



# ASIAN RAPTOR RESEARCH & CONSERVATION

Programme & Abstracts  
The 2nd Symposium  
On Raptor of Asia  
Bandung, Indonesia  
July 25-27, 2000



**The Peregrine Fund**

WORLD CENTER FOR BIRDS OF PREY  
*Working to conserve birds of prey in nature*



JICA



Biodiversity Conservation Project

# **ASIAN RAPTOR RESEARCH & CONSERVATION**

**The 2nd Symposium on Raptors of Asia**

**Programme & Abstracts**



**Grand Aquila, Bandung, INDONESIA  
July 25-27, 2000**

**The Committee for the Symposium on Raptors of Asia**



## Hosts

Javan Hawk Eagle Working Group  
The Indonesian Institute of Sciences



## Supporting Organizations

Biological Conservation Society  
Nymphaea-Institut Teknologi Bandung  
Lingkung Seni Sunda-Institut Teknologi Bandung  
Sekolah Tinggi Seni Indonesia

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Biodiversity Conservation Project-Japan International Cooperation Agency  
BirdLife International-Indonesia Programme



# **Organizing Committee**

## **General Coordinator**

Dr. Arie Budiman

## **Facilitator**

Dr. Toru Yamazaki  
President of ARRC-N

## **Symposium Coordinator**

Dr. Dewi M. Prawiradilaga

## **Coordinator**

Hapsoro

## **Secretary-General**

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Yusron Saaroni  
Zaini Rahman

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# General Information

## Dates

July 25 (Tuesday) - July 27 (Thursday), 2000

## Venues

### Grand Aquila Hotel

Jalan Dr. Djundjuran 116, Bandung 40173, INDONESIA.

Telephone. +62-22-203-9280, 203-8491, 203-9284

Facsimile. +62-22-203-9282

E-mail. aquila@indo.net.id

Secretariat: Room 225 on 2<sup>nd</sup> Floor.

Symposium will be held on July 25, 2000 at Nusantara Room I, 2<sup>nd</sup> floor.

Posters will be mounted on the Mezzanine Ballroom in the second floor from July 25 until July 27, 2000.

ARRC-N General Meeting will be held at Java/Sumatra Room (2<sup>nd</sup> Floor) in July 26, 2000.

Workshop will be held on July 27, 2000 at Nusantara Room II, Java/Sumatra Room 2<sup>nd</sup> floor.

Breakfast at Cafe Pasteur.

Lunch:

During the symposium, buffet lunch will be provided at Nusantara room. Lunch box will be provided during excursion, and during work shop lunch will be served at Cafe Pasteur.

Complimentary Refreshment.

Coffee, tea and water will be available on the 2<sup>nd</sup> Floor lobby during morning and afternoon break.

**Attentions:**

Mini bar, laundry, telephone call (inner/inter city & international) and other additional order will be charged to your personal account.

# Scientific Information

## Asian Scientific Committee:

1. Dr. Dewi Malia Prawiradilaga (coordinator)
2. Dr. Lucia Liu Severinghaus
3. Dr. Vibhu Prakash
4. Dr. Vladimir Galushin
5. Mr. Dennis I. Salvador

## Oral Presentation

The speaker is encouraged to use English in the oral sessions. Please contact the Secretariat (Room 225, 2<sup>nd</sup> Floor) to confirm your presentation.

### Visual Equipment

The committee provides slide & Over Head Projector and LCD in focus. Please indicate the need of visual equipment when you report to the Secretariat (Room 225, 2<sup>nd</sup> Floor).

### Presentation Time

Time allocated for each presentation is as follows:

Oral presentation: 10 minutes presentation and five minutes discussion for each session.



## **Poster Presentation:**

Location : Mezzanine Ballroom on the second floor,  
Grand Aquila Hotel.

Set-up Hours : 13.10-15.00 Monday, July 24, 2000

Removal Hours : 16.00-17.00 Thursday, July 27, 2000

Discussion Time: for explanation and discussion, presenters are recommended to stay beside their poster between 13.10 and 15.00 hours in July 25, 2000 during the display period.

## **Workshop:**

Workshop Organizer : Hapsoro

Facilitators : Dr. Ani Mardiasuti  
Drs. Rudyanto  
Mr. Mike Chong

# Symposium Schedule

Tuesday, July 25, 2000

TIME	EVENTS	PLACE
08.00-09.00	Registration	Front Desk
09.00-09.40	Opening Ceremony	Nusantara II 2 <sup>nd</sup> Floor
09.05-09.10	Report from the Organizing Committee	
09.10-09.15	Welcome speech from President ARRCN Dr. Toru Yamazaki	
09.15-09.20	Welcome address from BCP-JICA by Mr. Hiroo Uehara	
09.20-09.40	Opening remarks and keynote address from The State Ministry of Environment Republic of Indonesia, Dr. Sony Keraf	
09.40-10.00	Coffee Break	Lobby
10.00-12.15	<b>Symposia</b>	Nusantara II 2 <sup>nd</sup> Floor
10.00-10.05	Introduction to symposia (Dewi M. Prawiradilaga)	
	<b>A. Current Research on Biology and Ecology of Asian Raptors</b>	
10.05-10.15	Hector Miranda Jr., <i>et al.</i>	
10.15-10.25	Gargi & Vibhu Prakash	
10.25-10.35	Varadarajan Gokula	
10.35-10.45	Koji Nishi & Takehiko Inoue	
10.45-10.55	TV. Guruprasad	
10.55-11.05	Jevgeni Shergalin	
11.05-11.10	Discussion	
	<b>B. Conservation Programmes of Asian Raptors and Their Habitats</b>	
11.10-11.20	Nguyen Cu	
11.20-11.30	Huisheng Chen	
11.30-11.40	S. van Balen & Vincent Nijman	
11.40-11.50	Jati Adiputra & Dewi M. Prawiradilaga	
11.50-12.00	S. Sklyarenko	
12.00-12.10	Vladimir Galushin	
12.10-12.15	Discussion	

## Tuesday, July 25, 2000

TIME		EVENTS	PLACE
12.15-13.10		Lunch	Nusantara I Mezzanine Ballroom Nusantara II 2 <sup>nd</sup> Floor
13.10-15.00		<b>Poster Presentation</b>	
15.00-15.30		Afternoon tea/coffee	
15.30-16.50		<b>Symposia</b>	
		<b>C. Conservation Model of Asian Raptors</b>	
	15.30-15.40	Dennis I. Salvador	
	15.40-15.50	M. Yayat Afianto & Mulyadi	
	15.50-16.00	Khorshidnam Behnam	
	16.00-16.05	Discussion	
		<b>D. Raptor Migration in Asia</b>	
	16.05-06.15	Yasunori Nitani	
	16.15-16.25	Yu-Cheng Hsu & Jo-Shih Tsai	
	16.25-16.35	Mike N.H. Chong	
	16.35-16.45	Vincent Nijman	
	16.45-16.50	Discussion	
16.50-17.00		Conclusion and Recommendation (Scientific Committee)	Nusantara I
17.00-17.10		Closing Remarks	
19.00-22.00		Welcome Party	
		The Governor of West Java Province, Mr. H.R. Nuriana cordially invites all participants to have dinner Entertainment: Sundanese Cultural Performance by Lingkung Seni Sunda-ITB	

## Wednesday, July 26, 2000

TIME		EVENTS	PLACE
08.00-09.00		Departure for excursion	Lobby Pancaruban P.F.
09.00-09.15		Briefing & welcoming introduction at the site	
09.15-12.00		Raptor observation I at Pancaruban Protected Forest	Tangkuban Perahu R.P.
12.00-13.00		Lunch	
13.30-14.30		Raptor observation II at Tangkuban Perahu Recreation Park	
14.30-15.30		Back to Bandung	
15.30-17.00		Visit to Gedung Sate	Java/Sumatra Room 2 <sup>nd</sup> Floor
17.00-18.00		Back to Hotel	
18.00-19.30		Dinner	
20.00-22.00		ARRC-N General Meeting; agenda:	
		1. Next symposium 2. ARRC-N proposal for Haze Project 3. Membership fee	

## Thursday, July 27, 2000

TIME		EVENTS	PLACE
08.00-17.00		Workshop Priority Setting for Asian Raptor Conservation Plenary:	Nusantara II Java/Sumatra Room
	08.00-08.15	1. Introduction to Workshop	
	08.15-08.25	2. Summary of the symposium	
	08.25-08.35	3. Group Division: Conservation, Ecology & Raptor Migration	
	08.35-09.30	Working Group: Discussion	
09.30-10.00		Coffee Break	
	10.00-12.00	Working Group: Discussion continued	
12.00-13.00		Lunch	
	13.00-15.00	Working Group: Discussion continued	
	15.00-15.30	Coffee Break	
	15.30-17.00	Plenary:	
		1. Summary of the workshop	
		2. Recommendation	
		3. Follow up Action	
17.00-17.30		Closing	
18.00-19.00		Pers Conference	
19.00-22.00		Farewell Party	Nusantara I

## **Oral Presentation on Tuesday, July 25, 2000**

### **A. Current Research on Biology and Ecology of Asian Raptors**

#### **1. Updates on The Nesting Biology and Population Status of The Philippine Eagle *Pithecophaga jeffreyi***

Hector Miranda Jr., D.I Salvador, K. Gatil, J. Ibanez, D. Afan,  
G.L. Bueser & G.B. Ibanez

#### **2. Nesting Population and Breeding Success of Resident Raptors in Keoladeo National Park, Bharatpur, INDIA**

Gargi & Vibhu Prakash

#### **3. Ecology of Crested Hawk-eagle *Spizaetus c. cirrhatus* in Mudumalai Wildlife Sanctuary, Tamil Nadu, INDIA**

Vadararajan Gokula

#### **4. Geographical Features in The Home Range on Mountain Hawk-eagle *Spizaetus nipalensis* and Around Its Nest**

Koji Nishi & Takehiko Inoue

#### **5. Vultures Disappering from Tumkur District, INDIA**

T.V. Guruprasad

#### **6. Brief Analysis of The Main Researching Raptor in Asian Part of The Russian Federation During Last 1 Years**

J.E. Shergalin

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## **Updates on the Nesting Biology and Population Status of the Philippine Eagle *Pithecophaga jeffreyi***

**H. Miranda Jr., D.I. Salvador, K. Gatil, J. Ibanez, D. Afan,  
G.L. Bueser, and G.B. Ibanez  
The Philippine Eagle Foundation**

New findings suggest that the Philippine Eagle may not be seriously suffering from reproductive failures and that the key factor to the species' survival is the dispersal and survival of juveniles and/or subadults. Also, estimations based on the distribution of nests in Mindanao suggest that each pair cover an average of 133 km<sup>2</sup>, with an average of 68 km<sup>2</sup> of forest. The breeding population in Mindanao is estimated 200 pairs. Similar extrapolations to include the islands of Samar, Leyte and Luzon suggest that there could be a total of 300 pairs remaining in the wild. Over the short-term, hunting is identified as the most serious problem. In the long term, fragmentation and degradation of the lowland rainforest is serious, with only 3 percent of the original old-growth lowland dipterocarp expanse left at present.

