Final Report

Conservation of Critically Endangered Species

Study on Distribution, Population, Habitats and Ecological Aspect of Flores Hawk Eagle (Nisaetus floris) on Rinjani National Park and Other Protected Areas in Lombok Island

WEST NUSA TENGGARA – INDONESIA

Prepared for

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Indonesia, October 2011

Best Wishes,

USEP SUPARMAN, *Chairman*
Raptor Conservation Society-RCS

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1.0 INTRODUCTION

Indonesia is located in a tropical regional characterized by high temperature and humidity, and well know as a country with a great deal of biological diversity. However, the rapid population explosion and industrial development have increased demand for land and natural resources, which in turn have led to the decrease in forest coverage. There are serious concerns that the natural environmental could be facing considerable destruction and the number of living species is decreasing. Accordingly, the Indonesia government established the Biodiversity Action Plan Indonesia (BAPI in 1991) to conserve it's biological diversity.

This report has been prepared to provide current information for the presence, distribution, population, habitats and ecological aspect of Flores Hawk Eagle (*Nisaetus floris*) in Lombok Island, West Nusa Tenggara. The results of the project are to help in conservation efforts of this critically endangered species in Indonesia. Following is a brief description of the project; a review of the methods used to conduct scientific surveys and the results of those surveys; a discussion of those results; and the conclusions reached based on those results.

1.1 PROJECT CONTEXT

In general, birds especially raptors can be used as the best indicators for evaluating a healthy ecosystem (Ferguson-Lees and Christie, 2001). This is because the position of raptors as predators is at the top of many food chains. Indeed, raptors prey upon insects, other arthropods, amphibians, reptiles, other bird's species and some mammals. Therefore, they have roles to regulate the number of animals, maintain the balance of nature and maintain the diversity of habitat.

However, in the last century raptors all over the world haves been suffered from human prosecution, pollution like pesticides and habitat destruction because of the country development. The population was already low declined and their habitat was getting smaller and fragmented. Disturbance on bird of prey species will be affecting the chain and food in a ecosystem, both directly and indirectly. The eagle is one of the endemic bird of prey species occurring on Nusa Tenggara islands which plays very important role in influencing the ecosystem in the Nusa Tenggara islands.

Flores Hawk Eagle is endemic and only found in Flores, Sumbawa and Lombok Island. These birds usually inhabit lowland forests and Montana forests up to 1600 meters altitude above sea level. Currently, the population of Flores Hawk Eagle estimated no more than 250 adult male individuals (IUCN Red list, 2005), and only noted at some point just in Nusa Tenggara (Lombok Sumbawa and Flores Island). Therefore, the effort to conserve much needed given the trend decline in the population. Obstacles in efforts to conserve this species include a very limited basic data; because this bird is one of the species of birds of prey which is least known. Another important constraint is the lack of sufficient intensive monitoring, the lack of local human resource development, and low public support and the local government's efforts towards conservation of birds and their habitats.

Degradation of environmental quality that occurred in some ecosystems is the main cause of biodiversity decline in conservation areas. Natural habitat for various animals has been damaged so there is no shelter to find food and to reproduce. Request on flora and fauna unique to this area remains high. By collectors willing to pay dearly for various types of unique and rare animals and plants, one of which is a type of bird of prey, namely Flores Hawk Eagle.

International attention has focused on Flores Hawk Eagle, because it's one of the critically endangered species birds in Indonesia. Specific concern is the future of the Flores Hawk Eagle (which is considered by IUCN Red List, 2005) to be Critically Endangered Species birds, and the fate of various threat habitats within Mount Rinjani National Park (because of their high biodiversity and concerns about trade and forest destruction). Many of the threats of Flores Hawk Eagle (and its habitat) and the degradation of environmental quality that occurred in some ecosystems is the main cause of biodiversity decline in conservation areas. Natural habitat for various animals has been damaged so there is no shelter, find food and reproduce. Request flora and fauna unique to this day remains high

THE OVERALL GOALS OF THE SURVEY ARE:

This activity is intended to realize the conservation efforts of the critically endangered Flores Hawk Eagle (*Nisaetus floris*) and to understand the viability of populations and their habitats in Lombok Island, West Nusa Tenggara. And the goals are:

1. To collect data of distribution, population, habitats and the ecological aspect of Flores Hawk Eagle (*Nisaetus floris*) inhabiting conservation areas and other protected areas in and around Lombok Island, West Nusa Tenggara.
2. To identify habitat types as well as to make inventory of threats facing the species and its habitats in each location.
3. To list other bird of prey species possibly occur at each location surveyed.
4. To increase public awareness and to encourage involvement of many parties on conservation effort of raptor and its habitat.

