

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Karimunjawa Marine National Park is located 120 km north of Java Island. It consists of 22 islands and is under the administrative District of Jepara, Central Java Province. The national park is located within the distributional range of the White-bellied Sea Eagle *Haliaeetus leucogaster* in Indonesia. The national park was also the location from where one of the soon to be released sea eagles was captured. A study was conducted to prepare and evaluate the suitability of potential release locations on the island for the White-bellied Sea Eagles. The study also covered their distribution, density, territory mapping and potential threats to the released birds. Public awareness activities were carried out to increase support from the island's local communities for the project. From 13 areas surveyed, the White-bellied Sea Eagles were recorded at seven locations namely Burung Island, Galeang Island and Karimunjawa and Kemujan islands (watching tower area, Legon Lele, Ujung Pudak, Alang-alang and Kemloko). The study on sea eagle density and territory mapping was conducted at three potential areas for release i.e. Ujung Gelam, Kemloko, and Legon Boyo (Karimunjawa and Kemujan islands). Campaigns, public awareness and environmental education activities were conducted amongst the local communities and several elementary schools surrounding these three potential release areas on the island.

Observations on the breeding ecology of the Oriental Honey-buzzard *Pernis ptilorhynchus torquatus* in Malaysia

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Oriental Honey-buzzard *Pernis ptilorhynchus* is a polymorphic raptor with highly variable plumages. Several subspecies are found in temperate Asia and the Indo-Malayan region, of which two subspecies are known to occur in Malaysia. *P. p. orientalis* occurs as a migrant in large numbers in Peninsular Malaysia during the

northern winter. *P. p. torquatus* is an uncommon resident of forest and forest edge in the lowlands and sub-montane areas. The latter subspecies was formerly presumed to be a breeding resident in Malaysia although no nests or fledglings had been reported prior to the record presented in this paper. In 1998 a pair of *P. p. torquatus* took up residence in the grounds of a golf club in Ipoh, Perak in Peninsular Malaysia and subsequently nested a total of eight times. These nestings were the first records of the breeding of *P. p. torquatus* in Malaysia. This paper presents results of observations on these nestings using conventional field equipment as well as with the aid of digiscopy (photography method using a digital camera attached to a spotting scope). Notes on breeding season, courtship, nest building, incubation, development of young, diet and breeding success are presented.

Notes on the nesting and growth behaviour of the endemic Philippine Hawk Eagle *Spizaetus philippensis* in Barlig, Mountain Province, Philippines and lessons learned from the interactions

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A Philippine Hawk Eagle eaglet *Spizaetus philippensis* was discovered in a nest on a 20 m tall old pine tree located between two mossy forest patches in Barangays Lias, Barlig, Mountain Province in March 2004. The nest where it was located was familiar to most of the hunters in the area since it appeared to be repeatedly used by birds for nesting. On appearance, the less than one month old eagle was all white and uses its claws for defense like a fighting cock. Observations on the nest was made and documented before the eaglet was taken into captivity by community members who assumed that this was a Philippine Eagle. Information such as nest type, location and habitat type was also confirmed by its captor who also had the initiative to release the almost adult raptor into the wild on February 2005, through the help of the local Department of Environment & Natural Resources (DENR) officers. The eagle was named Changyasan and was well known in the community as the local environment club's name was also after the eagle's name. Conservation measures to protect these eagles were highlighted during the town's environmental camp, which was held in April 2005.

The management of confiscated raptors at animal rescue centers in Indonesia

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In recent years, threats on raptor communities in Indonesia are related to hunting or capture for the wildlife trade, although all birds of prey are protected by Indonesian law. Other common threats are forest destruction, deforestation, disturbances and fragmentation. For the last two years, the government has established some animal rescue centres to support the confiscation of all protected animals, including raptors, from illegal trade and private owners. There are seven Animal Rescue Centres in Indonesia: Pusat Penyelamatan Satwa Tegal Alur (PPSTA) in Jakarta, Pusat Penyelamatan Satwa Cikananga (PPSC) in Sukabumi-West Java, Pusat Penyelamatan Satwa Gadog (PPSG) in Bogor-West Java, Pusat Penyelamatan Satwa Jogja (PPSJ) in Kulonprogo-Jogjakarta, Pusat Penyelamatan Satwa Petungsewu (PPSP) in Malang-East Java, Pusat Penyelamatan Satwa Bali (PPSB) in Tabanan-Bali and Pusat Penyelamatan Satwa Tasikoki (PPST) in Manado-South Sulawesi. The numbers of confiscated animals, including raptors, have

