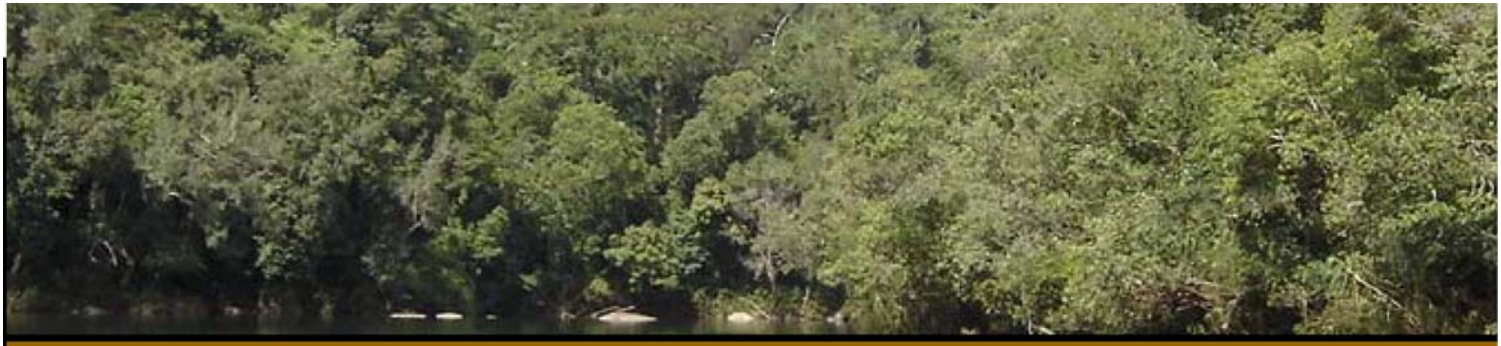

COMMUNITY-DRIVEN OF CAMBODIAN CHELONIAN CONSERVATION LEADERSHIP AWARD (2007-2009)

Cambodian Turtle Conservation Team

Sitha Som, Yoeung Sun, Chaman Kim, and Sokhorn Kheng

Final Report
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Financial Support By:
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Community-Driven of Cambodian Chelonian

Published by: Cambodian Turtle Conservation Team (CTCT)

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Contents

Executive Summary

This report was compiling for the works we had implemented during the two years of project working in two different sites in Southwest Cambodia and one site along the Mekong River. The project was led by a group of Cambodian turtle experts with financial supports from Conservation Leadership Programme (CLP), and financial support from TRAFFIC, Southeast Asia – the Greater Mekong Region for producing field guide. The project was also working closely with Fishery Administration (FiA), Forestry Administration (FA), Wildlife Alliance, local authority and with technical support from Conservation International (CI).

The overall aims of the project were focusing on 1) creating community ranger at Koh Andeth village to patrol in their community forest to protect turtle population and other wildlife; 2) monitoring the very rare Endangered Impressed Tortoise in Central Cardamom Protected Forest (CCPF); 3) awareness raising to local students and communities in and around breeding area in coastal zone; 4) publishing turtle field guide, release protocol, and national species redlist for Cambodian turtle species.

The methods used in this project were to provide environmental awareness to local villages and school in and around the breeding area of turtle population by using the training skill the team got from Vietnam. Education material would also provide to improve the training. We would create turtle community in Koh Andeth village and form a patrol team comprising of 4 people (1 police, 2 local people, and 1 community committee member) to guard breeding population and remove turtle hook and traps. The patrol team would be paid each day per diem on patrol and some incentives would be given to the community. We would work with stakeholders and FiA to publish turtle field guide, release protocol, and national redlist. Four students would also be awarded for their degree research thesis.

As the results, turtle community was created in Koh Andeth village with participation from most of villagers and collaboration with Wildlife Alliance in the site. Community committee was selected and the head of community was also elected. Rule and regulation was significantly implemented by the committee and patrol schedule was being performed in the area to remove harmful snares, hooks, traps, etc that could kill turtle and other wildlife. One hand tractor and two motor boats were also given to community as an incentive. As the results, 19 patrols were conducted in different locations in the community biodiversity importance of which 16 turtles were found during patrols (9 Asian leaf turtles, 3 Black marsh turtles, 2 Asiatic softshell turtle, and 2 Asian box turtles). Significantly, 150 wildlife snares and 58 turtle traps and hooks were removed from the forest.

Five primary schools along the road 48 were identified and three lessons were developed for giving to students in these schools. The lessons were designed in the way of bringing students to participate in environmental understanding and especially regarding turtle conservation. All lessons were taught at all schools and there were 358 students participated in the courses. Furthermore, community discussion were also made with local communities and authorities such as police and village chiefs in Koh Andeth village as well and that all of them understood the concept of the importance of turtle conservation and are willing to share their time to conserve their turtle population for their next generation.

The team conducted 4 surveys to catch Impressed Tortoises for fitting with Radio transmitters to study about the behavior, habitat requirement, food, and weather

preferences. 12 tortoises were found of which 8 tortoises were obtained from local people and 4 tortoises were found by the team in the wild.

A Cambodian turtle field guide which was included with a section of Release Protocol and National turtle species redlist is being revised for publishing in both Khmer and English version. The field guide will distribute to all relevant stakeholders in the country and international partners including local and international NGOs and government rangers, community engagement teams, government agencies, and donors.

Furthermore, the project has awarded two BSc students and two MSc students for their research theses regarding turtle species conservation in Cambodia. The topics for MSc students were the Behavioural of Impressed Tortoise in the wild and food requirement for Asian giant softshell turtle in captivities. The topics for BSc students were studying about the turtle distribution, composition, abundant, and threats in Prey Long proposed protected forest in central Cambodia and in Virachey National Park located in Northeastern Cambodia.

Acknowledgement

This project was made possible by the Cambodian Turtle Conservation Team (CTCT) with the full support and funded by the Conservation Leadership Programme (CLP), a partnership between Conservation Leadership Programme (CP), Conservation International (CI), Fauna and Flora International (FFI), BirdLife International, and Wildlife Conservation Society (WCS), and technical support from Conservation International, and Fishery Administration (FiA).

The author would greatly express our great thanks to CLP, CLP managing team and their partners, especially Robyn Dalzen for their supports since the first round of grant such as Future Conservation Award, Follow-up Conservation Award, and this Conservation Leadership Award. Without their supports we could not achieve this conservation project fruitfully.

Many thanks to CI team, especially Mr. Seng Bunra and David Emmett for their technical support during the project implementation such as training techniques, excellent base of operation for the survey and field research activities, advising, fund raising, and report writing administration, office rental, report revision, and fund raising.

We are pleased to give our thanks to **Mr. Prum Sitha,** fishery counterpart, who has committed many times and work experiences to our team for achieving the project objectives such as administration, facilitation between team and FiA, and field guide terminology.