1.2 PROJECT AREA DESCRIPTIONS

The Project area is located within the West Nusa Tenggara (known as Nusa Tenggara Barat or NTB) is part of island chain originally called the Lesser Sunda Islands, and refers to the islands directly to the east of Bali, located slightly south of the equator, NTB is comprised of two main islands: Lombok and Sumbawa, as well as hundreds of smaller islands and coral atolls in the surrounding waters. Lombok island has a chain of volcanic mountains in the north, providing majestic scenery and lush agricultural lands on its slopes. The highest peak of Mt. Rinjani, towers 3726 m above the surrounding countryside and is internationally recognized as a world class destination for trekking and mountain climbing. Around the slopes of Rinjani are forests and agricultural areas, sprinkled with waterfalls and surrounded by stunning scenery. In other parts of the island, terraced rice paddies, natural jungle and age-old forests thrive in the rich volcanic soil.

Mount Rinjani National Park is one of the mountain rain forest on the Lombok Islands which coverage area of 41,330 ha and lies between 116 ° 2 1'30 "- 116°34'15" E and 8°18'18 "-8°32'19'S. It is located in 3 (three) districts, i. e.: North Lombok (12.357,67 hectares), Central Lombok (6.819,45 hectares) and East Lombok (22.152,88 hectares) which is divided into several management zones, such us: Core Zone (20.843,50 hectares), Wilderness Zone (17349.50 hectares), Utilization Zones (799.00 hectares), and Other Zones (2.338,00 hectares). This National Park is a mountainous area up to 500 - 3726 m above sea level (Rinjani summit) with the land slope variation: flat, wavy, hills to mountainous. The mountains around Mt. Rinjani National Park include: Mt. Pelawangan (± 2658 m a.sl), Mt. Daya (± 2.914m asl), Mt. Sangkareang (± 2588 m asl), Mt. Buah Mangge (± 2895 m a.sl) and Mt. Kondo (± 2947 m asl). In addition, Rinjani National Park is one part of the tropical forest located in West Nusa Tenggara region consisting of various types of ecosystems - and its vegetation is fairly complete starting from the Lowland Forests (Semi Evergreen) to the Montana Forest (1500-2000 m asl). This area is used as a source of *plasma nuftah* and natural beauty, which can be used for the purposes of science, education, research, and ecotourism.

2.0 METHODS

2.1 THE SURVEY METHODS

The survey methods to detect of the presence of Flores Hawk Eagle refers to Fuller and Mosher (1997, in Pendleton et al, 1987), using the method of "Cluster Sampling" with the main assumption on "clusters" (sampling units) that they have a considerable distance. In this survey, each location of the survey locations are considered one unit, because the location and distance between sites far and could not be done on one trip. The methods of determining the observation point (point count) in each sampling unit at the point of view towards the most optimum forest/ location with a view are spacious and the main assumption that every point of view of the different region and is not expected to overlapping.

2.2 THE DATA COLLECTED

The data collected on the existence of Flores Hawk Eagle on the survey areas. Every presence of Flores Hawk Eagle recorded which includes the total of individual, time and duration of the presence, estimated of the age and sex (adult, juvenile, immature and male/ female). The selected areas as places of observation point should be still in good forest condition and characteristics of habitat considered to be suitable for Flores hawk-eagle. Each location survey will be observed for 2-3 days.

2.3 RESEARCH EQUIPMENT

The equipments used during the survey are: Monocular, Binocular, Camera Cannon EOS 1100 D, Field Guide Book, GPS (Global Position System), Handy camp, Notebook, Maps, and Observation Tally sheet.

2.4 OBSERVATION PROCEDURE

The procedure of the work carried out to survey the Flores Hawk Eagle and other raptors on the sample location (cluster) begins on the search and determine of the observation points. Observation will be conducted on two-three days per location are started from mid-morning to mid-afternoon (08.00 am - 17.00 pm). Identification of the birds are carried out on observing the morphology, generally appears when a flying or perching at the tree and bird voice character. Through the voice a part of identification method, but didn't certainly its presence before the individual of Flores Hawk Eagle appear or seen. Generally, voice is very useful when the eagle unseen on the position or perching in the forest and are useful direct attention to some location.

