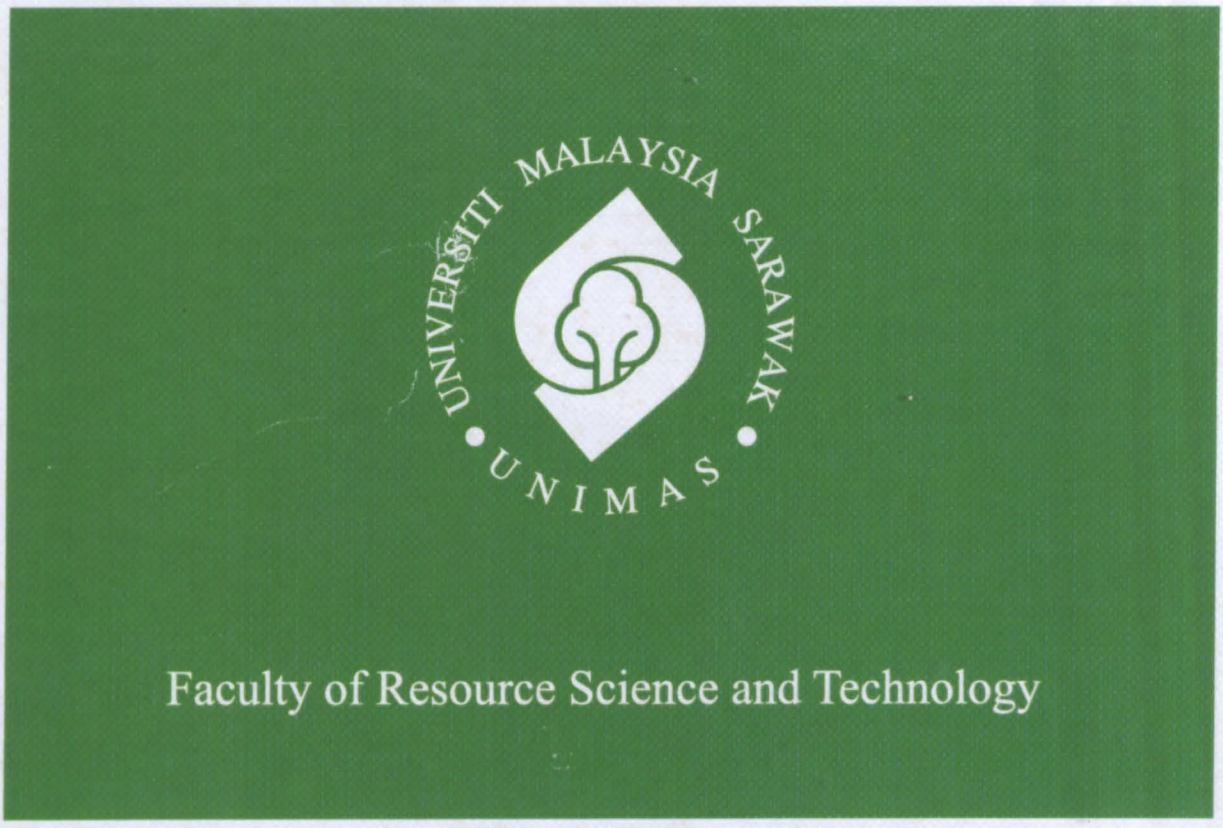

ABUNDANCE OF PROBOSCIS MONKEY (*NASALIS LARVATUS*) AT SAMUNSAM WILDLIFE SANCTUARY, SARAWAK, MALAYSIA

Mohamad Abid Bin Kamaruzzaman

(34921)

Bachelor of Science with Honours
(Animal Resource Science and Management)
2015

UNIVERSITI MALAYSIA SARAWAK

Grade: _____

Please tick (√)

Final Year Project Report [√]

Masters [ ]

PhD [ ]

DECLARATION OF ORIGINAL WORK

This declaration is made on the 27 day of June 2015.

Student's Declaration:

I Mohamad Abid bin Kamaruzaman, 34921, Faculty of Resource Science and Technology (PLEASE INDICATE STUDENT'S NAME, MATRIC NO. AND FACULTY) hereby declare that the work entitled Abundance of Proboscis Monkey at Samunsam Wildlife Sanctuary is my original work. I have not copied from any other students' work or from any other sources except where due reference or acknowledgement is made explicitly in the text, nor has any part been written for me by another person.