# Nesting Population and Breeding Success of Resident Raptors in Keoladeo National Park, Bharatpur, INDIA

Gargi and Vibhu Prakash  
Bombay Natural History Society

Few studies have been done on the nesting population and nesting success of raptors in a given area over a period of time in India. The health of the breeding population of raptors in an area reflects the quality of the habitat. The present study was carried out at the Keoladeo National Park, better known as the only known wintering ground of the highly endangered Siberian Crane *Grus leucogeranus* in India. The studies have been carried out between 1985-88, 1990-93 and 1997-99.

The nesting population and distribution was studied by systematic nest search all over the 29 Km<sup>2</sup> Park. The active nests were monitored once a week to determine the stage of nest and nesting success.

Eleven species of diurnal raptors and five species of owls have been recorded nesting in the Park. The population of White-backed Vulture *Gyps bengalensis* has crashed during the last decade from 353 nesting pairs in 1986-87 to 20 nesting pairs in 1998-99. Two species i.e. Pallas's Fish Eagle *Haliaeetus leucoryphus* (n=2) and Mottled Wood Owl *Strix ocellata* (n=3) no longer nest in the Park. A decline in nesting population of six species has been recorded. Declining trend has been recorded in the nesting populations of Short-toed Eagle *Circaetus gallicus* (75% decline, n=4), Black-winged Kite *Elanus caeruleus* (60% n=6), Egyptian Vultures *Neophron percnopterus* (40% n=5), Spotted Owlet *Athene brama* (40%, n=12) and Dusky Horned Owl *Bubo coromandus* (31%, n=13). Fairly stable population is recorded in four species namely King Vulture *Sarcogyps calvus* (n=5), Lesser-Spotted Eagle *Aquila pomarina* (n=2), Crested Honey Buzzard *Pernis ptilorhyncus* (n=5) and Collared Scops Owl *Otus bakkamoena* (n=3). The Greater Spotted Eagle, *Aquila clanga* and White-eyed Buzzard *Butastur tessa* has been recorded nesting only once.

**Ecology of Crested Hawk-eagle *Spizaetus cirrhatus*  
*cirrhatus* in Mudumalai Wildlife Sanctuary,  
Tamil Nadu, INDIA**

**Vadararajan Gokula  
Salim Ali Centre for Ornithology & Natural History**

Ecology of the Crested Hawk-Eagle *Spizaetus cirrhatus cirrhatus* was studied in the Mudumalai Wildlife Sanctuary during May 1994 to May 1996. Foraging, breeding, nesting, and nest-site selection were studied. The prey items of Crested Hawk Eagle varied from reptiles to mammals. No new nest was constructed during the study period. Only old nests were renovated which started in December and both the sexes were involved in the activity. In total, 12 nests were located in various sites within the dry deciduous habitat. Clutch size was single. The mean incubation period was 42.5 days. The eaglets were seen in the nest for a maximum period of 38 days. Nests were usually found in the upper one-third of a tree where two or more lateral branches extended from the trunk to form a platform. Some nest-site characters were significantly different from random-sites and reflected the importance of the size and age of the tree and nearness to the water source. The results indicate the importance of the mature and less disturbed forests with large sized trees for the conservation of this species.



# **Geographical Features in The Home Range of Mountain Hawk-eagle *Spizaetus nipalensis* and Around Its Nest**

**Koji Nishi and Takehiko Inoue**

**The Project Team For Research and Conservation of The  
Japanese Mountain Hawk Eagle**

According to the recent results of investigation about pairs of the Mountain hawk eagle (*Spizaetus nipalensis*) in Suzuka region, Shiga Prefecture, Japan, their home ranges overlap each other above the large ridge in this area. A similar situation could be often observed in other area (i.e. Hiroshima etc.). We think that the pairs of Mountain hawk eagle use such geographical features to divide their life space each other possibly. However, in their home ranges there usually are another large ridges which surrounds the nest or not used, therefore it is not clear what kind of geographical features is well used by the Mountain hawk eagle for life space division.

Moreover, according to the monitoring of 12 nests in Suzuka, the average inter-nest distance was almost 3.5 km and nests were regularly spaced with G-test Inoue, 1998). But each inter-nest distance vary widely (1.5-5.6 km), it may show that the geographical features-the altitude and inclination of ridge or width of valley which exists between nests participate have a part in factor.

In this report, using the GIS (Geographic Information System) and the numerical map(including 50m mesh altitude data), we analyzed the geographical features of 1)home ranges overlapped area and 2)nesting area about 3 pairs of the Mountain hawk eagle which well investigated its inner structure of home range in Suzuka, discussed about the relationship between the Mountain hawk eagle's land use and the geographical features-altitude, inclination and other features, and additionally discussed about the factor to decide the inter-nest distances.

# Vultures Disappearing from Tumkur District, INDIA

Guruprasad T.V.  
Wildlife Aware Nature Club

Devarayanadurga hills (13°23' N, 77°13' E) near Devarayanadurga State Forest, in Tumkur District of Karnataka State is a 44 km<sup>2</sup> patch of mainly dense deciduous forest along with other vegetation types like shrub, thicket and rocky areas. A small ridge leads to the Yoga Narasimha temple at the peak of Devarayanadurga hill (approximately 4,000 feet above sea level). On the eastern face of the hill, below Yoga Narasimha temple are inaccessible cliffs which hosted a nesting colony of Long-billed Vultures (*Gyps indicus*). Among the birdlife worth mentioning are yellow-throated bulbuls and numerous raptors. Long-billed Vultures, King Vulture (*Sarcogypus calvus*), White Scavenger Vulture (*Noephron percnopterus*) and White-backed Vulture (*Gyps bengalensis*) are the four species found in Devarayanadurga State Forest. I had an opportunity to monitor the nesting site of the above vultures since 1991. In average, the number of nests were eight. The nesting vultures was the last recorded there in 1996. Due to the increased number of pilgrims visiting the temple in recent days, film makers shooting films and tourists selecting this place as a picnic spot, there might have been disturbance for the vulture to roost and breed. Hence there might have been a sudden shifting of the vultures breeding and roosting grounds. The less availability of animal carcass might have also contributed to the decline in vulture population. Long-billed Vultures are the least distributed of all vultures in South India. Sighting of White-backed Vultures across Tumkur District is becoming very rare.

## **Oral Presentation on Tuesday, July 25, 2000**

### **B. Conservation Programmes of Asian Raptors and Their Habitat**

#### **1. Conservation Status of Raptors in The Annamese Lowlands**

Nguyen Cu

#### **2. The Microhabitat Parameters of Formosan Crested Goshawk *Accipiter trivirgatus formosae* Nest Sites in Kenting National Park,**

**TAIWAN**

Huisheng Chen

#### **3. Forest Fragmentation and The Conservation of Raptors on Java , INDONESIA**

Sebastian van Balen & Vincent Nijman

#### **4. Composition of Raptor Species in Different Type of Habitat in Southern Gunung Halimun National Park, West Java-INDONESIA**

Jati Adiputra & D.M. Prawiradilaga

#### **5. Raptors in Kazakhstan: Problems and Solutions**

S. Sklyarenko

#### **6. Raptors in Asiatic Russia: Their study and conservation**

Vladimir Galushin

# **Conservation Status of Raptors in The Annamese Lowlands**

**Nguyen Cu  
BirdLife International-Indo China**

The Annamese Lowlands, belonging to eight provinces, consist of the lowlands and foothills in north-central Vietnam and part of adjacent central Laos PDR. A total of 42 raptor species were recorded within Annamese Lowlands during the 1990-2000. The raptor diversity includes 13 nocturnal and 29 diurnal species.

Within these lowlands, there are 13 established protected areas. In Vietnam, three national parks and nine nature reserves are found in this region; while Laos PDR supports only one nature reserve. A total of four nocturnal and eight diurnal raptor species have been sighted in more than 50% of these protected areas.

All protected areas, except for Cuc Phuong National Park, have been designated protection status within the last decade. As a result of the lateness in protection, most protected areas show signs of environmental degradation from war activities, commercial logging, agriculture conversion, and resettlement extensions. All of these factors have threatened raptor populations in the Annamese Lowlands.

Due to their importance in transboundary conservation between Laos PDR and Vietnam, further research programmes concentrating on raptors in the Annamese Lowlands should be encouraged.