The achievements of this report are the results of collaborative efforts of huge participants from chief of communes, villages, schools (Tatai Krom, Trapaing Roung, Sre Ambel, and O'Som), and local community. Without their supports, we could not fulfill our goal of project, especially Tatai Krom community ranger.

We would also like to send our sincere thanks to MSc, and BSc Students from the Royal University of Phnom Penh (**Chey Koulang, Kea Ratha, Yen Sophearith, Bun Leanhak**) for their time involving with the team for their research thesis regarding turtle conservation.

We are gratefully giving our thanks to all CI' components such as CE, LE, Research and Monitoring Teams (Bear, otter, pangolin, and dragon fish) for giving information and turtle and tortoise photos to the project.

Acronym and Abbreviation

Ac: Amyda cartillaginea
Ba: Batagur affinis
CTCT: Cambodian Turtle Conservation Team
CLP: Conservation Leadership Programme
CR: Community Ranger
CI: Conservation International
CITES: Convention on International Trade of Endangered Species
CR: Critically Endangered
Ca: Cuora amboinensis
Ca: Cyclemys atripons
Co: Cyclemys oldhamii
CSES: Cambodia Socioeconomic Survey
EN: Endangered
FFI: Fauna and Flora International
FA: Forestry Administration
FiA: Fisheries Administration
Ha: Heosemys annandalii
Hg: Heosemys grandis
Ie: Indotestudo elongata
IUCN: Conservation Union for Nature
MAFF: Ministry of Agriculture Forestry and Fisheries
Mi: Manouria impressa
Ms: Malayemys subtrijuga
NTFP: Non Timber Forest Product
NT: Near Threatened
Pc: Polochelys cantorii
Pm: Platysternon megacephalum
RM: Research and Monitoring
Sc: Siebenrockiella crassicollis
VU: Vulnerable
UN: United Nation
WCS: Wildlife Conservation Society

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SECTION I: GENERAL INFORMATION

1.1. Introduction

The Kingdom of Cambodia is situated in Southeast Asia. It has three neighboring countries: The People's Democratic Republic of Lao to the north, Thailand to the north and west, and the Vietnam to the southeast. In the Southwest of Cambodia, the gulf of Thailand forms a natural border. Cambodia covers a land area of 181,035 square kilometers. Cambodia is also a predominantly rural and forested tropical country, bordering the Gulf of Thailand. About 14% of the country drains directly to the Gulf; the remainder is in the catchments of the Tonle Mekong, which Cambodia shares with Vietnam, Laos, Thailand, Myanmar, China, and Nepal. The cultivable area is approximately 21.6% of the total land area; more than 60% is forested area, but the average rate of loss of forest cover is estimated at 0.5%/annum.

Figure 1: Map of Cambodia and neighboring countries

2003. Crop value added increased in 2003 by 23%, livestock increased by 3.7%, fisheries decreased 2.3% and forestry also decreased 7.6%. In spite of the rapid growth of the

industrial sector, agriculture, forestry and fisheries sector continues to be the main source of employment for nearly 80 percents of the labor force.
Cambodia has valuable forest resources and a long tradition of forest utilization by its population. The forests are an integrated component in the way of life of rural communicates, contributing wood and wood products as well as non timber forest products and foods from employment for nearly 80 percents of the labor force.

However, forests in Cambodia have undergone major changes in the recent past, and serious concern has been expressed over their exploitation. The Government has taken efforts to protect forest and adopted a strategy for their exploitation in a suitable manner. In 1969, a forest resource inventory indicated that forests covered 13.2 million ha, covering 73% of the country's territory. Nowadays, about 50% (9 million ha) of its land area is still under forest cover.

The fishery sector plays as significant role in the economy and traditionally in providing the population's protein needs. Fish production comes from inland (rivers, lakes, and floodplain), marine and aquaculture sources.

The great Lake Tonle Sap is a unique natural resource. In addition to its hydrological role, it represents the heart of Cambodia's capture fisheries productivity. One of the richest inland fishing lakes in the world, the Tonle Sap was reported as being nearly 10 times as productive as the best fishing grounds in the North Atlantic, even through reduced fish yields were at least 65 kg/yr if calculated on the basis of the dry season area of the lake. This compares with an average yield of 12 kg /ha/yr in typical tropical rivers.

The total production of inland fisheries in 2003-2004 fishing season is estimated at around 250,000 tons of which 68,100ktons were from fishing lots exploitation; 106,400 tons were from family-scale fishing and 75,000 tons were from rice field fishing. Marine fishing exploitation harvested a total of 55,800 tons equal to 124% of 45,000 tons planned, increasing 1,050 tons compared with year 2003. Fish and shrimp farming, yielded 20,835 tons (20,760 tons fish and 75 tons shrimp); seaweed planting yielded 16,840 tons and crocodile farming yielded 74,820 heads.

1.2. People Livelihood

Living conditions in Cambodia have improved considerably between 1993 and 2004, the period covered by the Cambodia Socioeconomic Surveys (CSES). Life expectancy at birth increased from 52 to 60 years for men and from 56 to 65 years for women, mainly by rapidly declining infant and child mortality. Material living conditions improved substantially according to indicators on housing conditions and possession of durables. The differences in living conditions are large between urban and rural areas. The standard of living is better in Phnom Penh in almost all respects than in other urban areas, which in turn are better than the rural areas. The present report covers main aspects on selected important subject matter areas.

1.3. Population of Cambodia

The Cambodian people were devastated by war and genocide in the 1970's. After a 15-year period since 1980 with very high fertility and strong population increase there has been a 10-year period with rapidly declining fertility and mortality since 1995. The population increase has been sustained in both periods. New population estimates show that the population increased from close to 11 million in 1994 to 13.5 million in 2004. An estimation in 2005 the total population was around 14,144,000. It is expected to pass 15 million by 2010 according to a revised population projection. The population growth rate is about 2.4% per annum. (MAFF, 2006-2010).

1.4. Background

Most Cambodians consider themselves to be Khmers, descendants of the Angkor Empire that extended over much of Southeast Asia and reached its zenith between the 10th and 13th centuries. Attacks by the Thai and Cham (from present-day Vietnam) weakened the empire ushering in a long period of decline. The king placed the country under French protection in 1863. Cambodia became part of French Indochina in 1887. Following Japanese occupation in World War II, Cambodia gained full independence from France in 1953. In April 1975, after a five-year struggle, Communist Khmer Rouge forces captured Phnom Penh and evacuated all cities and towns. At least 1.5 million Cambodians died from execution, forced hardships, or starvation during the Khmer Rouge regime under POL POT leadership. A December 1978 Vietnamese invasion drove the Khmer Rouge into the countryside, began a 10-year Vietnamese occupation, and touched off almost 13 years of civil war. The 1991 Paris Peace Accords mandated democratic elections and a ceasefire, which was not fully respected by the Khmer Rouge. UN-sponsored elections in 1993 helped restore some semblance of normalcy under a coalition government. Factional fighting in 1997 ended the first coalition government, but a second round of national elections in 1998 led to the formation of another coalition government and renewed political stability. The remaining elements of the Khmer Rouge surrendered in early 1999. Some of the remaining leaders are awaiting trial by a UN-sponsored tribunal for crimes against humanity. Elections in July 2003 were relatively peaceful, but it took one year of negotiations between contending political parties before a coalition government was formed. (Sum - of National Institute of Statistics (NIS), Phnom Penh – Cambodia).