Date submitted

Mohamad Abid bin Kamaruzaman (34921)

Name of the student (Matric No.)

Supervisor's Declaration:

I Roberta Chaya Tawie Tingga (SUPERVISOR'S NAME) hereby certifies that the work entitled Abundance of Proboscis Monkey at Samunsam Wildlife Sanctuary (TITLE) was prepared by the above named student, and was submitted to the "FACULTY" as a * ~~partial~~/full fulfillment for the conferment of Bachelor of Science with Honours (PLEASE INDICATE THE DEGREE), and the aforementioned work, to the best of my knowledge, is the said student's work.

Received for examination by: _____ Date: 25/6/2015

(Name of the supervisor)

Roberta Chaya Tawie Tingga
Lecturer
Centre for Pre-University Studies
UNIVERSITI MALAYSIA SARAWAK

I declare that Project/Thesis is classified as (Please tick (√)):

☐ **CONFIDENTIAL** (Contains confidential information under the Official Secret Act 1972)*
☐ **RESTRICTED** (Contains restricted information as specified by the organisation where research was done)*
☑ **OPEN ACCESS**

Validation of Project/Thesis

I therefore duly affirm with free consent and willingly declare that this said Project/Thesis shall be placed officially in the Centre for Academic Information Services with the abiding interest and rights as follows:

- This Project/Thesis is the sole legal property of Universiti Malaysia Sarawak (UNIMAS).
- The Centre for Academic Information Services has the lawful right to make copies for the purpose of academic and research only and not for other purpose.
- The Centre for Academic Information Services has the lawful right to digitalise the content for the Local Content Database.
- The Centre for Academic Information Services has the lawful right to make copies of the Project/Thesis for academic exchange between Higher Learning Institute.
- No dispute or any claim shall arise from the student itself neither third party on this Project/Thesis once it becomes the sole property of UNIMAS.
- This Project/Thesis or any material, data and information related to it shall not be distributed, published or disclosed to any party by the student except with UNIMAS permission.

Student signature _____ (Date) 27/6/2015

Supervisor signature: _____ (Date) 25/6/2015

Current Address:
Lot 1519, Kg. Padang Pohon Tanjung, Pasir Pekan Hilir 16250
Wakaf Bharu, Kelantan.

Notes: * If the Project/Thesis is **CONFIDENTIAL** or **RESTRICTED**, please attach together as annexure a letter from the organisation with the period and reasons of confidentiality and restriction.

[The instrument is duly prepared by The Centre for Academic Information Services]

Abundance of Proboscis Monkey *(Nasalis larvatus)* at Samunsam Wildlife Sanctuary, Sarawak, Malaysia

Mohamad Abid bin Kamaruzzaman

A project submitted in partial fulfilment of the

Final Year Project 2 (STF3015)

Animal Resource Science and Management
Department of Zoology

Faculty of Resource Science and Technology
Universiti Malaysia Sarawak
2015

ACKNOWLEDGEMENT

Alhamdulillah and praise to Allah SWT the most gracious and most merciful for giving me this golden opportunities to finish all my fieldwork and writing for this research project. Firstly, I would like to express my gratitude to my supervisor of this project, Roberta Chaya Tawie Tingga and co-supervisor, Dr. Faisal Ali Anwarali Khan for invaluable guidance, experience, assistance, support, information and brilliant ideas throughout this project. They inspired me greatly to work hard in this project research. Secondly, I acknowledge the help and advice given to me by the Samunsam staff during the fieldwork experiences, especially warden of Samunsam Wildlife Sanctuary, Roy Francis. And I thanks to other Samunsam rangers Japri Senan, Shukor Bujang and Christopher Apong for assisted me during the survey moment on this project. Last but not least, I would like to thank my both parent, families and friends that never give up giving me moral support and understanding throughout the hardship of this project research.

DECLARATION

I hereby declare this thesis with entitled "Abundance of Proboscis Monkey *(Nasalis larvatus)* at Samunsam Wildlife Sanctuary, Sarawak, Malaysia" is based on my original observation and survey except for citation and references which have been duly acknowledged.

....