3.0 RESULTS

3.1 IDENTIFICATION OF FLORES HAWK EAGLE

Most of the people in Lombok (locally called 'Sasak') mostly recognize any kind of eagle. They named Flores Hawk Eagle as ***Kesambor***. They also name a small number of eagles such as ***Keling*** for Brahminy Kite (*Haliastur Indus).* Generally, the people in Lombok rarely see Flores Hawk Eagle, because this species is very difficult to see and more living on the forest and there are no records of hunting on the village, but the more dominant Brahminy Kites (*Haliastur Indus)* are often flying on the rice field and villages to hunt for domestic chickens. It means that the presence of Flores Hawk Eagle is rarely known by people.

In general, Flores Hawk Eagle has different characteristic compared to other eagles, they have collared feather all over, including head and belly to the lower part, and five black stripes on the tails. When perching, the white color of this birds seen contrast and also when flying above canopy or on sky. There is a black contrast line on the tip of the wing. Based on the field observation, Flores Hawk Eagle are often seen flying together (pair), and rarely flying alone. This maybe happen because during our observations (July-September) are the period in which territory is being maintained.

3.2 PRESENCE OF FLORES HAWK EAGLE

The presence of Flores Hawk Eagle has been recorded in 18 locations (Table 1 & 2). Most locations are primary and secondary forest, except Rinjani National Park and Other Protected Area/Nature Reserve are open landscape dominated by mountain forest (sub-Montana and Montana forest). The total number of Flores Hawk Eagle in the studied areas are 44 individuals consisting of 21 Pairs and 2 Floaters. The highest number of individuals recorded during our survey is at Senaru Resort Unit and Pusuk Forest.

3.3 DISTRIBUTION OF FLORES HAWK EAGLE

The distributions of Flores Hawk Eagle in Lombok Island are recorded on 18 locations around Rinjani National Park and Other Protected Areas/Nature Reserves. Some recorded on region of the still complete forest and in good condition, especially on eastern and eastern parts of Lombok Island. Probably this species are ecologically-called "slope species". Nearly the presence of Flores Hawk Eagle frequently appear, flying and perching in the sub-Montana forest zone (> 900-1000 m asl) which still has good forest. As with other raptors, such as Javan Hawk Eagle (*Nisaetus bartelsi*) and Changeable Hawk Eagle (*Nisaetus cirrhatus*) who prefers the slope area and near to river and waterfalls. Whereas, the habitats that occur on 200-900 m above sea level being dominated by Brahminy Kite (*Haliastur indus*). Such domination is possible because a habitat along coastlines in lowland forest in Lombok is rarely covered by high trees. Therefore, the kite is common and often found to nest.

3.3.1. MOUNT RINJANI NATIONAL PARK

Jan Ove Grejshaugh *et al*. (2004), Wahyu Raharjaningtrah and Zaini Rahman *et al.* (2003-2004) and Dr. Dewi Malia Prawiladilaga (in preparation) explain that the presence and distribution of Flores Hawk Eagle is only recorded on Senaru, Sesoat, Pidana, Sembalung and Jeruk Manis (Mount Rinjani National Park) and Pusuk (Protected Area/ Nature Reserve).

Survey result. The presence and distribution of Flores Hawk Eagle, were found on nine locations around Mount Rinjani National Park, such as: (1) SPTN I West Lombok (Santong, Anyar, Senaru), (2) SPTN II East Lombok (Aik Berik, Steling), and (3) SPTN III Central Lombok (Joben, Kembang Kuning, Aikmel, Sembalun). The distribution of Flores Hawk Eagle around in

Mount Rinjani National Park are common on sub-Montana (>900-1500 m a.sl). It is because the most of Rinjani National Park borders of the Community Forest Management

3.3.2. OTHER PROTECTED AREA (NATURE RESERVE)

As for the distribution of Flores Hawk Eagle in outside of the National Park, we found at nine location around in Protected Area/Nature Reserve, such as: Pusuk, Sambelia, Belanting, Obel-obel, Gondang, Sesoat, Tower Senggigi, Tanjung, and Sidemen. This is the news record of the presence and distribution of Flores Hawk Eagle in Lombok islands.

In generally, the presence and distribution of Flores Hawk Eagle in the Protected Areas/Nature Reserve have the better of the habitat and vegetation as good with the rain forest characteristic. Although, this protected areas are dominated by a plan mixture and direct border with communities residential. While the presence (flying and perching) of Flores Hawk Eagle on protected area/nature reserve a more commonly to seen better on Rinjani National Park.

3.4. POPULATION ESTIMATION

The population of a species is not easy to count, especially by direct method, so some approaches were described to estimate the population of Flores Hawk Eagle in Lombok island, one the approach which is based on the home range of a pair within a certain area. Although there are variation within a different sites but extrapolation is allowed to generalize one species home range.