1.5. Economy - overview

In 1999, the first full year of peace in 30 years, the government made progress on economic reforms. The US and Cambodia signed a Bilateral Textile Agreement, which gave Cambodia a guaranteed quota of US textile imports and established a bonus for improving working conditions and enforcing Cambodian labor laws and international labor standards in the industry. From 2001 to 2004, the economy grew at an average rate of 6.4%, driven largely by an expansion in the garment sector and tourism. With the January 2005 expiration of a WTO Agreement on Textiles and Clothing, Cambodia-based textile producers were forced to compete directly with lower-priced producing countries such as China and India. Although initial 2005 GDP growth estimates were less than 3%, better-than-expected garment sector

performance led the IMF to forecast 6% growth in 2005. Faced with the possibility that its vibrant garment industry, with more than 200,000 jobs, could be in serious danger, the Cambodian government has committed itself to a policy of continued support for high labor standards in an attempt to maintain favor with buyers. The tourism industry continues to grow rapidly, with foreign visitors surpassing 1 million for the year by September 2005. In 2005, exploitable oil and natural gas deposits were found beneath Cambodia's territorial waters, representing a new revenue stream for the government once commercial extraction begins in the coming years. The long-term development of the economy remains a daunting challenge. The Cambodian government continues to work with bilateral and multilateral donors, including the World Bank and IMF, to address the country's many pressing needs. In December 2004, official donors pledged $504 million in aid for 2005 on the condition that the Cambodian government implements steps to reduce corruption. The major economic challenge for Cambodia over the next decade will be fashioning an economic environment in which the private sector can create enough jobs to handle Cambodia's demographic imbalance. More than 50% of the population is 20 years or younger. The population lacks education and productive skills, particularly in the poverty-ridden countryside, which suffers from an almost total lack of basic infrastructure. Fully 75% of the population remains engaged in subsistence farming (http://www.indexmundi.com/cambodia/).

1.6. Environments - current issues

Illegal logging activities throughout the country and strip mining for gems in the western region along the border with Thailand have resulted in habitat loss and declining biodiversity (in particular, destruction of mangrove swamps threatens natural fisheries); soil erosion; in rural areas, most of the population does not have access to potable water; declining fish stocks because of illegal fishing and over fishing.

1.7. Environment - international agreements

Cambodian also has joined some of beneficial agreements and conventions during the past year until now such as agreement on biodiversity, Climate Change, Climate Change-Kyoto Protocol, Desertification, Endangered Species, Hazardous Wastes, Marine Life Conservation, Ozone Layer Protection, Ship Pollution, Tropical Timber 94, and Wetlands. https://www.cia.gov/cia/publications/factbook/geos/cb.html

1.8. Cambodia Climate

1.8.1. Geography and geology

The Cardamom Mountains of Southeast Cambodia span more than one million hectares (over 10,000 km^2) and comprise chiefly of the Mount Samkos massif, the Central Cardamom Mountains, and the Mount Aural massif. This region extends northwards to the Veal Veng and Kravanh districts in Pursat province, with the Northern slopes of Mount Tumpor

extending into Battambang province. To the south it extends towards the gulf of Thailand. To the east it encompasses Mount Sokor and Sre Ambel districts. The western boundary is around the Thai- Cambodian border.

The highest points in this range are Mount Samkos at 1717 m above sea level (a.s.l), and Mount Aural, Cambodia's highest mountain at 1771 m a.s.l. This ancient range comprises largely uplifted grey, yellow or pink Mesozoic sandstone, but some of the highest peaks are formed from plutonic igneous rocks such as granite and ryolitic basalt. The granite rocks of Mount Aural cover some 1500 km^2 (Ashwell, 1997; Daltry & Momberg, 2000).

1.8.2. Climate

Cambodia has three seasons during the year. The rainy, monsoon season lasts from May to October. From November to January is cold and dry, and February to April is the dry and hot season. The seasonal variations in temperature are small, ranging between 21 to 35 degrees Celsius during the day. The coastal and mountain areas of south-western Cambodia constitute one of Cambodia's three major bioclimatic regions (Fontanel, 1972). The climate is generally monsoonal, with rainfall being largely derived from the south-west monsoon between May and early October. The average temperature per year is $27.5^{o}C$, maximum average temperature per year is $30.9^{0}C$ and minimum average temperature per year is $24.1^{0}C$ with the hottest month in April is $29.4^{0}C$ and coldest month in October is $26.6^{0}C$. The average temperature of the coldest month of areas above 700-800 meters in elevation is less than $20^{o}C$, while those in lower elevations are typically greater than $20^{o}C$. During the colder months (January and February) the temperatures, particularly at higher elevations can drop below 12˚C during the night (Chheang Dany *et al*, 2002).

The Cardamoms are likely to be the wettest areas within Cambodia as they extract moisture from the monsoon winds. It appears likely that the CCPF receives up to or more than 4,000 mm rainfall annually as the southern slopes of the range induce orographic rainfall from the monsoon winds after they pass over the Gulf of Thailand. The Val d'Emeraude (Emerald Valley) in Phnom Bokor has the highest recorded annual average rainfall of 5,384 mm. and 223 rain days per year (Dy Phon, 1981).
http://www.climateandweather.com/Climate/Countries/Cambodia

1.9. History

Very little is known about prehistoric Cambodia, although archeological evidence has established that prior to 1000 BC, Cambodians subsisted on a diet of fish and rice and lived in houses on stilts, as they still do in some places today. From the 1st to the 6th centuries, much of Cambodia belonged to the Southeast Asian kingdom of Funan, which played a vital role in developing the political institutions, culture and art of later Khmer states. However, it was the Angkorian era, beginning in the 8th century, which really transformed the kingdom into an artistic and religious power.

Forces of the Thai kingdom of Ayudhya discharged Angkor in 1431, leaving the Khmers plagued by dynastic rivalries and continual warfare with the Thais for a century and a half. The Spanish and Portuguese, who had recently become active in the region, also played a

part in these wars until resentment of their power led to the massacre of the Spanish garrison at Phnom Penh in 1599. A series of weak kings ruled from 1600 until the French arrived in 1863. After some gunboat diplomacy and the signing of a treaty of protectorate in 1863, the French went on to force King Norodom to sign another treaty, this time turning his country into a virtual colony in 1884.