Signature Date

Mohamad Abid bin Kamaruzzaman

Animal Resource Science and Management

Faculty of Resource Science and Technology

Universiti Malaysia Sarawak

TABLE OF CONTENTS

LIST OF ABBREVIATION

CITES	Convention of International Trade in Endangered Species of Flora and Fauna
GPS	Global Positioning System
IUCN	International of Union Conservation and Nature
KF	Kerangas forest
Km	Kilometer
KWNP	Kuching Wetland National Park
MDF	Mixed dipterocarp forest
MF	Mangrove forest
RF	Riverine forest
SFD	Sarawak Forestry Department
SWS	Samunsam Wildlife Sanctuary

LIST OF FIGURES AND TABLES

LIST OF APPENDIXES

Abundance of Proboscis Monkey *(Nasalis larvatus)* at Samunsam Wildlife Sanctuary, Sarawak, Malaysia

Mohamad Abid bin Kamaruzzaman

BSc. (Hons) Animal Resource Science and Management
Faculty of Resource Science and Technology
Universiti Malaysia Sarawak

ABSTRACT

A total two weeks on boat survey was conducted in October 2014 and February/March 2015 at Samunsam Wildlife Sanctuary. The purposes of this research to valid the abundance of proboscis monkey *(Nasalis larvatus)* with comparison of total abundance from previous studies on the same methodological mechanism. During the survey the groups of proboscis monkey sighted mainly were live at 2 km stretch further upstream from the river mouth of sanctuary's headquarter along Samunsam River. The abundance calculated for both periods were not much distinctive with 0.32 groups/km surveyed in October 2014 and a bit lower in February/March 2015 with 0.29 groups/km surveyed. Thus, with an average 0.305 groups/km surveyed in present study, the total abundance was much higher than two previous study conducted in 2001 and 2004. This is because the groups of proboscis monkey sighted were favoring their sleeping sites and have sufficient food availabilities in Samunsam area. The surveys also found that proboscis monkey tend to use trees from *Rhizophora* sp. and *Avicennia* sp. as their foraging site as well as for sleeping site.

Keywords: abundance, *Nasalis larvatus*, Samunsam Wildlife Sanctuary

ABSTRAK

Sebanyak dua minggu jumlah kesuluruhan peninjauan bot telah diadakan pada Oktober 2014 dan Februari/ Mac 2015 di Santuari Hidupan Liar Samunsam. Tujuan kajian ini untuk mengesahkan kembali bilangan kependudukan monyet belanda (Nasalis larvatus) dengan memandingkan bilangan kependudukan dari kajian sebelum ini pada mekanisme kajian yang sama. Peninjauan bot telah melihat kumpulan-kumpalan monyet belanda mengutamakan tempat tinggal 2km kawasan hulu ke atas bermula dari kuala ibu pejabat santuari sepanjang Sungai Samunsam. Jumlah bilangan kependudukan monyet belanda pada kedua-dua waktu tidak memberi perbezaan yang jauh iaitu sebanyak 0.32 kumpulan/km pada peninjauan Oktober 2014 dan sedikit rendah pada Februari/ Mac 2015 dengan jumlah 0.29 kumpulan/ km. Oleh itu, dengan purata 0.305 kumpulan/ km pada kajian terkini, jumlah bilangan kependudukan monyet belanda lebih tinggi berbanding dua kajian sebelum ini pada tahun 2001 dan 2004. Ini kerana dalam pemerhatian terhadap monyet belanda mendapati mereka selesa dengan tapak tidur dan makanan yang mencukupi di kawasan Samunsam. Peninjauan kajian ini juga mendapati monyet belanda menggunakan pokok dari spesies Rhizophora sp. dan Avicennia sp. sebagai tempat makanan serta tempat tidur mereka.

Kata kunci: bilangan kependudukan, Nasalis larvatus, Santuari Hidupan Liar Samunsam

1.0 INTRODUCTION

1.1 Background Study

The proboscis monkey *(Nasalis larvatus)* is a type of primate that classified by the International Union for Conservation of Nature (IUCN) Red list of threatened species as endangered. This species is prohibited in all commercial trade under Appendix I of the Convention of International Trade in Endangered Species of Flora and Fauna (CITES). It is one of the monkeys from the old world monkey of family Cercopithecidae that have two subfamilies which are Colobinae and Cercopithecinae (Oates & Davies 1994). The proboscis monkey is under subfamily Colobinae that contain over 30 species throughout Africa and Asia (Oates & Davies 1994). It is also known as *rasong*, *belang pinggang*, *bekantan*, and *monyet belanda* (Dutch monkey) by the various local people and endemically in the island of Borneo. Based on their morphologies, *N. larvatus* features are distinguish by their elongated pendulous noses and distended stomach. Only adult male have this kind of nose while females have sharp pointy witch-like noses. Function of its larger nose is still unknown. Underparts of *N. larvatus* usually dull with pale greyish-yellow to red-brown and darker on the upper back. On top of the head is reddish-brown and its underparts more paler (Payne *et al.*, 2007).