The total population of Flores Hawk Eagle in Lombok Island is 21 Pairs and 2 Floaters. This population are distribution at Rinjani National Park (12 pairs) and other protected areas (9 pairs and 2 floater). Its population size has been, based on the extent of suitable habitat and a territory size estimate on area surveyed. In each area surveyed, the eagles were often seen flying together (July-September is the period of maintaining territory). Therefore, it is concluded that Flores Hawk Eagle could be living on the still relatively forested areas (inside or outside the conservation areas), however, this should be supported by sufficient food. The species also seems to prefer slopes and hilly s areas (sub-Montana forest).

Table 1. The Population of Flores Hawk Eagle in Rinjani National Park

No	Observation Point	Total Individual		Altitude (m a.sl)	Forest Type
		Pairs	'Floater'		
1	Senaru	2	0	571	Lowland and Sub-Montana
2	Santong	2	0	631	Lowland and Sub-Montana
3	Anyar	1	0	676	Lowland and Sub-Montana
4	Aik Beling	1	0	702	Lowland and Sub-Montana
5	Steling	1	0	679	Lowland and Sub-Montana
6	Joben	1	0	734	Lowland and Sub-Montana
7	Kembang Kuning	1	0	784	Lowland and Sub-Montana
8	Aikmel	1	0	673	Lowland and Sub-Montana
9	Sembalung	2	0	705	Lowland and Sub-Montana
	Total	**12**	**0**		

Table 2. The Population of Flores Hawk Eagle in Other Protected Area

No	Observation Point	Total Individual		Altitude (m a.sl)	Forest Type
		Pairs	'Floater'		
1	Pusuk	2	1	615	Lowland and Sub-Montana
2	Sambelia	1	0	502	Lowland and Sub-Montana
3	Belanting	1	0	445	Lowland and Sub-Montana
4	Obel-obel	1	0	435	Lowland and Sub-Montana
5	Gangga	1	0	534	Lowland and Sub-Montana
6	Tower Senggingi	0	1	135	Lowland and Sub-Montana
7	Tanjung	1	0	512	Lowland and Sub-Montana
8	Sedimen	1	0	517	Lowland and Sub-Montana
9	Sesoat	1	0	578	Lowland and Sub-Montana
	Total	**9**	**2**		

3.5 HABITAT CONDITION

The habitats selected by the eagles are still in good condition and directly adjacent on agricultural plantation. This species is related on primary forest. However, they are sometimes seen on disrupted forests. The species is also seen on utilized and secondary forests for hunting, but not fornesting. As sated early that most secondary forest areas are dominated Brahminy Kite (*Haliastur Indus*) for nesting, so the Flores Hawk Eagle selects primary forest instead.

3.5.1. RINJANI NATIONAL PARK

The habitat condition around Rinjani National Park is dominatedby plant species, such us: Elevation <1000 m aspl (*Ficus Benjamin, Laportea stimulant, Syziium sp, Myritica fatna, Antdesma sp, Azadiratcha indica, Pterospermun javanicum, Gossapinus heptophylla, Artocarpus elastic, Melastoma sp, Pandanus tectorius, Diptorocrapus haseltii, Syzigium polyantha, dll),* Ketinggian 1.000 - 2.000 m dpl (*Syzigium sp, Dysoxylum sp, Aglaia sp, Aglaia argentea, Saccharum spontaneum, Cyclocorus sp*), Elevation >2.000 m asl (*Casuarina junghubniana, Anaphalis visdica, Engelhardia spicata, Podocarpus vaccinium, Vacinium caringifolia, Syzigium sp, Photinia moniana),* and the Elevation <3.000 m asl near Rinjani Peaks the situation are nearly heirless and desolation (Source: Rinjani National Park, 2009).

3.5.2. PROTECTED AREA/ NATURE RESERVE

Outside national park, i.e.: nature reserve, production forest and community forest management (KPH) in boundary of the Rinjani National Park are dominated by mixture plantation, such us: *Dalbergia latifolia*, *Duacontomelori magniferum*, *Swettania macrophyla*, Suren, Dadap, Nangka, Alpukat, Kopi, Coklat, Jambu Mete, etc. One of the protected forest which are still in good condition is Pusuk Forest covering an area of 43.550.20 hectare with 162 tree species. (*Source: Dinas Kehutanan Kabupaten Lombok Barat, 2009*). Could be concluded, the second difference of the conditions of the habitat, the presence of Flores Hawk Eagle in still complete forests, availability of foods and undisturbed, through it is outside on conservation areas (National Park).