Following the arrival of the French, a relatively peaceful period followed (even the peasant uprising of 1916 was considered peaceful). In 1941 the French installed 19-year-old Prince Sihanouk on the Cambodian throne, on the assumption that he would prove suitably pliable. This turned out to be a major miscalculation as the years after 1945 were strife-torn, with the waning of French colonial power aided by the proximity of the Franco-Viet Minh War that raged in Vietnam and Laos. Cambodian independence was eventually proclaimed in 1953, the enigmatic King Norodom Sihanouk going on to dominate national politics for the next 15 years before being overthrown by the army.

In 1969 the United States carpet-bombed suspected communist base camps in Cambodia, killing thousands of civilians and dragging the country unwillingly into the US-Vietnam conflict. American and South Vietnamese troops invaded the country in 1970 to eradicate Vietnamese communist forces but were unsuccessful; they did manage, however, to push Cambodia's leftist guerillas (the Khmer Rouge) further into the country's interior. Savage fighting soon engulfed the entire country, with Phnom Penh falling to the Khmer Rouge in April 1975.

The Khmer Rouge was the French name for the communist organization which ruled Cambodia from 1975 to 1979. The organization's official names were Communist Party of Cambodia and later the Party of Democratic Kampuchea. The Khmer Rouge is generally remembered for its violent rule in which many people died.

Over the next four years the Khmer Rouge, under Pol Pot's leadership, systematically killed an estimated two million Cambodians (targeting the educated in particular) in a brutal bid to turn Cambodia into a Maoist, peasant-dominated agrarian cooperative. Currency was abolished, postal services were halted, the population became a work force of slave labourers and the country was almost entirely cut off from the outside world. Responding to recurring armed incursions into their border provinces, Vietnam invaded Cambodia in 1978, forcing the Khmer Rouge to flee to the relative sanctuary of the jungles along the Thai border. From there, they conducted a guerilla war against the Vietnamese-backed government throughout the late 1970s and 80s.
A 1978 invasion by Vietnamese armies drove the Khmer Rouge into the countryside and touched off almost 13 years of civil war. This regime led to exploitation of Cambodian resources such as damaging illegal logging activities throughout the country and strip mining for gems in the western region along the border with Thailand. These activities resulted in habitat loss and declining biodiversity (e.g. destruction of mangrove swamps which threatens natural fisheries), soil erosion, water pollution (in rural areas, most of the population does not have access to potable water), and declining fish stocks because of illegal fishing and over fishing (Cambodia, 2004).

The 1991 Paris Peace Accords mandated democratic elections and a ceasefire, which was not fully respected by the Khmer Rouge. In mid-1993, UN-administered elections led to a

new constitution and the reinstatement of Norodom Sihanouk as king. The Khmer Rouge boycotted the elections, rejected peace talks and continued to buy large quantities of arms from the Cambodian military leadership. In the months following the election, a government-sponsored amnesty secured the first defections from Khmer ranks, with more defections occurring from 1994 when the Khmer Rouge was finally outlawed by the Cambodian government. UN-sponsored elections in 1993 helped restore some semblance of normality and the final elements of the Khmer Rouge surrendered in early 1999 (Cambodia, 2004).

Future stability is tied to improving the country's long-suffering economy, eradicating the entrenched culture of corruption, reducing the size of the military and answering the troubled question of royal succession (Cambodia Lonely Planet, 2000).

CHAPTER II: CONSERVATION BACKGROUND

2.1. Introduction

Chelonian species are familiar, four-legged reptile whose body is enclosd within a bony shell. Their heads can be retracted into their shell. Turtles swim through the water peacefully, with their shell not heavy as feather. Yet the huge shell and quite heavy are difficult for them to carry around on the land, which is why the turtle species move slowly in the nature. The water is a major factor to help them move and swim with ease. Some male turtles will come on the land to find females mating. Turtles first appear in the fossil record of the Triassic period, from about 215 million years ago. This gives them an older fossil history than any other living kind of four-legged animal. Turtles were already present when the first dinosaurs appeared. Most chelonian species are semi-aquatic, living in such habitats as ponds, streams, swamps, and marshes. In fact, turtles have diversified into species that are specialized in various ways. Some turtles, for example, the soft shells like living in river or stream and are flattened to hide on sandy or muddy bottom habitat. Still others, such as the tortoises like living on terrestrial areas, with a high-domed shell, elephant-like feet, and ranging into grassland or evergreen forest habitats.

2.2. About Turtles

Most turtles are very long-lived in the nature. They may live 100 years, and some species have been known to live for more than 150 years. In some species, the male turtles are much larger than the females, while in other species the females are larger.

There are many different kinds of turtles, over 250 species in fact. You can find them almost anywhere. Many people confuse the words turtles and tortoises. What you call these shelled creatures of the order Chelonian species, may just depend on where you live. In Australia, only sea turtles are considered turtles; everything else is a tortoise. However, there are no land turtles in Australia. In the United States, the distinction of turtle families seems focuses between turtles and tortoise. Chelonians that spend most of the time in water are called turtles. Ones that spend most of their time on land are called tortoises. There is also a third type of chelonian: the terrapin. All turtles are cold-blooded and have an outer protective shell.

However, in Khmer Language, the distinction of turtle families focuses on difference of hard and soft-shell turtle is that the word **Andoek** refers to hard shell turtle but **Kanthiey** refers to Soft-shell turtle.

2.3. Turtle foods

Many turtles are omnivores, eating plants, and other small animals like craps, snails, but others are more specialized in their food habits. However, tortoises are herbivorous, eating some kind of fruits, mushroom, bamboo shoot, or leaves.

2.4. How Turtles Communicate

Turtle was not much known about how to communicate with each other. They do seem to use some type of communication when it is time to mate the males actively search for receptive females. Some species will travel together to nesting grounds to mate. Courtship may include different kind of interesting behavior, such as the males of some tortoises make noises during courtship or mating so on. Some male turtles will use other methods to attract a female in mating, including head bobbing, biting the female's legs, or use different leg movements while seeing the female. They also have excellent sight and sense of smell.

2.5. Behavior of turtles

Freshwater turtles will bury themselves under leaves or mud. When it is time to lay eggs, females will dig a nest in the ground for their eggs. After the female lays her eggs, she buries them with sand or vegetation. Most turtle species will not stay to take care of the eggs. A few species will guard the eggs from snakes or other predators for a short time. When a baby turtle hatches, it is on its own from birth. http://www.ehow.com/how-does_4568277_turtles-communicate.html. For some tortoise species, female and male will make nests in the ground and some stay under dead trees or rocks to protect their bodies and hide from their predators

2.6. Nesting and laying eggs

All turtles lay eggs are varies in shape in the nature depend on their species and geographic locations. The amount of eggs a turtle lays varies according to its species as well. Smaller species may lay only two or three eggs in a clutch, but some turtles may lay three or more clutches in a year. This can range from one or two eggs to nearly 200. The eggs come out of her through a small opening that all reptiles have, known as the cloaca. Most turtles dig a nesting cavity with their hind feet, lay their eggs inside, and cover their body, leaving the eggs to be incubated by usually the weather warm up. Some female turtles will lay eggs several times in one year and then take a break for a year or two before mating again. Typically, the eggs hatch during 60-90 days. http://science.jrank.org/pages/7047/Turtles-Behavior-life-history.html#ixzz0Kbv2uPUE&D.