In their social organisation, the most typical group types in proboscis monkey are one-male group that consists of an adult male, females and their offspring; and all-male (bachelor) group that consists of adult males and male juveniles. The main causes of all-male (bachelor) group type are due to inbreeding avoidance and sexual competition avoidance (Boonratana, 1999). The proboscis monkey is an arboreal (tree-dwelling) primate that spends their daily

activities mostly on feeding, moving, resting, playing, and grooming. For dietary composition, proboscis monkey consuming exclusively 98.25% on leaves, shoots, unripe fruits, and flowers. Several food types that consumed by *N. larvatus* in mangrove forest are *Rhizophora apiculata, Avicennia officinalis, Bruguiera gymnorhiza, Bruguiera parviflora,* and *Alophyllus cobbe* (Bismark, 1994).

N. larvatus is known to use three main forest types which are mangrove forest, riverine forest, and peat swamp forest (Sha *et al.,* 2011). This is because proboscis monkey is totally sensitive with their habitat structure that determined the specific food resources in their natural habitat. Thus, this will affect the total number of proboscis monkey present in their habitat because this species focus on habitat quality that makes it relatively intolerant to habitat disturbances (Yeager, 1992; Bennet & Gombek 1993).

According to Bennet and Gombek (1993), hunting and illegal logging is the two major factors that cause the decreasing of proboscis monkey in the last 20 years. The population number in the past three generation experienced a substantial drop due to habitat loss and hunting. Although these factors seem the old threat, it shows the benchmark that proboscis monkey is highly threatened in the wild. Thus, it requires continuous study to implement appropriate actions in the future. Approximately 36 – 40 years back, the numbers proboscis monkeys have descended exceeding 50% but expected to be less than 80% (Meijaard *et al.,* 2008).

Proboscis monkey is threatened by the human activities such as expansion of human habitation and forest clearance for timber, large scale agriculture and other purpose that fragmented and disturbed populations in forest 'Alcatrazes' (Sha *et al.*, 2011). Thus, these agricultural development, deforestation and aquaculture activities may affect the proboscis monkeys' distribution throughout Sarawak. Currently, there is also lack of knowledge about the proboscis monkeys, such as their distribution, nutrition, and daily life patterns. Though it may not seem vivid, the decrease in their numbers may in fact pose as a great threat to their habitat use throughout Sarawak.

Thus, this study aims to document the current information and calculating abundance of proboscis monkey *(Nasalis larvatus)* in Samunsam Wildlife Sanctuary (SWS). Furthermore, this research also aims to make comparative study on abundance between two sampling period which is in October 2014 and February/ March 2015. And lastly, this project compares the abundance of proboscis monkey with the other studies conducted in Samunsam Wildlife Sanctuary.

2.0 LITERATURE REVIEW

2.1 Abundance of Proboscis Monkey

Within the past 30 years, many researchers have studied about abundance on proboscis monkey. For example in Samunsam Wildlife Sanctuary (SWS), it had been reported by Bennett and Sebastian (1988), Rubis (unpublished), and Tuen and Joshua (2007). The data shows that the abundance fluctuation of proboscis monkey that declining dramatically from 0.52 groups/ km survey in August 1984 – April 1986 (Bennet & Sebastian, 1988) to 0.11 groups/ km survey in October 2001 – September 2002 (Rubis, unpublished), and increase a bit to 0.17 groups/ km survey in August 2004 – November 2004 (Tuen & Joshua, 2007) in Samunsam Wildlife Sanctuary (SWS). Table 1 shows the mean group densities for the number of group observed per kilometer survey along Samunsam River. According to Rubis (2001), the declining of *N. larvatus* sighted in SWS due to encroachment activities which were reported 17 different cases that give disturbances within the sanctuary. The current abundance of proboscis monkey in SWS is crucial to be updated since not much survey conducted recently.