3.6 THREATS

Most threat to raptor is related to habitat destruction. Other classical threats including poaching, trade or pesticide are of local occurrence and it is often not significant (Thiollay 1999). In West Nusa Tenggara Island, forest clearances for agriculture and savanna fire are high especially at Sembalung. And the threats to Flores Hawk Eagle at protected forest area/nature reserve are mainly deforestation, degradation and building construction (villa/ hotel/bungalow).

3.6.1. FOREST ENCROACHMENT

Forest encroachment happened almost in all surveyed site, mainly at forest boundaries the people used for cultivation/ forest damaged has also accelerated by shifting cultivation. People, usually, growing their crops on the dry forest of lowland forest area. They are selected such area for their easiness on managing their garden. The forest were slashed and burnt at the end of dry season before they changed it into cultivation area in rainy season. If they through that the area was no longer fertile, they moved to another area.

3.6.2. ILLEGAL LOGING

Although the government has issued prohibition timber exploitation both for firewood and building material in protected area, however the high level of the community dependence are firewood and building material for household or to sale caused the people was come to the forest. During the survey, we found of points taking firewood and wood building material in the conservation area (senaru resort). The type of wood harvested a more dominant a Busur (*Acacia fernesiane*) species, because this species has good quality.

3.6.3. HUNTING

During the survey, hunting birds, dear, and wild pigs were often encountered done by the people around Rinjani National Park. In the Kembang Kuning location, many people hunted for raptors (Brahminy Kite) because this species are considered too often steal domestic chickens from their village. However, there are no records of hunting for Flores Hawk Eagle because this species is very difficult to find. In addition a threat to birds especially in Kembang Kuning village (buffer zone of national park), is a local custom of competition using pigeon; this activity has attracted Peregrine Falcon and Brahminy Kite to hunt on the village.

3.6. ECOLOGICAL ASPECT

There are interesting ecological aspects of Flores Hawk Eagle such us, every flying these birds are often pairing - maybe this behavior is often shown during maintaining of territory. In addition, the eagles were often seen perching than flying. They perched for 1-3 hours. The eagles often appear to fly when temperature is favorable with not strong wing (10.00 to 11.00 in the morning and 15.00 to 16.00 in the afternoon).

Similar to others raptors, the Flores Hawk Eagle when flying more flopping and soaring until they reach certain altitude to make gliding. While, the perching behavior of Flores Hawk Eagle is preening and looking around. And during the survey, we did not found and hear he eagle calling, when flying or perching.

5.0 DISCUSSION

Survey were conducted from July and September 2011 to document of Flores Hawk Eagle presence in Project area, including distribution, population, habitats and ecological aspect, with a particular focus on this species are surveyed in dry season.

During the dry season, the presence of Flores Hawk Eagle of dictates the annual distribution and densities of this bird in the region. Fourty-four individual of Flores Hawk Eagle were observed in the Project area from July and September 2011. Rinjani National Park were the most commonly found, ie: 24 individual (21 pairs), and were typical found in sub-montana forest (>900 m a.sl). In other protected area, found 20 individual (9 pairs and 2 floaters). Result from this survey can be compared with recent, which documented 20 individual or 10 pairs (Gjershaugh et al 2003, in prep, if the home range of hawk-eagle is estimated as wide as 38,5 km2 and then the population was extrapolated with the result in Lombok island).

Compared to survey conducted on 2003 (Gjershaug *et all*, Raharjaningtrah & Rahman. 2003 and Prawiradilaga, 2002), the distribution of Flores Hawk Eagle only be found in four location, i.e: Sesoat, Senaru, Pidana and Pusuk. However, result 2011, the distribution of Flores Hawk Eagle recorded on 18 locations, i.e: Senaru, Santong, Anyar, Steling, Joben, Aikmel, Sembalun (Rinjani National Park), and Pusuk, Sambelia, Belanting, Obel-Obel, Gangga, Tower Senggigi, Tanjung, Sedimen, Sesoat (Other Protected Area) were significantly higher.

During the survey, Flores Hawk Eagle most commonly occurs at an elevation >900 m a.sl (Sub-Montana Forest), it is very different from previous results on 2003 which is distributed 0-900 m a.sl (Raharjaningtrah & Z. Rahman). While an elevation <900 m a.sl, more dominated by Brahminy Kite (*Haliastur indus)*.

The most serious threat to Flores Hawk Eagle and their habitat is land use change, shifting cultivation, hunting practice by local community because the raptors is known as predator to their chicken, taking of firewood and wood material for building in Flores Hawk Eagle habitats and forest clearance agriculture which is especially high at buffer zone in Rinjani National Park.