The sex of turtle eggs will be determined by the temperature, which they are incubated underground. Cooler temperatures breed males and warmer temperatures result is female turtles.

2.7. Previous works and surveys

Our past study relevant to Chelonian species of Cambodia is existent but not abundance in the whole country. Through our surveys until now, showed that the values of the species for local consumption are varies such as for food, religious purposes, houses ornaments, various Khmer traditional medicines and especially for trade in and across the country. These activities cause decline of population of turtle rapidly comparing during the last 2 decades. Other, all kind of turtle eggs are good source of food for people, according to the much of research and information collection in the markets and restaurants. Due to many demands of turtle species in the market, which caused by not only over collection of the species but also other wildlife species are increased exploration from day by day. Some species have become extinct because of over-hunting for those purposes. Other hand, many illegal activities cause harmful to chelonian species including turtle hooks, electro fishing gears, fishing gears, fishing nets, fishing spear, traps, mainly is hunting dogs people bring with to catch all kind wildlife species in forest (Som S. et al,.2006). Furthermore, there are many threats still occur on chelonians species in Cambodia because most of local people are poor and limit education and also they depend on the natural resources extract to use and raise their daily livelihood such as turtles and tortoises hunting and other wildlife harvest and kind of NTPFs product from forest for business and food. The ever- increasing population pressures so they increase their needs more and more by unsustainable collection levels and also turtle habitat degradation such as agriculture, alteration of river by hydroelectric power, pollution, that have impacted and disrupted nesting and reproduction of the species. In Cambodia, there are 16 species of tortoise and fresh water turtle through our study until now including two of exotic species such as Chinese Soft-shell Turtle *pelodiscus sinensis* and Red-eared Slider *Trachemys scripta elegans*. *P. sinensis* originated from China, Taiwan, Korea, North Viet Nam was classified as vulnerable species, which was introduced to the region for commercial feeding. Also *T. scripta elegans* originates in U S A that importing and selling in front of Cambodian Royal palace and other places for belief people buys to release back to the nature in Buddhist ceremony (Robert V. 2006).

Some rare species of turtles and tortoises are being bred and reared commercially, and can bring a lot of money. Europeans and Americans are major purchasers of captive-bred turtles. However, wild animals are caught from the nature as an activity of illegal trade and this is an extremely serious risk to the survival of rare species. http://science.jrank.org/pages/7050/Turtles-Captive-turtles.html#ixzz0Kb

One of chelonian species in Cambodia play a very important role as national symbol of reptile species is Mangrove terrapin *Batagur baska* that its global status is critically endangered species. This species only live in brackish water area at the southwest Cambodia. Unfortunately, this species is rapidly decreased because anglers harvest adult turtles and the last remaining known habitats are being destroyed due to forest loss along river banks and subsequent flooding and erosion of nesting beaches.

Cambodian Turtle Conservation Project, Conservation International, work in partnership with Forestry Administration and Fisheries Administration to help protect the species and other wild animals from hunting and trading and stop of illegal activities occurred in Cambodia as well.

2.8. The History of Conservation in Cambodia

"Cambodia is one of the great game lands of the world. Considering the number and distribution of big-game animals, one is led to believe that parts of northern, eastern, Southwestern Cambodia are second only to the African game lands in game abundance. As expedition members stumbled through acres of elephant tracks and watched herds of banteng, water buffalo or Eld's deer sweeping across parkland in billowing clouds of dust, it was not only evident that an effort should be made to preserve this phenomenal paradise of hoofed mammals, but that factors responsible for this distribution and concentration should be encouraged." Biologist Charles H. Wharton wrote these words in 1957. Around that time, most of Cambodia and surrounding areas of Southeast Asia were "filled with abundant wildlife." This was the land of the legendary kouprey (*Bos sauveli*), only discovered by western scientists in 1937, as well as many other of the planet's most charismatic species of animals - including elephants, tigers and rhinos (WWF-Cambodia, 2004). As recently as 50 years ago, large numbers of some of the world's most magnificent wildlife species lived in Cambodia. There were Asian elephant, tigers and rhinoceros. Kouprey, gaur, banteng, and wild water buffalo made Cambodia one of the richest places in the world for wild cattle species (WWF-Cambodia). There were many deer species, including the now endangered Eld's deer, hog deer, sambar and several species of muntjac. Some visitors to Cambodia at that time said that only Africa had a greater variety, and larger numbers, of large mammals than Cambodia.

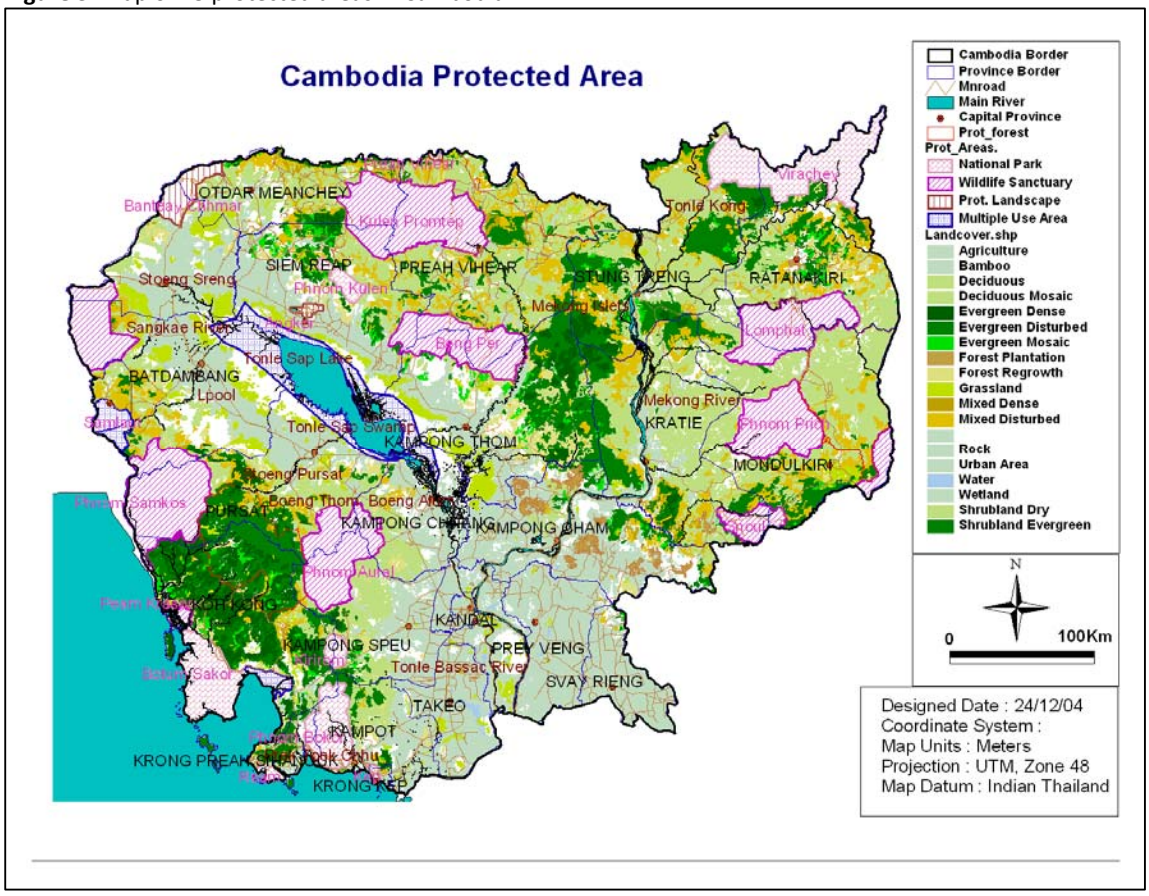
Figure 2: Photograph of large turtle carved at Angkor Wat about 1,000 years ago