**The Microhabitat Parameters of Formosan Crested  
Goshawk *Accipiter trivirgatus formosae* Nest Sites in  
Kenting National Park, TAIWAN**

**Huisheng Chen  
Department of Biological Sciences,  
University of Arkansas-Fayetteville 1175**

The knowledge of the habitat needed for successful raptor nesting is essential to implementing conservation and management strategies; but is essentially not available for Formosan Crested Goshawks (*Accipiter trivirgatus formosae*). In this study, the nest site or microhabitat (i.e. habitat within a 730 m<sup>2</sup> plot centered on the nest, in this study) characteristics of occupied goshawk nest sites and random sites were compared to determine the habitat parameters that may be selected by characteristics selected by goshawks included forest patches with a higher canopy, higher *Ficus* cover percentage, higher vine cover percentage, more small palms, more shrubs, more large trees. Among the understory parameters, goshawks used habitat with higher fern, debris and bare ground cover percentages, and thicker litter depth than in random sites.

# Forest Fragmentation and The Conservation of Raptors on Java, INDONESIA

S. (Bas) van Balen & V. Nijman  
University of Amsterdam

Java harbours 18 resident birds of prey. Amongst these are the endangered Javan Hawk-eagle *Spizaetus bartelsi* and the endemic races of another four species. Habitat fragmentation and hunting on Java have put the survival of most, if not all, these species at stake. During 1981-2000 surveys of 27 isolated forest areas distributed throughout the island were carried out. The number of forest raptors in a forest area (S) is significantly related to the size of the forest patch (A) following  $S=1.306 A^{0.147}$  ( $F_{1,25}=33.8$ ,  $p<0.0001$ ). Size of the forest patch explains almost 60% of the variation in species richness. The slope of the regression line has a z-value well below those of isolates, and falls within the range of typical samples. Forest raptors apparently survive in smaller patches than might be expected. The possible historical disappearance of four obligate forest raptors along with the far-going destruction of Java's lowland forest is discussed

# **Composition of Raptor Species in Different Type of Habitats in Southern Gunung Halimun National Park, West Java-INDONESIA**

**Jati Adiputra<sup>1)</sup> and Dewi M. Prawiradilaga<sup>2)</sup>**

**<sup>1)</sup> Faculty of Biology, National University (UNAS) & Biological Science Club – Jakarta**

**<sup>2)</sup> Division of Zoology, R & D Centre for Biology-LIPI & Fauna Flora International-Indonesia Programme**

The composition of raptor species was studied at four habitat types including primary forest, production forest, production forest and open landscape especially ricefield in southern Gunung Halimun National Park (6°52'S; 106°32'E), West Java.

The study was conducted by long watches in all habitat types for a total of 442 hours from January to May 2000. There were five species of raptors: Crested Serpent-eagle (*Spilornis cheela*), Black eagle (*Ictinaetus malayensis*), Rufous-bellied eagle (*Hieraaetus kienerii*), Javan Hawk-eagle (*Spizaetus bartelsi*) and Changeable Hawk-eagle (*Spizaetus cirrhatus*) recorded in the area. From these species, Crested Serpent-eagle and Black eagle were found in all habitat types. There were four species recorded in the primary and production forests; however only three species were recorded in the secondary forest and ricefield.

# Raptors in Kazakhstan: Problems and Solutions

S. Sklyarenko

Institute of Zoology, Akademgorodok, Almaty

Forty species of diurnal birds of prey inhabit in Kazakhstan in which 34 species breed there. Some of them are common and 15 species are included in Red Data Book of Kazakhstan. Even some of the species such as Imperial eagle (*Aquila heliaca*), Pallied Harrier (*Circus macrourus*), Spotted Eagle, White-tailed Eagle, Cineureus Vulture (*Aegypius monachus*) and Lesser Kestrel (*Falco naumanni*) are in the List of Threatened Birds of IUCN. Large scale surveys of raptors were conducted at the South, Southeast, East and North Kazakhstan in 1996-1999. The results showed that Common Kestrel (*Falco tinnunculus*) and Lesser Kestrel were most common in the area followed by Hobby (*Falco subbuteo*) and Red-footed Falcon was common in the North. The next species on frequency was Black Kite (*Milvus migrans*), Marsh Harrier (*Circus aeruginosus*), Montagu's Harrier (*Circus pygargus*), Long-legged Buzzard (?) and Common Buzzard (*Buteo buteo*). Steppe Eagle (*Aquila rapax nipalensis?*) was the only species from Red data Book of Kazakhstan recorded regularly. Cineureus Vultures and Griffon Vultures were rare, however they were more common in the South and almost absent in the North. The trends of most part of the species are unknown. The threats are different for each group. The main threat for large falcons mainly breeding Saker (*Falco cherrug*) is mass illegal capture for export to Arabian markets. In 1993, the number of breeding pairs of Saker reached 2,000; however currently it is approximately 400-500 pairs. A possible solution under existing economic situation is permission of legal limited capture under strong government control and monitoring the use of fund for protection and restoration of populations. In 1998-1999 a total of 30 Sakers from Almaty Zoo were re-introduced after being trained specially. There is a lesser threat to Golden Eagle (*Aquila chrysaetos*) occurring in some places. This species is a favourite bird of Kazakh falconers. However, both Saker and Golden eagle require special government regulation for sustainable use. Electrocution was rather common in the past but now its use is less because many low-voltage of electric lines in the country have been destroyed through economical crisis. The other less important threats are the impact of overgrazing, disturbances and pesticides. A sharp decrease in the stock of domestic animals especially sheep causes a decline in forage base of vultures, so it is possible that the number of vultures is decreasing. It is recommended to have organized raptor monitoring on control plots in order to have better planning of measures on protection and restoration of raptors.



# Raptors in Asiatic Russia: Their Study and Conservation

Vladimir Galushin  
Russian Bird Conservation Union

Asiatic Russia is inhabited by 38 species of nesting birds of prey (Falconiformes); 15 species are included into Red Data Book of Russia (1984) and 17 species - into its second edition has to be published soon. Four of them are globally threatened species: *Haliaeetus pelagicus* (over 3 thousand pairs; stable), *Aquila clanga* (number unknown probably over 2 thousand pairs; decreasing), *A. heliaca* (number unknown probably over 1 thousand; locally in a sharp decline - round the Baikal lake, for example) and *Falco naumanni* (5-10 thousand pairs in Tuva Republic only, in other parts of the range is scarce). About 10 species are noted as decreasing their number either through the whole range or locally: *Aquila rapax*, *A. heliaca*, *A. clanga*, *Butastur indicus*, *Milvus migrans* (still numerous but in overall decline), *Pandion haliaetus*, *Circus macrourus*, *C. melanoleucos*, *Falco cherrug*, *F. naumanni* (except Tuva). 3-4 species demonstrate some increase of populations: *Accipiter gentilis*, *Haliaeetus albicilla*, *Buteo hemilasius* (significant range expansion to the north) and *Falco peregrinus* (in some tundra regions). Population trends of many other species are less-known.

Major threats to raptors are environmental changes: drastic transformation of nesting habitats and decline of prey animals. For large species human disturbance (mostly by tourists because local people are more tolerant to birds while aboriginal natives like Buryats are even favourable to eagles) is important. Large falcons, the Saker (*F. cherrug*) and Gyrfalcon (*F. gyrfalco*) suffer much from illegal removal and trade. In result the saker number (still over thousand pairs) rapidly decrease over south Siberia lowlands. First conservation priorities are: particular surveys of declining populations, prevention of disturbance thanks to wide environmental education, construction of artificial nest platforms nearby dense prey populations, activation of all administrative and non-governmental wildlife organisations to stop poaching and smuggling of large falcons. The Red Data Book of Asia which is under preparation would be helpful to activate all kinds of raptor conservation measures. Joint bilateral and international projects will certainly help much to study and protect raptors in Asiatic Russia. Number one priority of such international projects has to be urgent development of overall Asian Raptor Conservation Programme by ARRCN starting at its 2<sup>nd</sup> Symposium.

## **Oral Presentation on Tuesday, July 25, 2000**

### **c. Conservation Model of Asian Raptors**

- 1. Trends and Strategies for The Conservation of The Philippine Eagle *Pithecophaga jeffreyi***  
Dennis I. Salvador
  
- 2. Integrated Local Community Development for Conserving Javan Hawk-eagle *Spizaetus bartelsi* Population at Mount Salak and Telaga Warna Nature Reserve, West Java, INDONESIA**  
M.Yayat Afianto & Mulyadi
  
- 3. The Ancient of Art of Falconry as a Modern Method to Save the Raptors**  
Khorshidnam Behnam

# Trends and Strategies for The Conservation of the Philippine Eagle *Pithecophaga jeffreyi*

Dennis I. Salvador  
The Philippine eagle Foundation

Success in conservation would not be achieved without the support of the communities that share the resources with the Philippine Eagle. Realizing this, the Philippine Eagle Foundation embarked on a multi-prolonged program to address the complex problems associated with the conservation of the target species. The field research program was organized to provide scientific information on the ecology and population biology of the species.

The community-based initiatives program provides financial and technical assistance to marginal-income families living in the forest areas as a means of engaging their partnership in the protection of eagle habitats. Projects with local communities vary across cultures, landscapes and needs but basically deal with capability building for effective natural resources management and poverty alleviation. The captive breeding program has had considerable success using both cooperative artificial insemination and natural pairing techniques. Release of captive-bred birds is predicted in a few years. The conservation education program employs a center-based and extension-based approach targeting teachers, students, radio broadcasters, government officials, business organizations and the general public. In addition to furthering public awareness and understanding of raptor conservation issues, education campaigns serve to muster grassroots and local government support for both *insitu* and *exsitu* conservation actions of the PEF. Long-term strategies include the development of forest corridors to link fragmented habitat, use of raptors as focus of multi-species umbrella concept for land use planning, and the application of modern technology as imperative tools for conservation research.