During the survey, we found five species of raptors, i.e: Brahminy Kite *Haliastur Indus*, Spotted Kestrel *Falco moluccensis*, Peregrine Falcon *Falco peregrinus* and Black-winged Kite *Elanus caeruleus and* Crested Serpent Eagle *Spilornis cheela bido (only voice in the forest)*. The other wildlife is Lutung *Tracyphites auratus cristatus*, Kera Abu-abu *Macaca fascicuralis*, and Rusa Timor *Cervus timorensis.*

6.0 RECOMENDATION

- Nest search of Flores Hawk Eagle in all locations surveyed. It is more important to support the presence of accurate data of this species that is actual populations and ecological aspect on breeding season.
- Sustainability survey of Flores Hawk Eagle in other place (Flores and Sumbawa Island)
- Strengthening of local communities and Rinjani National Park Staff with Raptor ID training.
- Development of the environmental campaign with environmental education based on raptor and their habitats to elementary school, junior/senior high school and general public (local community around in national park or nature reserve).
- Community Development and reforestation development around on buffer zone of the Rinjani National Park.

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Appendix A

Survey Results of Flores Hawk Eagle in Rinjani National Park

A. Seksi Pengelolaan Taman Nasional (SPTN I West Lombok)

National Park Management Section (known as Seksi Pengelolaan Taman Nasional/SPTN I) is the part areas of Mount Rinjani National Park at Western Lombok District which coverage area of ± 12.357,67 hectare (30%) which three Resort Unit, i.e.: Senaru Resort, Santong Resort, and Anyar Resort.

1. Senaru (8°18'19.96"S - 116°24'12.24"E). Senaru i s one of the main gates to trekking of the Mount Rinjani National Park, at the western side of the national park. This area is one of the main habitat for the existence of Flores Hawk Eagle, they are variation habitat, i.e.: lowland forest, sub-Montana, Montana and alpine (rinjani summit). Observation point at buffer zone of the national park comprises an agriculture area. Sindanggila Waterfall Information Centre, Pondok Senaru and Tapang Gunung is the best place for observation point with the views of the Rinjani Summit, Mt. Sampurarang, Mt. Malang and Mt. Plawangan. Observation on 27-28 July 2011 (First Survey), we found 4 individual (2 pairs) of Flores Hawk Eagle (*Nisaetus floris*) flying around Mt. Sampurarang and Mt. Malang valley and one individual was identified carrying of food (rat) to Mt. Sampurarang valley. And the second survey on 10-11 September 2011, we also found 4 individual (2 pairs) flying on same place. The other raptors, we found 3 individual (1 pairs) and 1 juvenile (fledgling) of Brahminy Kite (*Haliastur Indus*) flying, calling and perching in the nest tree. The nest location about 500 meters to northern from Pondok Senaru. And 1 individual of Spotted Kestrel (*Falco moluccensis*) flying around Sindanggila Waterfall.

2. Santong (8°18'1.68"S - 116°19'9.67"E). Santong i s an agricultural area on the western Lombok. The forest condition on this area is degradation land to agricultural. The community livelihood is farming and livestock. Observation on 28 July 2011 (10 km from Senaru), we found 4 individual (2 pairs) of Flores Hawk Eagle (*Nisaetus floris*) flying around Mt. Malang and Mt. Pelawangan valley. Moreover, 2 individual (1 pairs) of Brahminiy Kite (*Haliastur Indus*) and 1 individual of Spotted Kestrel (*Falco moluccensis*) flying around primary forest.

3. Anyar (8°16'12.80"S - 116°21'59.29"E). Anyar is coffee and cocoa plantation areas was located on buffer zone of the national park are managed by local communities. The vegetation type is lowland forest and sub montane. Observation on 28 July 2011, we found 2 individual (1 pairs) of Flores Hawk Eagle (*Nisaetus floris*) flying and perching around Mt. Pelawangan valley and 1 individual of Brahminy Kite (*Haliastus indus*) flying agricultural area.

B. Seksi Pengelolaan Taman Nasional (SPTN II East Lombok)

National Park Management Section (known as Seksi Pengelolaan Taman Nasional / SPTN II) is located at Eastern Lombok which coverage area is ± 22.152,88 hectare (53%) which two Resort Unit, i.e.: Aik Berik Resort and Steling Resort. The vegetation type of this area is lowland forest and sub-Montana forest.

1. Aik Beling (8°30'23.09"S - 116°21'21.11"E). Aik Beling is one of the community forest a advancement with national park. The community livelihood is coffee and cocoa farming. The vegetation type of this location is lowland forest and sub-Montana. Observation on 29 July 2011, we found 2 (1 pair) of Flores Hawk Eagle (*Nisaetus floris*)flying together around

Benang Kelambu waterfall area. And also, we found 1 individual of Brahminy Kite (*Haliastur indus*) and 1 individual of Peregrine Falcon (*Falco perigrinus*) flying around rice field and agricultural land.