Long ago, Cambodia was known as a large empire country within the world. Looking to the Angkor Wat period we can see that there were conservation activities in Cambodia even then. During that time the empire of Cambodia was full of Asian elephants. This important animal was used by people for building temples, in all wars, in transportation, and in agriculture. A lot of other animals were also kept or protected by people at that time. To confirm this we can see the statues of elephants in the walls of many temples around Angkor Wat and the other 108 temples across the whole country (Hean Chheang, 1987). Also today we can still see carvings of turtles at Angkor Wat, and people respected and protected them because of their religious importance, see figure 2. The carvings on temples show us that wildlife conservation and use came to Cambodia long ago.

From 1963-1964 the creation of protected areas as national parks became popular after seeing that the condition of natural resources in Cambodia was becoming a problem. Unfortunately, this effort was stopped during Khmer Rouge 1970s. Cambodia gradually became poorer in conservation. Cambodia had once been known as rich in wildlife, forest, and other natural resources but now had become a country with serious biodiversity loss. It changed the ecology of wildlife and some species are now possibly completely extinct like the kouprey, and extinct in Cambodia like the rhino (Hean Chheang, 1987).

In 1993, twenty-three protected areas were designated in categories under Royal Decree (in Khmer Reach Kreth) by the King Norodom Sihanouk, covering 3,273,200 ha, over 18% of the country's total area, see figure 2. They comprised seven national parks, 10 wildlife sanctuaries, three protected landscapes, and three multiple-use areas (Daltry, 2002).

Figure 3. Map of 23 protected areas in Cambodia



In 2002, three additional conservation areas were designated for biodiversity conservation purposes. His Majesty King Norodom Sihanouk's Royal decree declared these national protected forests to be: 1) the Central Cardamoms Protected Forest in Koh Kong and Pursat, 2) Chheb in Preah Vihea in northern Cambodia, and 3) Koh Nhek to the west of Mondulkiri (Daltry, 2002).

Also, three important wetland areas that have value in conserving natural ecosystem for wildlife habitats of birds, reptiles, and mammals have been designated as RAMSAR sites. These are Boeng Chhmar, Koh Kapei and surrounding areas, and the Mekong close to the Lao border.

Besides these protected areas, to help preserve natural resources, the Royal Government of Cambodia established wildlife regulations such as:

- Forest law
- Kret No. 33, March 1987 on fishery management
- Regulation on supreme system and Cambodian legal code, September 1992
- Preah Reach Kret No. 1296-36, issued in December 24 1996, which declared law focusing on environmental protection and natural resource management
- Article 5 & 6 of Bra Kas No. 1563, 1996, on prohibition of wildlife hunting and trading in all aspects
- Bra Kas No. 1563 on wildlife trade banning for all species in the country
- Declaration No. 3837 on stopping wildlife trade
- Forestry concession management decree, February 2000Forestry community decree, December 2003
- Decision on preparation and implementation of forestry administration, November 2003

Cambodia also signed an agreement with the international convention on biodiversity in June 1992 at the international earth conference talking about Environmental Problem in Rio de Janeiro. Cambodia have signed CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora). Also, Cambodia has joined the RAMSAR Convention.

2.10. Threats to Conservation

The biggest threat to Cambodia's natural environment is the logging frenzy which reduced the country's forest coverage from 75% in the mid-1960s to just 49% in mid-1993 - and with the government constantly strapped-for-cash, there's little reason to believe that the stripping of such assets will come to a halt soon. The number of national parks is slowly growing, but with illegal logging as rife as legal concessions, no tree in Cambodia is safe. The parks under severe threat include Bokor, on the south coast; Ream, near Sihanouk Ville; Kirirom, outside Phnom Penh; and Virachay, bordering Laos and Vietnam. A number of endangered species which are elsewhere extinct are thought to be hidden in the more remote habitats, including elephants, tigers, leopards, rhinos, gibbons, bats, turtles, tortoises, and crocodiles (Lonely planet - Cambodia, 2004).

Over the past centuries and decades, until the 1920s, Cambodia has faced a lot of civil war and wars with border countries. Cambodia has had serious problems due to the destruction of natural resources through illegal deforestation, fragmentation, and hunting by Cambodians and people from neighboring countries for the national and international wildlife trade.

Unfortunately, much of Cambodia’s wildlife has been destroyed in the last 40 years, mostly because of too much illegal hunting for trading of animals and their parts for Chinese traditional medicine, decoration, food and other purposes. The kouprey, Cambodia's

national animal, the rhinoceros and the hog deer may have already become extinct in the country. Tigers, elephants, wild water buffalo, Eld's deer, and many tortoise and turtle species are also extremely highly threatened with extinction in Cambodia in the next few years, and populations of many other species are now very small and might also disappear in the future unless immediate action is taken (WWF-Cambodia 2004).

Wildlife trade is now becoming an extremely serious threat to all animals in the wild in Cambodia. The main worry of conservationists is increasing levels of illegal wildlife trade activity, even though Cambodia has the wildlife regulations to punish people who commit wildlife crimes in order to do business. Most of the rare and globally threatened animals such as elephants, tigers, bears, pangolins, lorises, gibbons, tortoises and turtles are valuable in trade for hunters, poachers, and middle-men. For example, one turtle in the region, the box turtle *Cuora trifasciata* is worth more than $1,000 and up to $3,000 per kg because it is believed in China that they have medicinal cancer-curing properties. Many animal species are exported by traders from Cambodia to international markets such as China and Taiwan through Lao and Thailand and large amounts end up in Chinese markets through Vietnam (MoE, 1998-2002).