**Key words:** Philippine Eagle, communities, partnership, research, captive breeding, education, strategies.

**Integrated Local Community Development for  
Conserving Javan Hawk-eagle Population at Mount Salak  
and Telaga Warna Nature Reserve,  
West Java, INDONESIA**

**M. Yayat Afianto<sup>1)</sup> and Mulyadi<sup>2)</sup>**

**Javan Hawk-eagle Working Group**

<sup>1)</sup> **Telapak Indonesia Foundation**

<sup>2)</sup> **Cibodas BirdWatchers Association (KPB CIBA)**

Initiation of community participatory programme in monitoring Javan Hawk-eagle and its habitat is very important step for the species conservation and preservation. The success of the program itself will depend on the approach and active participation of the communities in various conducted programmes and understanding on the importance of their strategic function and existence. This approach will further develop their commitment to conserve Javan Hawk-eagle and its habitat which provides resources for supporting their daily lives. The objectives of the project are:

- 1) facilitating local economic development initiative in three villages and around the nature reserve;
- 2) reducing poaching activities by involving local people to monitor Javan Hawk-eagle habitat and population;
- 3) initiating the establishment of Javan Hawk-eagle research station and community center at Mount Salak.

In summary, community participatory approach has been able to control the local community habits to collect young Javan Hawk-eagle due to the understanding on the importance of their living area in conserving Javan Hawk-eagle and its habitat.

# **The Ancient Art of Falconry as a Modern Method to Save the Raptors**

**Khorshidnam Behnam**

The ancient art of Falconry in brief is -Training of the birds of prey in order to hunt with them. It is one of the few ancient field sport still being practiced in many parts of the world.

Falconry, if be done correctly, can help rather than harm wild populations. Although difficult, breeding raptors in captivity can be an important conservation tool as proven by the recent delisting of the Peregrine Falcon as an endangered species. New developments are made each year in different countries, in order to combat declining populations of raptors in the wild. Despite falconers can never be self sufficient in terms of producing all their own birds for future hunting and breeding, many types of birds of prey are being bred annually for the need of the falconers, without reaping wild populations. Reintroduction of captive bred raptors has proven beneficial for many species such as the peregrine falcons of North America. Unfortunately, the ancient of art falconry is prohibited in Iran. Although the ban was meant to protect birds of prey in Iran, it may have had adverse effects on raptor populations. Lifting the ban on falconry and undertaking captive propagation without harvesting wild populations may well be the solution to the conservation of raptors in Iran. Following and learning from the example of successful conservation models from other countries, we can ensure ourselves that: Our World Will Be Able to Have a Better Future.

## **Oral Presentation on Tuesday, July 25, 2000**

### **D. Raptor Migration in Asia**

#### **1. Cooperative Raptor Migration in Haze Project, JAPAN**

Y. Nitani

#### **2. The Migration and Female Bias of Common Kestrels *Falco tinnunculus* in TAIWAN**

Yu-Cheng Hsu & Jo-Shih Tsai

#### **3. Raptor Migration in Peninsular Malaysia with References to The South-East and East Asian Raptors Migration flyways**

Mike H.N. Chong

#### **4. Composition and Number of Migrant Raptors on Western Java, INDONESIA**

Vincent Nijman

# Cooperative Raptor Migration in Haze Project, JAPAN

Yasunori Nitani

Raptor migration was investigated for the cooperative study of Asian raptor migration in haze condition from September 1 to October 30, 1999 in Japan. NGOs' and individual observation data were collected at 36 observation sites. The data covered three species: Chinese Goshawk (*Accipiter soloensis*), Oriental Honey-buzzard (*Pernis ptilorhynchus*) and Grey-faced Buzzard (*Butastur indicus*). About 440,000 Chinese Goshawks were observed in Tsushima island from September 1 to 30. Approximately 340,000 birds were migrated on September 25. It seems that some part of these birds flew away to Taiwan through West Kyushu. A total of 7,800 Oriental Honey-Buzzards were observed at Fukue-shima from September 23 to October 6 and these flocks flew away into west direction to the Shanghai district in China. Approximately 32,000 Grey-faced Buzzards were observed in Kohyama-cho, Kagoshima Prefecture during September 27 to October 19. These flocks seemed to fly away from Miyako island to Taiwan.

# The Migration and Female Bias of Common Kestrels *Falco tinnunculus* in TAIWAN

Yu-Cheng Hsu and Jo-Shih Tsai  
Raptor Research Group of Taiwan

The Common Kestrel (*Falco tinnunculus*) is a common winter visitor in Taiwan. The database maintained by the Raptor Research Group of Taiwan (RRGT) contained 870 entries on this species between November 1994 and October 1999, cumulatively covering 1110 individuals. Analysis of this data set showed that most Common Kestrels arrived in September and left in April. However, peak abundance in October suggests the presence of additional autumn migrants passing through. There was no peak in the spring which suggests a different northward route from the southward one.

Among the 186 wintering birds that sex was recorded, the sex ratio was female biased (1.95:1). The same bias was also observed in wintering Common Kestrel populations on Kinmen and Matsu, two islands close to mainland China, but the sample sizes there were small. Females appeared to arrive at Taiwan one month earlier than males but both left Taiwan in April around the same time. There are two competing hypotheses for this phenomenon:

- 1) Common Kestrels are sexually segregated both in the timing of migration, and in their wintering locations.
- 2) Our data on the sexual identity of the wintering birds was a biased sample.

Further data gathered in Taiwan should verify the second hypothesis, while regional data are needed through collaboration with observers in neighbouring countries in order to elucidate the first possibility.

**Key words:** female biased, wintering, Common Kestrels.



# Raptor Migration in Peninsular Malaysia With Reference to The South-East and East Asian Raptor Migration Flyways

Mike H. N. Chong  
Oriental Bird Club of Malaysia

Peninsular Malaysia (West Malaysia), is situated in a strategic and important geographic area in South-East Asia, where many raptors annually migrate in spring, from Thailand, on their passage to the Indonesian Archipelago, and returning in autumn. Raptor migration observations in Peninsular Malaysia, conducted over a 10-year period, during autumn and spring migration seasons, were compiled and analyzed. Results show that migration of raptors occurs within a fairly broad front, through various areas and habitats, ranging from the coastal plain, lowland and hill forests to mountain forest, up to an altitude of over 800 m.. Observations were conducted mainly in the west coast region, with a few from the east coast. Depending on weather conditions, visible raptors were usually observed migrating at altitudes of between 100 to 500 m. Level of migration activity was highest along the coastal plain and lowland forest areas. Species of raptors that migrated in large to fairly large numbers, were Black Baza (*Aviceda leuphotes*), Oriental Honey Buzzard (*Pernis ptilorhynchus*), Japanese Sparrowhawk (*Accipiter gularis*), Chinese Sparrowhawk (*A. soloensis*) and Grey-faced Buzzard (*Butastur indicus*). A few species, including wintering species, were found in smaller numbers, and these include Greater Spotted Eagle (*Aquila clanga*), Imperial Eagle (*A. heliaca*), Rufous-bellied Eagle (*Hieraaetus kierenii*), Eurasian Kestrel (*F. tinnunculus*) and Peregrine Falcon (*Falco peregrinus*).

Data is presented for counts of raptors that migrated via Tanjung Tuan (Cape Rachado), across the Straits of Malacca, from Sumatra, Indonesia, during spring migration seasons. Weather, wind and environment conditions has an important part in the 'migration-push stimulus' factor and raptor arrivals at the cape. Tanjung Tuan and its surrounding forest habitat, as a key migration site, needs urgent conservation action to provide the area with a permanent protection status, and to designate it as a Raptor Migration Site of Eco-Importance (RMSEI), in Asia. Observation sites where migration occurred, were identified, and these are transcribed on maps to project the main raptor migration routes. From data evidence, passage migrants not only migrate to Indonesia using Tanjung Tuan cape, but also along a more southern route via

Singapore. This study indicates that Peninsular Malaysia, is located in a strategic trans-migration area in the South-East and East Asian migration flyways. Therefore, Malaysia has an important and advantageous position in the monitoring of migrating Asian raptors, with implications to their conservation. I compare raptor species that migrate along the East Asian migration flyways, with those found in Thailand and Indonesia, and speculate future species that will occur in Malaysia. A raptor monitoring strategy is also recommended for the long term survey of raptor migration and conservation in Malaysia.

Key words: raptor, migration, migration flyway, migration sites, routes, raptor conservation.

# Composition and Numbers of Northern Migrant Raptors on Western Java, INDONESIA

Vincent Nijman

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In the autumn of 1998 and 1999, the migration of northern migrant raptors was studied at two study sites in West and Central Java, Indonesia. During 56 days of observation 4,623 migrants were observed, 3,042 of which could be identified to the species level. The migrants comprised six species, i.e. Chinese Sparrowhawk *Accipiter soloensis*, Japanese Sparrowhawk *A. gularis*, Oriental Honey Buzzard *Pernis ptylorhincus*, Common Buzzard *Buteo buteo*, Booted Eagle *Hieraaetus pennatus* and Marsh Harrier *Circus aeroginosus*. In total some 4,389 accipiters were counted, including 2,567 Chinese Sparrowhawk and 238 Japanese Sparrowhawks, and 231 Oriental Honey Buzzards were identified. Of the three remaining species only single individuals were observed. Proportions of the three most common species identified remained constant over the two-year study period. Passage rates were similar in West and Central Java, and peaked at the end of October. The findings from Java are similar to those reported from the Thai-Malay peninsula and confirm the existence of a large south-east passage in western Indonesia. Populations of raptors migrating through Java originate from northern Asia and before reaching Java, most likely have passed over the Thai-Malay peninsula and Sumatra. Little is known about their final wintering grounds. It seems likely that a proportion migrates further to Bali and the Lesser Sunda islands.