Table 1: Comparison between the total abundance (No. of group observed/ km surveyed) sighted along Samunsam River (Source: adapted from Tuen & Joshua, 2007).

Years of Research Conducted	**1984-1986 (Bennett and Sebastian 1988)**	**2001-2002 (Rubis, unpublished)**	**2004 (Tuen & Joshua, 2007)**
Abundance of Proboscis Monkey	0.52	0.11	0.17

Meanwhile in Kuching Wetland National Park (KWNP), the survey on primates had been carried out by Beavitt & Tuen (2010) reported that three species of diurnal primates sighted. These are proboscis monkey *(Nasalis larvatus)*, long-tailed macaque *(Macaca fascicularis)*, and silver-leaf monkey *(Presbytis cristata)*. They estimated around 60-80 proboscis monkey, 80-100 long-tailed macaque, and 60-80 silver-leaf monkey was recorded with high densities of these primates along the stretch of Salak River, opposite to Salak Village, in KWNP.

According to Yeager and Blondal (1992), Sarawak holds approximately 1000 individuals total population of proboscis monkey where 300 individuals can be found in conservations areas. But in Sabah, the total population is higher with 435 harem groups, 31 all-male groups, and 12 one-male groups was sighted with total number 5907 individuals found from June 2005 – November 2005 (Sha *et al.,* 2008). The abundance of proboscis monkey groups are different according to specific habitat type. They calculated the sighting group frequency is higher in swamp forest (0.86 groups/km and 10.86 individuals/km), followed by riparian forest (0.64 groups/km and 8.43 individuals/km) and lowest group frequency in mangrove and nipah forest (0.26 groups/km and 2.98 groups/km).

2.2 Population Threats

The proboscis monkey in SWS gives behavior reflection on hunting activities that occur in their habitat. According to Tuen and Joshua (2007), there were two gun shots fired somewhere in the forest during the fieldwork. The hunters seem to targeting wild boar or other game animals, but for proboscis monkey it will perceive as a threat. Thus, *N. larvatus* will protect and cover itselves from hunters by spending further inland which are poor in habitat resources and fleeing quickly when spotted by humans. In Kalimantan, the population of proboscis monkey is declining due to hunting activities by non-muslim Dayaks in inland areas. But in Sabah, proboscis monkey seems flexible distribute within areas dominantly by Muslim groups that religiously do not hunt monkeys (Sha *et al.*, 2011).

Other places such as KWNP, the anthropogenic activities nearby directly destroy natural habitat quality for various species of flora and fauna. Primate survey from Beavitt & Tuen (2010) reported that there were sand dredgers extracting sand along the estuarine and inshore waters. The recruitment of sand will generate new roads and urbanization development that affecting peat swamp forest and mangrove forest in KWNP. In southern part of the park, approximately 50 acres had been cleared for oil palm agricultural activities. This activity already gives wide open areas of shrubs and forbs that intolerant to primate vegetation in KWNP such as proboscis monkey, long-tailed macaque, and silver-leaf monkey.

2.3 Activities and Behaviors

Daily activities and behaviors of proboscis monkey are different between the other primates. A part of series on ethology that shows the pattern and specific daily activities of organisms is called ethogram. According to Lehner (1989), ethogram repertoire all functional and non-functional behavioral pattern of an organisms include their daily maintenance. In proboscis monkey, there are seven categories of behaviors that were described successfully by Kombi (2013) in Bako National Park (BNP). These ethogram constructions are included feeding, resting, agonistic, grooming, solicitation, copulation, and locomotion. From these categories, he manage to identify the others activities and actions of *N. larvatus* such as jumping, leaping, quadrupedal walking, chasing, slapping, biting, facial threats, postural threats, grooming, solicitation, copulation and other miscellaneous behavior.

N. larvatus is a diurnal primate that can be sighted closely to the riverbanks. They select sleeping sites up on the trees along the water edges then travel away from inland to forage and returning back at sleeping sites in the evening. The proboscis monkey more frequently selected narrower locations of tree branch-to-bank and arboreal routes to cross the river (Mastuda *et al.*, 2008). This behavior action of *N. larvatus* is to ensure they can function vigilant against predators. Throughout this research, they found that adult male proboscis monkey used its larger bodied that can leap longer distance from trees to riverbanks without swimming across river. Comparing with females and juveniles that have smaller bodied, it's significantly act as antipredator behavior that minimizing frequency and time utilization while crossing the river (Mastuda *et al.*, 2008).