Wildlife trading of animals of mammals, birds and reptiles is not only for food but is also for decoration, traditional medicine, and the pet trade. This also uses local and international trade. The main problems are that all traders put high prices on the rare and threatened wildlife that has the most international demand. Add to this poor law enforcement and the fact that there are many poor people and poorly educated people in the country, especially the indigenous people who are living in the rural areas that are rich in biodiversity. This all means that many people are interested in wildlife hunting and sell wildlife to middle men who bring them to market (MoE, 1998-2002).

2.11. Rationale

The distributions of many species are uncertain owing to a lack of records and because almost no records exist for wild tortoises or turtles. Almost all information is from traded confiscated animals. Because turtles are so extensively traded in the region, most records now come from the animals in trade. Although mainland Southeast Asia has long been regarded as a hotspot of chelonian diversity (van Dijk *et al*., 2000), the turtle and tortoise fauna of Laos, Cambodia, and Vietnam (formerly known as French Indochina) remains poorly known. Decades of civil unrest, political instability, and military conflict have largely prevented fieldwork, and Cambodia become a source for animals rather than a destination or transfer country for trade. Specimens obtained from markets and workers in Cambodia usually originated from that country which has led to confusion on species distributions within the country, with serious biological, conservation, legal, and regulatory implications. Little information is available on the occurrence and distribution of chelonians. The reason is little scientific research and an unstable country (Stuart *et al*., 2001, Stuart and Timmins, 2000, Touch *et al*., 2000, Hendrie, 2000).

2.12. Turtle Distribution in Cambodia

Even though Cambodia is a small country but it is rich in biodiversity all over the country. And you will see that Cambodia is located in the Southeast Asia where they considered as the hotspot area for wildlife. In 2004, the BP-funded project discovered a new record of impressed tortoise in CCPF for Cambodia (Sitha *et al*., 2005). In 2006, Vietnamese authorities confiscated a 45-turtle sack being traded to Vietnam and they assessed that these turtles were probably originated from Cambodian territory from the northern. In November 2006, MoE rangers at Virakchey National Park found an alive of big-headed turtle in the park (Emmett D. *et al*., 2006). In 2007, Asian leaf turtle – *Cyclemys oldhamii* were confirmed to be presented in Virachey National Park and Prey Long proposed protected area (Sitha 2007). In 2004 Asian leaf turtle – *Cyclemys pulchristriata* was found to be occurred in Northeast Cambodia in Mondulkiri province (Bryan L. Stuart, 2005). In conclusion, there are currently 14 species of freshwater turtle and tortoise species confirmed in Cambodia. These species are Asian leaf turtle *(Cyclemys atripons, Cyclemys oldhamii, Cyclemys pulchristriata)*, Giant Asian pond turtle *(Heosemys grandis)*, Asian box turtle *(Cuora amboinensis)*, black marsh turtle *(Siebenrockiella crassicollis)*, Malayan snail-eating turtle *(Malayemys subtrijuga)*, yellow-headed temple turtle *(Heosemys annandalii)*, impressed tortoise *(Manouria impressa)*, elongated tortoise *(Indotestudo elongata)*, mangrove terrapin *(Batagur affinis)*, Asiatic softshell turtle *(Amyda cartillaginea)*, Asian giant softshell turtle *(Pelochelys cantorii)* and big-headed turtle *(Platysternon megacephalum)*. All of these species are now becoming threatened across the country (Sitha *et al.,* 2006)**.**

2.13. Project Description

2.13.1. Core Problem: Destruction and Trade of Cambodia's wildlife

Much of Cambodia's wildlife has been destroyed in the last 40 years, mostly because of too much illegal hunting for national and international trading of animals and their parts for China traditional medicine, decoration, food and other purposes. The Kouprey, Cambodia's national animal, the rhinoceros and the hog deer may have already become extinct in the country. Tigers, elephants, wild water buffalo, Eld's deer, and many tortoise and turtle species are also threatened with extinction in Cambodia in the next few years, and populations of many other species are now very small and might also disappear in the future unless immediate action is taken (Sitha *et al.,* 2004).

Wildlife trade is now becoming an extremely serious threat to all animals in the wild in Cambodia. The main worry of conservationists is increasing levels of illegal wildlife trade activity, even though Cambodia has the wildlife regulations to punish people who commit wildlife crimes in order to do business. Most of the rare and globally threatened animals such as elephants, tigers, bears, pangolins, lorises, gibbons, tortoises and turtles are valuable in trade for hunters, poachers, and middle-men. These species are all exported by traders to international markets such as China and Taiwan through Lao and Thailand and very large amounts end up in Chinese markets through Vietnam (BP Project Report, 2004).

Wildlife trading of animals of mammals, birds and reptiles is not only for food but is also for decoration, traditional medicine, and the pet trade. This also uses local and international trade. The main problems are that all traders put high prices on the rare and threatened

wildlife that has the most international demand. Add to this poor law enforcement and the fact that there are many poor people and poorly educated people in the country, especially the indigenous people who are living in the rural areas that are rich in biodiversity. This all means that many people are interested in wildlife hunting and sell wildlife to middle men who bring them to market.

2.13.2. The Asian Turtle Crisis

Research throughout the region has shown that Asia's turtles are being systematically extirpated from nature to feed the insatiable demand from export markets. According to some estimates, as many as 10 million turtles are traded annually in the region, most of these ending up in China. In the last decade, industrialization in China has provided new-found wealth which has generated increased demand for expensive foods and traditional medicines made from turtles. This has caused a dramatic increase in the organized and opportunistic collection of turtles from the wild, greatly depleting the numbers of many species and creating the so-called "**Asian turtle crisis**." Of the estimated 90 species which are native to the region, sixty-seven are classified as threatened through habitat loss and collection for trade (IUCN, 2004), up from 33 in 1996. On 2003, a report of mixing workshop resulted trade of tortoise and freshwater turtle in Asia. It was held in Phnom Penh in Cambodia. The workshop showed that currently there are 90 species in Asia and 75 percent of once have being threaten.

2.13.3. Turtle and Tortoise Species Findings

The 2004 surveys by the Cambodian Turtle Conservation Team found 5 species of turtles and 2 species of tortoises. One species is Endangered, five species are Vulnerable and one of them is Near Threatened. One of them, the impressed tortoise *Manouria impressa*, had never been recorded in Cambodia alive in the wild. This species is a very rare vulnerable montane species and it is highly threatened. It is very important for conservation of this species to find this population in Cambodia, and more research and monitoring of this tortoise is recommended.