**Key words:** autumn migration, species composition, raptor abundance

**Poster Presentation  
on Tuesday, July 25, 2000**

**Posture Behavior of The Lapper-faced Vulture *Torgos tracheliotus* Chicks on The Nest Play a Major Role in Protecting Them from The High Temperature at Arabian Desert**

**Mohammed Shobrak**

**National Commission for Wildlife Conservation and Development  
National Wildlife Research Center**

Observations at nests in Mahazat as-Sayd protected area in central-west of Saudi Arabia were made to measure the importance of the chicks' posture as a protection against high temperatures. Five categories were recorded, the wing position, head position, body position, the direction from the sun and if the chicks are at shade by its parents. The position of the head was recorded down at the shade of the body more scientifically than up position. Chicks also adopted significantly deferent wing postures at different time of the day. When the chick is 0-30 days, the adults shade it, the average time the chicks shaded by adults wing was 94.42 second. As the chick grows, the time spent by the adults in shading decreases, and the chick starts to shade itself by not facing the sun and by putting the head down to keep it in the shade of its body. By this age the covert and flight feathers are growing strongly, and chick's position themselves so that bare areas of skin are in the shade, and direct sunlight only strikes heavily feathered parts on back which probably play a major role in protecting the chicks from the high temperatures. Thus, with solar radiation reach is 1000 Watts/m<sup>2</sup>, the behavioural mechanisms to reduce heat stress will be important for reducing energy expenditure and survival of chicks.

# **Preliminary Assessment of Wetland-Related Raptors in Asia: Information Collected by The Asian Waterfowl Census**

**Taej Mundkur & Aun Tiah Lim  
Wetlands International - Asia Pacific**

The definition of "waterfowl" under the Convention on Wetlands (Ramsar, Iran, 1971) includes wetland-related raptors (Accipitriformes and Falconiformes). However, there is no international programme specifically aimed to gather information on the distribution and abundance of wetland-related raptors.

The Asian Waterfowl Census (AWC) is a co-operative international programme. It runs parallel to other international census of waterbirds in Africa, Europe and Neotropics under the umbrella of the International Waterbird Census (IWC) and is co-ordinated by Wetlands International. The census aims to obtain information on an annual basis of waterbird populations at wetlands in the region during the non-breeding period of most species (January), as a basis for evaluation of sites and monitoring of populations; to monitor on an annual basis the status and condition of wetlands; and to encourage a greater interest in waterbirds and wetlands amongst people, and thereby promote the conservation of wetlands and waterbirds in the region. It is an annual event and takes place each January. The census was initiated in 1987 in the Indian subcontinent, and now cover over 32 countries in the region. Sites covered include rivers, lakes, reservoirs, tanks, swamps, coastal sites, mangrove and mudflats, reefs, sandy beaches, etc.

Counts of wetland-related raptors collected as part of the AWC and results have been published in the annual reports of the census. This paper presents a preliminary analysis and overview of the data collected on wetland-related raptors. Based on the analysis, it is evident that if developed further, the AWC can provide a valuable tool to assist with the monitoring of the distribution and abundance of wetland-related raptors.

# **Flight Skill Development, Home Range and Movements of Javan Hawk-eagle *Spizaetus bartelsi* During Post-fledging Period at Ciasem, Gunung Tangkuban Perahu Nature Reserve, West Java-INDONESIA**

**Gana Hendarsah**

**Department of Biology, Faculty of Natural Science and Mathematics-  
University of Padjadjaran**

The fledgling of Javan Hawk-eagle (*Spizaetus bartelsi*) at Ciasem, Gunung Tangkuban Perahu Nature Reserve has been monitored to investigate its flight skill developments, home range and movements after it left the nest until seven months later. On the age of 56 days old (October 8<sup>th</sup> 1998), the fledgling was seen out of the nest at the first time and began to perch on the limbs nearby the nest. That day was assumed as the early stage of the post-fledgling periods. At the age of 63 days the fledgling started to fly to other tree near the nest tree. That day could be a new experience for the fledgling in beginning traversed out of the nest tree. After 63 days old, the flight skills of the fledgling of Javan Hawk-eagle started to develop. The fledgling's flight skill development seems related to the strengthening of its wings and to the growth of its feathers. The rapid development of the flight skills affects the increase of the fledgling movement ranges and mobility rates. The fledgling gradually enlarge its home range after seven months old although it did not move more than one or one half kilometer from the nest. Though I didn't estimate the size of the parent home ranges, the fledgling in 56 – 243 days old is presumably still lived in its parent home ranges.

# Population and Distribution of Marsh Harrier *Circus aeruginosus* in Keoladeo National Park and Environs Bharatpur, INDIA

Ashok Verma and Vibhu Prakash  
Bombay Natural History Society

The information of the wintering raptors in Indian is very scanty. The marsh harrier, *Circus aeruginosus* is a wetland dependent common winter visitor to the Indian subcontinent. The present study was carried out in Keoladeo National Park, 27° 7.6' - 27° 12.2' N lat. and 77° 29.5' - 77° 33.9' E long., better known for the massive congregation of migratory waterfowl and only known wintering ground for the highly endangered Siberian Cranes *Grus leucogeranus* in India. The present study was taken up with the objective of studying population and distribution of marsh harrier in the Park. The studies were carried out during the winters of 1996-99. Absolute counts were attempted following road transect method. Direct counts were made from vantage points to estimate roosting population.

The marsh harriers arrive in the Park by late August and population builds up by mid winter and declines gradually, thereafter. The highest population recorded was 32, during 1996-97, 17 during 1997-98 and 13 during 1998-99. The population remained fluctuating between the months during the three years ( $\chi^2=129.2$ ,  $P < .01$ ). The population of juveniles was found to be maximum followed by females and males.

The highest population in the roost was also recorded during mid winter when 125 birds were sighted during 1996-97, 132 birds during 1997-98 and 54 birds during 1998-99. Birds come from different directions both from within and outside the Park, for roosting. The roost population remained fluctuating between different months in all the three years ( $\chi^2=583$   $P < .05$ ). Birds of all age classes and sex were recorded. Juveniles outnumbered both adult males and females.

Wetlands were utilized the most by the harriers (85%,  $n=5685$ ) followed by grassland (6%) and cropland (5%). The wetlands with trees and floating and emergent vegetation were preferred.



A high positive co-relation was observed between the population of marsh harrier and waterfowl, its principal prey species (Pearson's co-relation coefficient,  $r = .85$   $P < .01$ ).

The major conservation problem to the harrier population is the fluctuating water spread area between the years and the biotic pressure from the neighbouring villages. Mitigation measures are discussed

# Population and Distribution of Raptors in Velavadar Blackbuck National Park and Environs, Bhavnagar District, Gujarat, INDIA

N.Ramesh and Vibhu Prakash  
Bombay Natural History Society

There have been very few studies on the raptor community of an area in the Indian subcontinent. The birds of prey are at the apex of food pyramid and their population reflects the health of the ecosystem in which they occur. The present study was carried out in the Velavadar National Park which is open savannah like grassland and is situated in semi-arid area in the alluvial plains on the western shore of the Gulf of Khambhat (21° 56'N and 70° 10'E). The population and distribution of raptors was studied intensively between the years 1997-99.

An absolute count of raptors was attempted weekly by following the road transect method both within and around the Park to get an idea of the population in disturbed and undisturbed areas. 21 species of raptors were recorded in and around the Park. 48% were migratory and 52% were resident. The species diversity index remained consistently high during the winter months from December till February. It was highest in December 1997-98 (Shannon Weiner Index  $H=2.24$ ) whereas it was highest in February during 1998-99 ( $H=2.01$ ). The species richness was the highest during in December during the years, 16 and 9, respectively. The four wintering species namely Montagu's Harrier *Circus pygargus*, Pallid Harrier, *Circus macrourus*, Marsh Harrier *Circus aeruginosus* and Kestrel *Falco tinnunculus* formed the bulk of the population (>90%) in all the months from September till April. The population of the dominant harriers however shot up in September but it showed a declining trend till they all migrate back by April. Apparently the harriers utilise the area both as wintering and staging ground. A similar trend was noticed in the areas adjoining the Park, which were man modified and largely had agricultural fields of cotton *Gossypium* sp, and jowar *Sorghum vulgare*. Foraging habitats and feeding habits segregated the congeneric sympatric harriers.

The migratory raptors were mostly distributed over grassland, cotton field and shrub land. The resident raptors were largely seen in the shrubby area or ecotone areas of shrub land and saline patch. In the areas adjoining the Park, the dominant species, Montagu's Harrier was seen in cotton fields, the abundant habitat, whereas Pallid Harrier occupied *Prosopis* dominated areas.

Twenty nine percent of the 9% species were insectivorous, 38% were dependent on small birds and rest either preyed on rodents or was scavengers. A strong positive correlation was seen between the numbers of insectivorous raptors and insects (Pearson's co-relation coefficient  $r = .74$   $P > .01$ ). There was no correlation between the numbers of bird dependent raptors and terrestrial birds.