2.4 Habitat Distribution

The distributions of proboscis monkey are endemic to Borneo and mostly are sighted in peat swamp forest, mangrove forest and riparian forest. According to Soendjoto (2003), there is a small population of proboscis monkey detected in the upstream dipterocarp forest and also rubber plantations which are about 300 km from coastal areas. In Kalimantan, 8% of proboscis monkey was detected >200 km directly inland from coastal areas; 18% between 100 km to 200 km; 16% between 50 km to 100 km; and 58% which presence <50 km from the coastal areas (Meijaard & Nijman, 2000). This study also successfully covered more than 30 different locations whereby the species detected in mangrove forest, small islands in the coastal deltas, riverbanks, and peat swamp forest.

Meanwhile, the highest numbers of proboscis monkey over ten different places survey conducted in Sabah comprised 48% in riparian forest, 44.9% in mangrove and nipah forest, and 7.1% in peat swamp forest (Sha *et al.,* 2008). The habitat distributions of *N. larvatus* are influenced by two factors, which is the present of food sources and rivers. Habitat use is refer to the preferred habitat to be used significantly for feeding, moving, resting, and other related activities such as sleeping location, foraging sites and also food-related travel activities (Salter *et al.*, 1985). According to Bennett and Gombek (1993), *N. larvatus* will use the tree near the river to sleep every night and after dawn they will move far away from sleeping habitat to find their food.

3.0 MATERIALS AND METHODS

3.1 Study Site

Samunsam Wildlife Sanctuary (SWS) (see Figure 1) is the first wildlife sanctuary in Sarawak that was gazetted on 22nd March 1979 and located at western tip of Sarawak, Malaysia and Kalimantan, Indonesia border (1◦ 78' N, 109◦ 36' E) (Bennet & Sebastian, 1988). They estimated that approximately 160 individuals of proboscis monkey left. The main establishment of this sanctuary is to protect proboscis monkey that was thought to be the largest population in Sarawak.

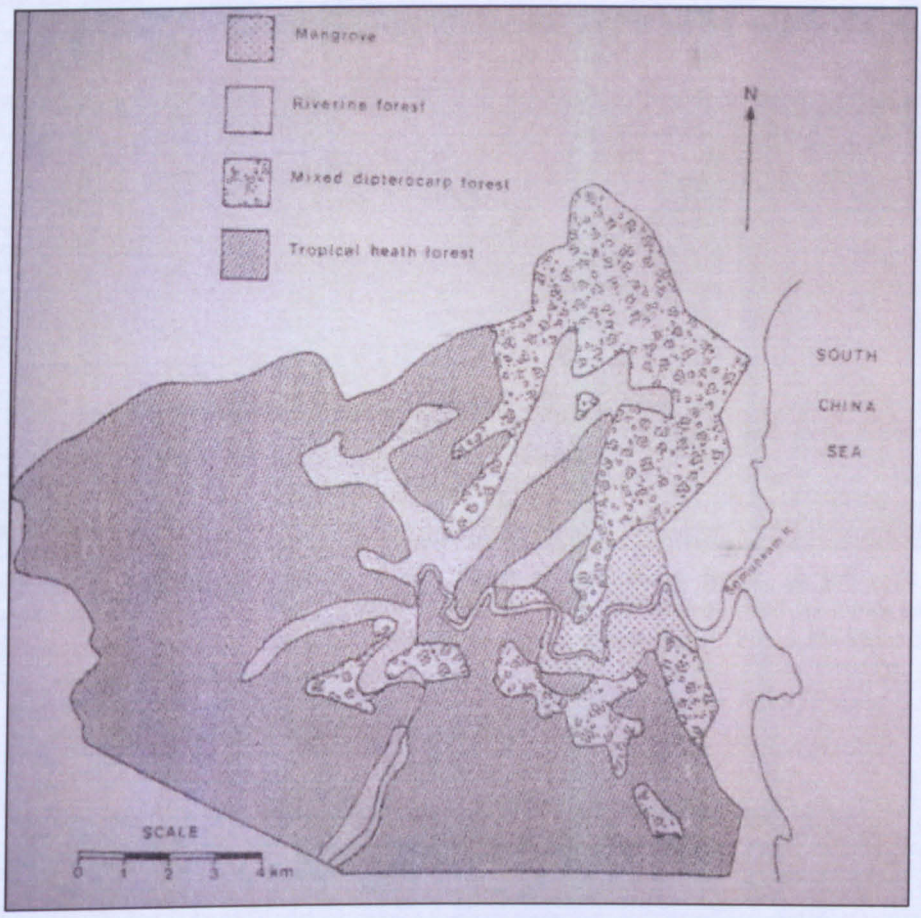

Figure 1: Distribution of different forest types at Samunsam Wildlife Sanctuary (Sources: adapted from Bennett and Sebastian, 1988)