2. Steling (8°30'17.61"S 116°24'50.84"E). Steling i s an agricultural area and mixture plantation at buffer zone of the national park. The vegetation type this location is lowland forest and sub-montane. Observation on September 2011, we found 2 (1 pairs) of Flores Hawk Eagle (*Nisaetus floris*) flying and perching around Mt. Plawangan valley and 2 individual of Brahminy Kite (*Haliatus Indus*) flying around agricultural land and rice field.

C. Seksi Pengelolaan Taman Nasional (SPTN III Central Lombok).

National Park Management Section (known as Seksi Pengelolaan Taman Nasional/ SPTN III) is located at central Lombok which coverage area is ± 6.819,45 Ha (17%) which 4 Resort Unit, i.e.: Joben Resort, Kembang Kuning Resort, Aikmel Resort and Sembalun Resort. The vegetation type this area is savanna, lowland forest and sub-montane forest.

1. Kembang Kuning Resort (8°31'9.82"S - 116°25'26.1 3"E). Kembang Kuning is a agricultural and rice field area as bordering of the national park. The vegetation type on this area is lowland forest and sub-montana forest, which a tourist area has rice field attraction and waterfall. The community livelihood is paddy, coffee and tree production farming. Observation on 12 September 2011, we found 2 (1 pairs) of Flores Hawk Eagle (*Nisaetus floris*) flying and perching around Mt. Rinjani valley. Other raptors, we found 1 individual of Peregrine Falcon (*Falco peregrinus*) perching and peeding of pigeon on the picus tree, and 7 individual of Brahminy Kite (*Haliastur Indus*) flying and hunting around rice field area.

2. Joben Resort (8°30'5.53"S - 116°30'56.82"E). Abo ut 10 km from Kembang Kuning Resort. Joben is a agricultural and rice field area. The community livelihood is paddy, vegetable and coffe farming. The vegetation type is lowland forest and sub-montane forest. Observation on 13 September 2011, we found 2 individual (1 pairs) of Flores Hawk Eagle (*Nisaetus floris*) flying around in Mt. Plawangan valley, and also 2 individual of Brahminy Kite (*Haliastur Indus*)flying around in rice field area.

3. Aikmel Resort (8°28'11.20"S - 116°32'17.00"E). A ikmel is a alternative cross pathway toward Sembalun with the distance about 3 hour from Aikmel mainroad to Sembalun. This is alternative cross pathway in the national park. The vegetation type is sub-montane forest. Observation on 14 September 2011, we found 2 individual (1 pairs) of Flores Hawk Eagle (*Nisaetus floris*) flying a pairs around Mt. Adastimur and Mt. Mundung valley. Other raptors, we found 1 individual of Brahminy Kite (*Haliastur indus*) flying around secondary forest and 1 individual of Spotted Kestrel (*Falco moluccensis*) flying around agricultural area.

4. Sembalun Resort (8°20'36.65"S 116°30'23.90"E). S embalun is an agricultural area a bordering which national park. The vegetation type is savanna, lowland forest and sub-montane forest. The community livelihood is farming. Observation on 29 July 2011, we found 4 individual (2 pairs) of Flores Hawk Eagle (*Nisaetus floris)* lying and perching around Mt. Batu, Mt. Turunjalan. Mt. Sengkor, and Mt. Iyas valley. Other raptors, we found 1 individual of Black-winged Kite (*Elanus caeruleus),* 1 individual of Spotted Kestrel (*Falco moluccensis*) and 1 individual of Crested Serpent Eagle (*Spilornis cheela bido*) ?? Calling around in the forest.

Appendix B

Survey Results of Flores Hawk Eagle in Other Protected Area

1. Pusuk (8°27'35.22"S - 116° 5'17.18"E). Pusuk is a protected area/ nature reserves which management of the Forestry Department District of West Lombok. This area is very important for water catchment area for people in Senggigi and Mataram Town. The Pusuk forest area is 43.550.20 hectare and an alternative route to Senggigi. Observation on 27July 2011, we found 5 individual (2 pairs and 1 floater) of Flores Hawk Eagle (*Nisaetus floris*) flying and perching around Mt. Pusuk, Mt. Meninting, and Mt. Masjid Borok valley. Other raptors, we found 6 individual of Brahminy Kite (*Haliastur Indus*) flying around rice field area.