# **The Home Range and The Behavior of The Newly Settled Japanese Mountain Hawk-eagle Female**

**Hiromichi Ichinose and Toru Yamazaki**  
**The Project Team for Research and Conservation of**  
**the Japanese Mountain Hawk-Eagle**

The home range and behavior of the newly-settled Mountain Hawk-Eagle female were researched in the Suzuka Mountains area. Wingmarkers and transmitters were attached to the newly-settled female (9902), the former female (9202) and the male (9501) to identify and radio-track each individual. 9902 had been radio-tracked for 7 months until it died as the result of an accident. Locations were recorded on the map divided into 500m meshes. The size of the home range was 11 km<sup>2</sup> for 9902, 14 km<sup>2</sup> for 9202, 13 km<sup>2</sup> for 9501. 70.45% of 9902's home range was involved by 9202, 75.00% by 9501. The home range of 9902 covered 55.35% of 9202's, and 63.46% of 9501's. Display behavior was observed on 15 days out of 35 days(43%) for 9902, 3 days out of 14 days(21%) for 9202. Display behavior consisted of parallel flight, approaching, diving, perching side by side with 9501, undulating flight against an unknown individual, and circling with 2 unknown individuals. The numbers of mesh in which display behavior was observed are 28 for 9902, and 11 for 9202. From these results, it was confirmed that the size and location of the home range of the newly-settled female is similar to the home range of the former female. In addition, display behavior in the newly-settled female 9902 was observed more often than in 9202 within the short period after settlement.

# **Spatial Analyzes on Javan Hawk Eagle *Spizaetus bartelsi* Distribution in Java, INDONESIA**

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**Division of Zoology, Research & Development Centre for Biology-  
LIPI**

The distribution of Javan Hawk eagle on Java island was analyzed using land used, land status, land system contour and river map to identify the relationship between its nest and habitat. Data on the distributions of the hawk eagle published by KMNLH/PHPA/BIRD LIFE IP have been completed with geo position. Based on that data, analyzes were carried out using ArcView 3.1. The results were then analyzed using SPSS packages program for obtaining relationship identification.

The results showed that the locations of Javan Hawk eagle habitat were closely related with the river position. Approximately 37.9 % of its habitat was located at a distance of 250 m from the river and 16.7%, 16.7%, 4.5% respectively were located at 500 m, 750 m and 1 km from the river. Analysis using land system thematic map indicated three major habitats: TGM (16%), BTK (14.7%) and BMS (13.3%) which have been used by the Javan Hawk-eagle. Approximately 56.9 % the eagle searched for prey in villages especially in the open area.

**Key words:** Barung Tongkok (BTK), Bukit Masung (BMS), Tanggamus (TGM)

# **Display Patterns Related to The Home Range Structure of The Japanese Mountain Hawk-eagle**

**Masamichi Ishikawa and Tomoko Kisaichi  
The Project Team for Research and Conservation of  
the Japanese Mountain Hawk-Eagle**

We observed one pair and attached wingmarkers and transmitters from April 1998 to March 1999 when the pair was not breeding. When the display behavior of the pair was observed, the place and the date were recorded on a map divided into 250 m meshes. Display behavior was classified into three types of flight and one type of perching. Display behaviors were observed 35 times from December to April and 15 times from May to November. The area of high-frequency use named the core area was 4 km<sup>2</sup> surrounding the nest site.

Although all of the display behaviors by the female were observed within the core area, some of those of the male were observed outside of the core area.

All of the approaching flight of the pair occurred within the radius of 1 km from the nest (n=4). Exhibit perching by the female was mostly observed on a certain tree located close to the nest. It was suggested that the approaching flight of the pair and exhibit perching by female should be adequate indicators of the the breeding territory.

# **The Home Range and Habitat Use of Sub-adults of The Japanese Mountain Hawk-eagle *Spizaetus nipalensis* in JAPAN**

**Tatsuyoshi Murate**

**The Project Team for Research and Conservation of the Japanese Mountain Hawk-Eagle**

We surveyed two sub-adults of the Japanese Mountain Hawk-Eagle (*Spizaetus nipalensis*) by using radio-telemetry in the Suzuka Mountains, Japan. One individual was studied from October 1992 to May 1994, and another one was studied from January 1999 to March 2000. The 2 sub-adults were non mated females and did not occupy their own territory. The size of the home ranges calculated by the minimum convex polygon method were 4,063 ha and 13,488 ha. The longest distances of the home ranges were 10.1 km and 32.9 km. The home range sizes are 5.4 times and 18.0 times as large as the mean core area size of territorial adults. Each home range overlaps 5 and 13 core area of mating pairs. The mean size of the home ranges per day were 100 ha and 66 ha which are 0.7 times and 0.5 times as large as the size of adults. Both individuals exhibited the same behavior of occupying one area within their home range for several days, then moving to another area quite a distance away. The vegetation type of the habitats was mainly mixed forest and Red pine (*Pinus densiflora*) forest near a small village. The mean heights of the habitats were 441 m and 395 m above sea level, lower than the middle altitude of main ridges. Although the daily home range size of sub-adults was smaller than that of adults, whole home range of each sub-adult covers several home range of mating pairs. They tended to prefer lower habitat where territorial adults do not.

# **The Status and Distribution on Diurnal Raptors of Mongolia and Problems of Their Conservation**

**D. Batdelger**

**Mongolian Bird Conservation Society**

The study and conservation of Birds of Prey in Mongolia are still at a very early stage. Birds of Prey of Mongolia have attracted people's attention for ages, a fact reflected in Mongolian Folklore. Mongolia has a rich and varied avifauna. Recently, ornithologists have identified 449 bird species in Mongolia belonging to 19 Orders, 59 Families and 191 Genus. Most species are not abundant and some are rare and endangered. Only three species of Raptors are included in a new National Red Book of Mongolia (*Osprey-Pandion haliaetus*, White-tailed See-Eagle-*Haliaeetus albicilla*, Himalayan Vulture-*Gyps himalayaensis*).

Mongolia is an important habitat for Raptors. Forty two species of diurnal Birds of Prey have been recorded from Mongolia, 26 are migratory, 8 are resident and 8 are migratory visitors. Birds of Prey have on the whole been very little studied in Mongolia. Diurnal Raptors are on the list of protected Birds in Mongolia, most of their habitats are not conserved. The limiting factors are rare shooting, death on electric lines, and habitat destruction. The most dangerous is illegal capture and export of Saker Falcon. Number of export and captured Falcons was increase in 1999 than in 1998. A long term Project to study conservation of ecology, biology and use of Satellite tracking to study migration routes of some breeding Raptors should also be initiated without further delay



# **Population Dynamics of The Mountain Hawk-eagle *Spizaetus nipalensis orientalis* in the Suzuka Mountains**

**Ikuyo Maeji**

## **The Project Team for Research and Conservation of the Japanese Mountain Hawk-eagle**

Since 1983, we have investigated the ecology of the Mountain Hawk-eagle (*Spizaetus nipalensis orientalis*) for 18 years in the Suzuka Mountains of Shiga Prefecture. Twenty seven individuals were captured to which wing markers and transmitters were attached. The home range, alternation of pair, and behavior of each individual were recorded by members of the project team.

The following is a preliminary report about population dynamics of the Japanese Mountain Hawk-eagle in the Suzuka Mountains. From 1991 to 1999, we captured 9 individuals (4 adult males, 5 adult females) and researched by radio-telemetry method. Locations were recorded on a map divided into 500 m meshes. This area (about 20 km<sup>2</sup>) is a habitat of the 3 pairs and the home range of neighbouring pairs overlapping each other. The estimated age of a pair from C zone: 9402 and 9403 is at least eleven years and over, and the pair bond has been kept at least 6 years or more. The other 2 pairs (B zone : male 9201, 9203, 9501, female 9202, 9902; A zone: female 9103, 9903) changed pairs with a non-mated adult or after one member of a pair died. In 1992, at least 3 pairs and 2 non-mated adults inhabited this area, and we estimated that 8.5 + individuals (3 pairs and 2 non-pairing adults, juveniles, and 0.5 sub-adult) were in residence. Population dynamics might be determined by the density of the population, the distribution of the home range, the life span of the individuals, and the breeding success rate.

# **Do Parents of The Japanese Mountain Hawk-eagle Leave The Zone Surrounding The Nest as a Good Hunting Area for Their Fledgling ?**

**Koji Nakanishi, Hiromichi Ichinose and Toru Yamazaki**  
**The Project Team for Research and Conservation of**  
**the Japanese Mountain Hawk-eagle**

A study of the hunting area of the Japanese Mountain Hawk-eagle (*Spizaetus nipalensis orientalis*) was conducted in the Suzuka Mountains in Shiga Prefecture from April 1997 to March 1999. Wing markers and transmitters were attached to the male and female of the pair. Their nestling hatched early in May 1997 and fledged early in August. The fledgling was radio-tracked until the following March when it was found to have died. Locations where hunting behaviour was observed were recorded on a map divided into 250 m meshes. Vegetation distribution in the home range was also surveyed and recorded on the map.

The size of the home range was 11.75 km<sup>2</sup> for the female, and 9.5625 km<sup>2</sup> for the male. Hunting behavior was observed at 80 points for the female, and at 142 points for the male. Although the observed hunting behavior of both the female and the male were located within a radius of 1,750 m from the nest, the observation frequency was low within a 500 m radius from the nest. The size of the home range for the fledgling was 1.0625 km<sup>2</sup> which had been recorded while the fledgling was still living almost within a radius of 600 m from the nest. In this area, the fledgling was developing its flight ability and hunting techniques while the frequency of food supply by its parent was decreasing day by day.

It is supposed that the parents purposely choose not to hunt often around the nest site in order to decrease predation pressure and maintain an abundance of prey. This is their strategy for increasing the survival rate of fledglings: by increasing the predatory opportunities for the fledgling, the parents provide conditions in which the fledgling can more easily develop its hunting techniques.