There were four types of forest vegetation along the Samunsam River. These are mangrove forest (MF), riverine forest (RF), mixed dipterocarp forest (MDF), and kerangas forest (KF) (Bennett & Sebastian, 1988). Mangrove forest cover up to 5 km at the lower reaches of Samunsam River and riverine forest mainly at upper reaches of the river. And MDF is conquering the Samunsam River because it's diverse with tall, broad and buttressd trees of plant species (Rubis, 2001).

Figure 2: Picture showing the vegetation forest at Samunsam River on left side is characterization of trees from MG + MDF + KR and right side is dominated by nipah palm (*Nypa fructicans*) which is characterization of mangrove forest (MG) (Photo by Mohamad Abid)

3.2 Data Collection

The information of *N. larvatus* was obtained by direct observation throughout the whole fieldwork. In SWS, the best way to detect the present of proboscis monkey by the boat transects along the Samunsam River. Duration for observation is twice per day at dawn (0530-0830) and dusk (1630-1930). This project had done in two different periods of fieldwork in Samunsam Wildlife Sanctuary (SWS) for a total two weeks. The first trip was conducted on 20th October 2014 – 26th October 2014 and second trip is on 26th February 2015 – 4th March 2015.

During the sighting, the boat was slowed down and move to the riverside when a group of proboscis monkey was encountered. All the observation of the group such as total number of group, sexes identification, types of fruit and leaves consume by proboscis monkey and other behavior had been recorded. The habitat uses by proboscis monkey in study sites are also recorded. Moreover, the data sheet is used to determine the individual and group size of the proboscis monkey includes the male, female and also juvenile. On evening survey, a tape was used to tag the sleeping sites of proboscis monkey. This will help to recognise the same groups in the next morning survey because proboscis monkey usually do not flee from their sleeping sites after dark hour (Bernard *et al.*, 2011). The boat transect is limited the sighting of proboscis monkey because they travel inland away from early morning to late evening and return back to riverine areas for sleeping (Sha *et al.*, 2011).

Throughout this sighting, binocular (Bushnell, 8X-120X80) and GPS (Garmin etrex 30) reading were used to detect and coordinate the specific groups location of *N. larvatus* to allocate them inside the map that been created. Moreover, 40HP speed boat which belongs to Sarawak Forestry Corporation (SFC) was used to do the observation starting from the SWS headquarters's jetty until the longest distance can reach at the upstream site of Samunsam River. The one shot counting of proboscis monkey had been encountered since they fleeing inside the dense forest when detecting the present of boat survey. Moreover, the accessibility into dense forest was highly danger for example mangrove forest (MF) which was highly affected by tidal movement and cannot be accessible during the high tide.

Since the fieldtrip was conducted in different month, the specific food consumed by *N. larvatus* can be recorded based on where they were sighted. This is because according to Yeager (1989), the season of fruit starting from January until May. Hence, Yeager (1989) expects that proboscis monkey can consume fruit (frugivorous) in this season and then change into leaf-eaters (folivours) from June until December.

3.3 Data Analysis

For data analysis, this research had calculated abundance of proboscis monkey based on formula given below and individual density of proboscis monkey. It was used to find the current population size based survey on October 2014 and January/February 2015. The calculation also was adopted from Tuen and Joshua (2007) during their boat survey conducted in 2004. The abundance of proboscis monkey in this research was calculated as below:

1. **Individual abundance** $= \dfrac{\textbf{Total no.of individuals found}}{\textbf{Total km surveyed}}$

2. **Group abundance** $= \dfrac{\textbf{Total no.of groups found}}{\textbf{Total km surveyed}}$

*Total km surveyed = length of river transect surveyed (km) × frequency of boat surveyed