2. Sambelia (8°21'14.79"S - 116°41'17.47"E). Sambe lia is dry land areas. In 2006, this area has been of flood biggest that damage of hundreds of homes and agricultural land hectares. The community livelihood is paddy field farming and production forest. Most of the people are depend of natural resources. Firewood's is the main taken from the forest. This area is boundaries of the nature reserve which good forest vegetation. Observation on 10 September 2011, we found 2 individual (1 pairs) of Flores Hawk Eagle flying around Mt. Mundung and also, we found 2 individual of Brahminy Kite flying around agricultural land.

3. Belanting (8°18'33.35"S - 116°37'43.56"E). About 10 km from Sambelia by car. The community livelihood is rice field and union farming. The vegetation type is lowland forest and sub-montane forest. The community dependence as firewood is still high. Observation on 11 September 2011, we found 2 individual (1 pairs) of Flores Hawk Eagle (*Nisaetus floris*) flying and perching around Mt. Sengkor and Mt. Turunjalan valley. Other raptors, found 2 individual of Brahminy Kite (*Haliastur Indus*) flying around rice field area.

4. Obel-obel (8°16'43.97"S - 116°35'18.70"E). About 6 km from Belanting. This is a dry land area with vegetation type is savanna, lowland forest and sub-montane forest. The community livelihood is farming and livestock. Observation on 11 September 2011, we found 2 individual (1 pairs) of Flores Hawk Eagle (*Nisaetus floris*) flying around Mt. Turunjalan valley and other raptors, found 1 individual of Brahminy Kite (*Haliastur indus*) flying around agricultural area.

5. Gangga (8°21'47.45"S 116°15'42.68"E). Gangga is located in North Lombok, about 22 km from Pusuk forest (1 hour) or 50 km (1,5 hour) from Mataram. This location has a waterfall. The name is Gangga Waterfall was located at two villages, such us: Gangga Village and Kerta Raharja Village in Northern Lombok district. The community livelihoods are rice field, agricultural farming and community forest management. The vegetation type around this area is lowland forest and sub-montane forest. The first observation on 12 September, not found of Flores Hawk Eagle and the second survey on 27 September 2011, we found 2 individual (1 pairs) of Flores Hawk Eagle (*Nisaetus floris*) flying around Mt. Marungmeriris and Mt. Buahmangge valley and other raptor, found 2 individual of Brahminy Kite (*Haliastur indus*) flying around Gangga Waterfall area.

6. Sesoat (8°32'40.81"S - 116°19'2.75"E). Sesoat fo rest area is primary forest, secondary forest, mahoni plantation and agro forestry with various types of timber plants, fruits and annual crops. In addation, this location is a water spring (56 water spring) which empties to the Sesoat River, Jangkok, Tembiras, Pemoto, Bentoyang, Bentung and Bensue River. The community's livelihood is agro forestry. Observation on 15 September 2011, we found 2 individual (1 pairs) of Flores Hawk Eagle (*Nisaetus floris*) flying around Mt. Plawangan valley. Other raptors, found 2 individual of Spotted Kestrel (*Falco moluccensis*) and 1 individual of Brahminy Kite (*Haliastur indus*) flying around agro forestry area.

7. Sedimen (8°29'58.46"S - 116° 5'49.90"E). Sedimen is alternative main road to Pusuk forest. The vegetation type is lowland forest and sub-montane forest. The community's livelihood is agro forestry farming. Observation on 13 September 2011, we found 2 individual of Flores Hawk Eagle (*Nisaetus floris*) flying a pairs around Mt. Masjid Borok valley. Not found of other raptors.

8. Tower Senggigi (8°29'27.77"S - 116°2'38.89"E). T ower Senggigi is a lowland area with the vegetation type primary forest, secondary forest and agro forestry. The community's livelihood is agro forestry farming and livestock. Observation on 16 September 2011, we found 1 individual of Flores Hawk Eagle (*Nisaetus floris*) flying and perching around Mt. Meninting valley and other raptor, found 4 individual of Brahminy Kite (*Haliastur indus*) flying around village and agro forestry area.

9. Tanjung (8°25'30.03"S - 116° 9'35.13"E). Tanjung is a primary forest, secondary forest, and coconut plantation and agro forestry with various type of timber plant. Fruits and annual crops. The community livelihood is paddy field farming, livestock and agro forestry. Observation on 15 September 2011, we found 2 individual (1 pairs) of Flores Hawk Eagle (*Nisaetus floris*) flying and perching around primary forest and other raptor, found 2 individual of Brahminy Kite (*Haliastur indus*) flying around secondary forest and rice field area.