**The Behaviour of Young Javan Hawk-eagle *Spizaetus bartelsi* and Its Parents at The Age of 8-30 Weeks at Tangkuban Perahu Nature Reserve, West Java-INDONESIA**

**Henry Ali Singer**

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There was no information on the development behaviour of Javan Hawk-eagle during fledging period. Previous behavioural studies focused on the behaviour of eaglet and its parents during nesting period. This study documented the behaviour of young Javan Hawk-eagle aged 8 to 30 weeks and of its parents at the Mount Tangkuban Perahu Nature Reserve between October 1998 and March 1999 for a total of 238.2 hours. *Ad libitum* sampling method was used for data collections. The data showed that the young Javan Hawk-eagle fledged at 8 weeks old. Its flying and hunting ability increased as the young grew older. The young flew away from the nesting tree at 10 weeks old. It started to recognize and catch prey at 12 weeks old. He was able to fly high and soar at 18 to 20 weeks old. At the age of 24 to 26 weeks old, the young could fly with holding branches on his feet and could do flying-diving. At the age of 27 to 30 weeks old, the young could fly with carrying prey on its feet given by the parents and learnt how to kill prey. During this period, the parents still provided protection and prey to the young.

# **Observations on The Breeding Behaviour of Javan Hawk-eagle *Spizaetus bartelsi***

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Observations on the breeding behaviour were made on three pairs Javan hawk-eagle at Mt. Tangkuban Perahu Nature Reserve (August-October 1998), Curug Cijalu Recreational Park (4-6 December 1998; 1-5, 16-18 February and 3-5 March 1999); and Mt. Salak Protected Forest (26-27 May 1999). During observations, the pair at Mt. Salak still had their sub-adult from previous breeding season hanging around the territory. It was recorded that male and female took role in the selection and occupation of territory by performing territorial displays and nest inspection behaviour. When the territory was established, they started to build or rebuild the nest. During nest building, the male collected and brought the twigs and leaves to the female who made and lined the nest. The female often tried the nest by sitting on it for a long period. Copulations began about one month prior to egg laying. The pair copulated once or twice a day on the nest tree or nearby tree in their territory. After the egg laid the female was less active while the male was actively hunting and provided the prey for her. At Mt. Salak, it seemed that the male and sub-adult helped to incubate the egg for a short period when the female was off the nest during the day. After the egg hatched, the female looked after the eaglet by feeding and brooding it while the male hunted and brought the prey to the nest. Both parents and the sub-adult shared to guard the eaglet. When the eaglet grew up and was able to walk and hop the female started to leave the nest temporarily for hunting. From these observations, it was suspected that the breeding Javan Hawk-eagle may have a helper to raise their eaglet. However, further study on several breeding pairs is necessary to confirm those opinion.

# Overwintering Ecology of Greater Spotted Eagle *Aquila clanga* in Kyushu Island, JAPAN

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Greater Spotted eagle is a rare winter visitor in Japan. Specific individual of this species has migrated to overwinter in Kagoshima Prefecture in Kyushu island every year since the end of 1992. We observed overwintering ecology this individual four times from December 1999 to March 2000.

The Greater Spotted Eagle slept in specific woods fronting paddy regions. The Greater Spotted Eagle flew away by the time the sunrise and updraft occurred in the morning. Once the Greater Spotted Eagle flew away, hovering continued until sunset at an altitude of 100 m and above. It often called before flying in the morning and intermittently in flight.

The Greater Spotted Eagle was mobbed by Black Kites (*Milvus migrans*), Ospreys (*Pandion haliaetus*), Eurasian Buzzards (*Buteo buteo*) and Rooks (*Corvus frugilegus*), but did not care when the attacker was single. It often offended Black Kites and chased them all day on a full stomach. It hunted a prey by hanging-flight from the sky and dived perpendicular when it found one. The Greater Spotted Eagle often ate carcasses bird watchers seemed to have brought, but also tried to snatch preys away from Black Kites and Ospreys.

The home range of the Greater Spotted Eagle was relatively small from paddy regions it fronts to the sky above a river, and it was rare to fly to peripheral mountains or to the opposite side of the river.

## **Status and Distribution of Sulawesi Hawk-eagle *Spizaetus lanceolatus* in South Sulawesi**

**Pupung F. Nurwantha and Zaini Rachman  
Indigenous Nature Conservation Society**

The status and distribution of Sulawesi hawk-eagle (*Spizaetus lanceolatus*) in South Sulawesi Province was studied from 5 February to 15 April 2000. Field survey covered 15 locations with various habitat types including mangrove, savanna, lowland forest, karst or limestone forest, hilly and mountaineous forest. Observations were conducted by long watches at suitable points and walking to search for hawk-eagle signs in each site. The survey recorded that Sulawesi Hawk-eagles were found at six locations: Bulusaraung, Bantimurung, Mt. Mambuliling, Naggala, Faruhumpenai and Danau Towuti. From those locations, the highest number of individuals i.e. five adults and one juvenile encountered during survey was recorded at Faruhumpenai. Other juveniles were also recorded at two observation points in Bulusaurung and at Mt. Mambuliling once. It seems that the species is less common than the Barred honey-buzzard (*Pernis celebensis*). The species was not recorded from both savanna and mangrove habitats. The important threats to the population of Sulawesi hawk-eagle recorded during survey include deforestation resulting from forest conversion to palm-oil plantation and the enlargement of cacao plantation.

## **Raptor Notes from South Sulawesi**

**Pupung F. Nurwantha and Zaini Rachman**  
**Indigenous Nature Conservation Society**

The diversity of raptor species on Sulawesi island was studied in South Sulawesi Province from 5 February to 15 April 2000. The study was conducted by surveying 15 locations with various habitat types such as mangrove, savanna, lowland forest, karst or limestone forest, hilly and mountaineous forest. There were 20 raptor species recorded in the study areas. Brahminy Kite (*Haliastur indus*) was the most common species and found in eight locations followed by Sulawesi Serpent eagle (*Spilornis rufipectus*) in seven locations, Lesser Fish-eagle (*Ichthyophaga humilis*) and Sulawesi hawk-eagle (*Spizaetus lanceolatus*) in six locations, Black eagle (*Ictinaetus malayensis*) in five locations, black-winged Kite (*Elanues caeruleus*), Grey-headed fish-eagle (*Ichthyophaga ichthyaetus*), Spotted harrier (*Circus assimilis*) and Rufous-bellied eagle (*Hieraaetus kienerii*) in three locations, Osprey (*Pandion haliaetus*), White-bellied Sea-eagle (*Haliaetus leucogaster*), Spot-tailed Goshawk (*Accipiter trinotatus*) and Rufous-winged Buzzard (*Butastur liventer*) in two locations and Jerdon's Baza (*Aviceda jerdoni*), Black Kite (*Milvus migrans*), Sulawesi Goshawk (*Accipiter griseiceps*), Small Sparrowhawk (*Accipiter nanus*) and Vinous-breasted Sparrow-hawk (*Accipiter rhodogaster*) only in one location.

## **Javan Hawk-eagle at Mount Merapi, Yogyakarta, INDONESIA**

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In order to investigate current population and to estimate home range and territory size of the Javan Hawk-eagle, field studies were conducted at southern slope of Mount Merapi – one of the most active volcanoes in the world, from October to December 1999. There were two pairs and one juvenile recorded in the study area. Intensive observations were focused on one pair to obtain data on the home range and territory size. It was estimated that the home range of the observed pair covered an area of 5.5 km<sup>2</sup> and its territory size was 0.8km<sup>2</sup>. The eagles used pine trees (*Pinus merkusii*), *Ficus* sp. and ‘sarangan’ tree (*Castanea javanica*) for roosting. An old Javan Hawk-eagle nest was found on *Castanea javanica* tree.



# **Population Status and Distribution of Javan Hawk-eagle *Spizaetus bartelsi* in Central Java, INDONESIA**

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Extensive field surveys were conducted to estimate population status and distribution of Javan Hawk-eagle in Central Java. Seven mountains: Mt. Merapi, Mt. Lawu, Mt. Ungaran, Mt. Muria, Mt. Slamet, Mt. Segara and Dieng Plateau were visited between September and December 1998 for 31 days. The habitat types of the study areas consisted of mountain forests at Mt. Merapi, Mt. Lawu and Mt. Slamet; lowland forests at Dieng Plateau and Mt. Segara and fragmented forest surrounded by coffee plantation at Mt. Merapi. The surveys indicated that there were 14 pairs and 7 juveniles of Javan Hawk-eagles recorded and distributed at 8 sites: 1 pair and 1 juvenile at Petit Opak-Mt. Merapi (7°35' S, 110°27' E), 1 pair at Djogolarangan-Mt. Lawu (7°40' S, 110°10' E), 3 pairs and 2 juveniles at Linggoasri-Dieng Plateau (7°04' S, 109°38' E), 2 pairs and 1 juvenile at Pancuran Tujuh-Mt. Slamet (7°19' S, 109°13' E), 2 pairs and 1 juvenile at Guci-Mt. Slamet (7°19' S, 109°10' E), 2 pairs and 1 juvenile at Curug Cipendog-Mt. Slamet and 1 pair and 1 juvenile at Mt. Segara-Pembarisan Mts. (7°8' S, 107°50' E). These records showed that the number of individuals found in Central Java was higher than that was recorded in the previous surveys. Even, there were two new records for the locations: Mount Lawu and Curug Cipendog. Possibly, more intensive surveys in all sites could result in a higher population number.

**Nest Density of Javan Hawk-eagle (*Spizaetus bartelsi*  
Stresemann, 1924) at Gede-Pangrango National Park,  
West Java-INDONESIA**

**Siti Nuraeni  
KPB CIBA (Cibodas Bird Watchers Association)**

The Gede-Pangrango National Park is an important habitat of the endangered and endemic Javan Hawk-eagle (*Spizaetus bartelsi*). In order to estimate the population status of the species and investigate important threats in the area, nest surveys and ecological study were conducted at Gede-Pangrango National Park and adjacent areas from 1996 to 2000. The locations of the nests were recorded using GPS and these results were then plotted in the map. There were 7 nests found in the area: 4 nests were at Cibodas area and 3 nests at Puncak and Cibulao. From these nests, it was found that the distant between two nests ranged from 1.26 (Gunung Mas nest to Pasir Sumbul nest) to 7.25 km (Cibulao nest to Tarengtong nest). The closest distant of the nests might have been caused by heavy pressured to the Javan Hawk-eagle population. It was suspected that the heavy pressure came from habitat loss and a decrease in prey abundance.