been increasing since two years after the establishment of the animal rescue centres in 2002. On record, there were 127 raptors which have been held in PPSC; 41 in PPSJ; two in PPSG; 26 in PPSTA; eight in PPSP; 12 in PPSB and nine in PPST. The first treatment for these raptors is undergoing standard biological assessments, which include a feasibility study and background research on a species of confiscated animal, based on the IUCN guidelines for confiscated animals. In addition, follow-up efforts were on behavioural treatments such as training for flight and hunting skill of eagles, providing standard facilities and techniques especially for raptors. The possibilities for release or re-introduction to the wild are some of the priority programmes of the animal rescue management.

Raptor banding in west Sumatra

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Bird banding has been conducted in Indonesia since the 1960's, during the Migratory Animal Pathology Survey (M.A.P.S.) project (1967-1970). Currently, several organisations in Indonesia, such as Wetland International-Indonesia Programme, HIMBIO Padjajaran University, the Indonesian Institute of Sciences (LIPI) and Andalas University are banding birds for their own objectives and are not regulated nationally. However, there are only a few banding records of raptors in Indonesia. In west Sumatra, only four raptor species were banded during 1997-2004, consisting of the migrant Japanese Sparrowhawk *Accipiter gularis* and three nocturnal raptors: Reddish Scops Owl *Otus rufescens*, Mountain Scops Owl *Otus spilocephalus* and Collared Owlet *Glaucidium brodiei*. Based on elevation, the Reddish Scops Owl was captured in the lowlands (c.250 m asl) while the remaining three were captured in montane forest i.e Mountain Scops Owl and Collared Owlet at the middle slopes of Kerinci (1,700 m asl) and Japanese Sparrowhawk at Mount Gadut (c.1,855 m asl).

The Javan Hawk Eagle *Spizaetus bartelsi* as a flagship species in conservation education programme in west Java, Indonesia

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Since 1998 until 2005, a conservation education programme has been conducted around Gede Pangrango National Park and Gunung Halimun National Park. This programme has been using two endangered species, Javan Hawk Eagle *Spizaetus bartelsi* and Silvery Gibbon *Hylobates moloch* as flagship species to draw school children and communities around the National Parks to associate themselves to the programme. This conservation education programme was conducted by using mobile and non-mobile programmes. The non-mobile programme has a permanent site for education at Gunung Gede Pangrango National Park and the mobile programme uses a vehicle to visit from school to schools and to communities around conservation areas or wildlife habitats. The methods used in the programme were by: recognition of visual objects directly, movies or documentary films, nature games, a mobile library, and discussions. We used a pre- and post-test analysis for this programme to determine the impact of our activities. The conservation education programme has produced very good results, with many school students showing better attitude towards the national parks' existence. Some community members who had kept protected wildlife surrendered them to animal rescue centres and formed volunteer groups using the name of Javan Hawk Eagle. The Javan Gibbon and Javan Hawk Eagle are good flagship species as they are relatively easy to be found, and due to their conservation status.

Daily behaviour development of captive White-bellied Sea Eagles *Haliaeetus leucogaster* (Gmelin, 1788) in Jogja Animal Rescue Centre, Indonesia

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The White-bellied Sea Eagle *Haliaeetus leucogaster* (Gmelin, 1788) has a role in the biological control of the population of its prey in the wild. However, this function was conducted using captive birds in cages. A study was carried out on the daily behaviour and development of confiscated White-bellied Sea Eagles before they are released into the wild. The study was conducted on six White-bellied Sea Eagles in the Jogja Animal Rescue Centre in two types of enclosures; the observation and interaction enclosures. A scan sampling method was used to collect data on the perching, flight, hunting and feeding behaviour of these eagles. Results from the observations show that there were differences in the daily activities and development of each eagle. From the results of these observations, four of the sea eagles were recommended for the release programme.