**Reproductive Behavior of Black Eagle *Ictinaetus  
malayensis* in The Southern slope of Mount Merapi,  
Yogyakarta-INDONESIA**

**Dewi Soleha  
Faculty of Biology**

The Black Eagle (*Ictinaetus malayensis*) was the most common species of birds of prey in the Southern Slope of Mount Merapi, Yogyakarta. There were eight individuals recorded in the area. Intensive observations on the reproductive behaviour of the species were done on one pair from February to May 2000. The incubation period took place for 41 days. Both male and female shared to incubate the egg. After hatching, the female mostly brooded and fed the eaglet while the male hunted and brought the prey to the nest. The prey species included rodents and squirrels.

# **Javan Hawk-eagle at Meru Betiri National Park, East Java-INDONESIA**

**Siti Maimunah  
KAPPALA-Indonesia**

Meru Betiri National Park has been identified as an important habitat of endemic and endangered Javan Hawk-eagle (*Spizaetus bartelsi*) in East Java Province. It is located on the south-east coast of Java island covering an area of 58,000 Ha. In order to investigate the current status of the Javan Hawk-eagle in the park, field surveys were conducted between 1998 and 1999. The surveys reported that there were 15 individuals recorded in the area and the most important site for the species was the area in the border between forests (primary, production and protected forests) and villages. Other raptor species found in the area were Crested Serpent-eagle (*Spilornis cheela*), Black eagle (*Ictinaetus malayensis*) and Oriental Honey-buzzard (*Pernis ptilorhynchus*). The important threats to the species were illegal logging, encroachment using fire and illegal poaching of the eagle and its prey such as jungle fowls and squirrel. It is recommended that coordinated management between related institutions such as the National Park office and Perum Perhutani and local community may help to conserve the eagle and its habitat.

**Observations on The Development of Javan Hawk-eagle  
(*Spizaetus bartelsi* Stresemann, 1924) at Cibulao-Telaga  
Warna Nature Reserve, West Java, INDONESIA**

**Usep Suparman  
Cibodas BirdWatchers Association (KPB CIBA)**

The development of Javan Hawk-eagle eaglet was observed from a nest at Cibulao Protected Forest, Telaga Warna Nature Reserve, West Java. The observations were conducted from 06.00 to 18.00 hours with an interval every fortnight for three months (May-July 1999). Observations ceased when the weather was raining or foggy. The objectives were to document the morphological changes and the development of behaviour of the eaglet by taking pictures and recorded the prey species brought to the nest by the parents. It was recorded that the eaglet grew up well and fledged after three months old. The prey species consumed by the eaglet consisted of squirrels, tree shrews, small snakes, chicken, mice, skinks and agamids.

# **Status and Distribution of Red-headed Vulture in India**

**Nikita V. Prakash and J.C. Daniel**  
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The red-headed Vulture *Sarcogyps calvus* is resident throughout the Indian union, up to approximately 2000 m altitude in the Himalayas. It affects open country side chiefly deciduous and semi-desert biotopes in the neighbourhood of habitations. The species was never reported very common but the population is believed to have crashed all over its distribution range over the years. An extensive survey of raptors was carried out in 34 protected areas in various geographical zones of the country during 1991-93. Repeated surveys were carried out during March to May 2000 in some areas. Regular population monitoring is carried out at Keoladeo National Park, Bharatpur, Rajasthan since 1985-86. Road transect method was applied to estimate the population.

The species population has crashed in various areas of its distribution. The vulture was sighted in six biogeographical zones. The highest abundance of vulture was at Keoladeo National Park reaching 3.85 km/raptor, followed by Corbett National Park, 16 km/raptor within the Park and 5 km/raptor in the adjacent forest and 12.5 km/raptor along highways. It was uncommonly seen in Deccan and Western Ghats zones. The number has fallen drastically in North-East and Desert zones. In Kutch, it was described as common with the Egyptian Vulture. No bird was sighted during a recent 15 days extensive surveys in Kutch. Similarly, only three sightings were made in the three month long survey of West Bengal and North-east India, where these birds were seen in flocks large as thirty birds. The species is holding on in the dry and moist deciduous areas. The possible causes of population decline and conservation problems of the species are discussed.

## **Development of Local Community in Asian Raptor Conservation**

**K.C. Lim and A.T. Lim  
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Tanjung Tuan (Cape Rachado) is a well-documented raptor migration site on the west coast of Peninsular Malaysia. Its location at the narrowest part of the Straits of Malacca, this promontory serves as a staging point for thousands of raptors migrating southwards from eastern Asia through Malaysia and on to the Indonesian islands. On the return northward journey, these raptors again cross the Straits of Malacca and make landfall at Tanjung Tuan. Crested Honey Buzzards (*Pernis celebensis*) are the main species with the remaining mainly Japanese Sparrowhawks (*Accipiter gularis*), Chinese Goshawks (*Accipiter soloensis*), Grey-faced Buzzards (*Butastur indicus*) and Black Bazas (*Aviceda leuphotes*).

Although Tanjung Tuan is legally protected as a Wildlife Sanctuary, its location near a popular beach resort puts it under constant threat of being degazetted for tourism development. Recognising the need to protect raptors throughout their migratory journeys, the Malaysian Nature Society this year organized Raptor Watch Week 2000 to develop local community support for Tanjung Tuan.

This paper outlines the objectives of the first public raptor watch in Malaysia and presents details of its organization, implementation and outcomes. Local authorities, businesses, schools and the general public were targeted to achieve these objectives. Networking and the mass media played a crucial role in the success of the event.

Response to the event indicated that there was potential to develop the raptor migration at Tanjung Tuan into an ecotourism attraction and as a means to carry out monitoring studies on raptors. About 300 people attended the event, including students and teachers from local schools. A hotel loaned materials to carry out the raptor count and for the display of information materials. The local authority showed interest in promoting raptor-watching in the area. Volunteer help enabled raptor counts to be carried out at 3 sites, with a total of 2606 raptors counted.

# Records on Raptor Species in West Sumatra and Adjacent Areas

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There has been very little publication on raptor species in West Sumatra. However, some raptor species were always recorded in the few avifauna inventory reports. This paper compiles notes on raptor species from several studies in West Sumatra. Among 30 raptor species found on Sumatra island, 21 of them have been recorded on West Sumatra and adjacent areas including Kerinci Seblat National Park, Bengkulu and Mentawai island. Common species included *Spilornis cheela*, *Ictinaetus malayensis*, *Haliastur Indus* and *Haliaeetus leucogaster*. Eight species were migratory: *Pandion haliaetus*, *Aviceda leuphotes*, *Milvus migrans*, *Circus aeruginosus*, *Accipiter gularis*, *Accipiter soloensis*, *Accipiter badius* and *Buteo buteo*.

Breeding activity of *Ictinaetus malayensis* was recorded nesting in *Koompassia exelsa* tree. A report recorded that a scorpion was eaten by *Spilornis cheela*.

**Key words:** Resident raptors, migratory raptors.



# **Investigation on Raptors for Designing Environmental Conservation Measures**

## **Environment Department, Water Resources Development Public Corporation**

In Japan, river projects such as river improvement and dam construction for flood prevention, water use and other purposes, are carried out by the Ministry of Construction (MOC), the Water Resources Development Public Corporation (WARDEC) and prefectural governments.

Execution of such projects, however, inevitably has some impacts on the natural environment (e.g. flora and fauna and ecological system) are therefore carried out in advance, and the impacts of the projects on the environment are estimated and assessed based on the investigation results. Environmental conservation measures are then designed and implemented.

For dam projects, careful consideration for raptors such as Golden Eagles and Hawk Eagles, which inhabit in deep woods, is essential, since dams are usually constructed in mountainous areas. Accordingly, project implementers are investigating the environmental conditions in the habitats of raptors, grasping the territories of each pair of raptors, and studying whether impacts of the construction of a dam on their reproduction activities seriously affect the original population or not.

WARDEC has been conducting investigation in each dam project and has drafted "Guidelines for Conservation of Rare Raptors" under the guidance of researchers, based on the results of previous studies. Measures to conserve the natural environment properly are being taken.

Our poster shows you some examples of such investigations and analyses of the results.

## Diets of Four Residential Raptors in Yangmingshan, TAIWAN

Kuang-Ying Huang, Lucia Liu Severinghaus, and Yao-Sung Lin  
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Besra Sparrow Hawk (*Accipter virgatus*), Crested Goshawk (*Accipiter trivirgatus*), Serpent Eagle (*Spilornis cheela*) and Oriental Honey Buzzard (*Pernis ptilorhynchus*) are sympatric on YangMing Mountain near Taipei. We recorded the feeding of young of all four species both through direct observations and by recording with miniature video cameras placed near nests. The duration of our study lasted from April to August 1994-1999, covering the nestling stage, the fledgling stage, and before sub adults left the nesting areas.

Besra Sparrow Hawk fed their young mostly birds (66.6 %) and insects (24.5 %). Crested Goshawk preyed on mostly lizards (45.0%) and birds (35.3%). Serpent Eagles' diet contained mostly snakes (68.9%) and toads (22.2%), while Oriental Honey Buzzard focused on larval wasps removed from a comb (78.5%) and frogs (16.1%). There is obvious food segregation among the four species, which probably provided enough niche differentiation for them to coexist.

**Key words:** Food, niche differentiation, and sympatric existence.

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