Some of other species found in the previous survey had never been recorded alive in Cardamom Mountains before such as the giant Asian pond turtle *Heosemys grandis*, and black marsh turtle *Siebenrockiella crassicollis*. One species, the elongated tortoise *Indotestudo elongata* is Endangered but was found to be one of the commonest species in the area, showing that the Cardamom Mountains is a site of global importance for this tortoise. This species should be strongly monitored.

The Cambodian Turtle Conservation Team (CTCT) conducted a research project in the coastal southern Cardamoms of Southwest Cambodia, which is managed by the Forestry Administration (FA) with support from Wildlife Alliance-Cambodia. Surveys led by Cambodian CLP team in September 2005 founded seven species in Tatai Krom commune, Koh Kong district, Koh Kong province which is a part of the CCPF. Those species were the Elongated tortoise, Giant Asian pond turtle, Black marsh turtle, Asian box turtle, Asiatic softshell turtle, Asian leaf turtle, and Yellow Headed Turtle Temple. Among of seven species, one was found to be a very high important IUCN-classified Endangered species- the Yellow-

Headed Temple Turtle) adding to the previous findings. So now, 14 species have been found in Cambodia. The finding also concluded that some areas are extremely rich in turtles and tortoises that need to take immediate action to protect the populations of these species to ensure they remain in the wild. According the previous results, Tatai Krom commune, it is the rich place and very significant habitat for fresh water turtles. The flooded forest around the coastal areas is very important habitat for turtle and soft-shell turtle. To prevent and conserve the turtles, the team had established a community in Tatai Krom (community ranger) which located in Koh Andet village, Tatai commune, Koh Kong district, Koh Kong province. The main purposes of this community are observing all the fishing activities and illegal hunting in and around Koh Andet village to reduce the illegal hunting and provide the wildlife education by CPCT team and community committee. Furthermore, the community ranger need to implement the patrolling by participation from local villager and authorities in the area to confiscate the illegal fishing gears such as turtle traps, line hooks, snares and other illegal fishing gears that harm to the turtles and wildlife.

2.13.4. Threats to turtles

According to previous surveys found that most of turtles are facing extinction locally in some areas in the near future because there are many threats such as previous collection for trade in the 1990's that dropped the numbers of turtles in some areas to low population, and now local collection for food and low levels of trade to nearby towns.

The results showed that all local communities in the areas are presently depending on natural resources such as NTFP, wildlife hunting, fishing, logging, aloe wood collecting, resin extracting, and feeding domestic animals. Moreover, people often go to forest without supporting food but instead they rely on finding wild animals, especially turtles and tortoises. One of the key threats to turtle and tortoise species are collection by local communities in the field using trained hunting dogs. Dogs are very good at sniffing concealed animals like turtles and tortoises. This is a serious threat to these low levels of turtle populations because it takes adult turtles and does not let the populations recover so they go extinct in that area.

The survey also showed that there had been higher levels of turtle trade in some areas in the past because before1990 there were many turtles and tortoises at the areas, but the interviews and the current research data from the first phase and second phase project showed that there now are quite low numbers of most of the species in areas near villages and roads. But there were more turtles and tortoises in these areas in the past according to the local villagers. In some remote areas there are still quite a lot of turtles and tortoises because it is such a huge area and it can be two or three days walking to reach these remote places.

2.13.5. Education and awareness

Lack of local people awareness is a big factor threatening the turtles and tortoises because the villagers do not understand the importance of turtles and the reasons why if you take out lot of adults you destroy the population. This is because the adults used to live a long time and produce a lot of young, but now people collect them when they are young and the populations are destroyed. We need to tell the villagers this so they understand more about the lives of the turtles and how they should protect them or lose them forever.

SECTION III: OBJECTIVES

Our goal was to Conserve endangered chelonians by working with communities in priority sites and by providing educational/training materials for rangers and Cambodian researchers.

The followings were the proposed objectives:

Conducting environmental awareness work in priority sites.

Starting a community ranger program.

Conserving and monitoring Impressed Tortoises in situ.

Producing Field Guide

Producing Release Protocol.

Creating a national chelonian redlist.

Supporting students through theses and university lectures.

SECTOIN IV: METHODOLOGY

The following activities would result in the outcomes of the project implementation.

4.1. Environmental awareness

We would provide environmental education to twelve communes around turtle breeding areas we located and in important areas for critically endangered Batagur baska.

We would build on training we would get at a 2-week formal training course in environmental education by Environment for Nature (ENV) in Vietnam in December 2006 (funded by TSA). We would learn how to develop education activities and resources for children in schools and adults in communes. We would develop effective education materials and give talks on the importance of wetlands and conservation and sustainable use so their children's children can live with nature too.

Education material would include an illustrated story-book about Batagur baska, a childrens colouring book that gives information and conservation messages for kids, and school lessons and handouts on conservation. We would distribute other educational resources like posters and t-shirts.

Conservation messages would go into articles in Khmer-language newspapers and radio. The training we received from ENV means it would be well presented and good conservation messages are sent to rural communes across Cambodia.

4.2. Community rangers

The community ranger team was four people: one local police, two community member, and one member of the CNRMC. Local police would be selected on a rotating basis so all would be involved. For each patrol the community member would be selected at a community meeting so it would be fair, and so all community members were employed. The CNRMC member was selected in the same way. All CNRMC members would be trained in data collection and patrol techniques so every team had enough training.

They were paid each day on patrol. They would be monitored by recording every patrol with GPS showing their location and the date. There would be one patrol a month during the rainy season (when the site is flooded), and three patrols a month in the dry season (when we saw lots of juvenile and adults turtles were caught). Patrols were 5-8 days.

4.3. Impressed Tortoises Monitoring

We would do community education work in the hill villages so villagers know not to collect this species. We worked with rangers so they patrolled tortoise habitats.

We would monitor the tortoises with Dr Stanford from Berkeley University with radio-tracking equipment, so we would find out exactly where Impressed Tortoises live and where to protect them. We would also find out about the ecology of this tortoise. That way we would protect it in the wild and find out how zoos can keep and breed it in captivity.

4.4. Field Guide

We would use turtle distribution information for Cambodia, plus photos and other data we collected during our work. We would consult experts and HE Noan Touk (FiA Director) about conservation messages for the field guide. We would work with staff from FiA to produce the book. We would translate it to Khmer.

4.5. Release Protocol

We invited stakeholders to a roundtable about the contents of a good Release Protocol. We would find handling procedures that minimise the harm to confiscated turtles and gives them the best chance of surviving. We will work with vets from zoos to write about how to assess the health of turtles and diagnose diseases. We will use our data to identify provinces and habitats where confiscated turtles can safely be released.

4.6. National Redlist

We would use information from our previous work and other data. We would work with experts, FiA and NGOs to identify the national status of every turtle species in Cambodia. We would help the FiA classify them (Common, Rare, Endangered) with the aim being to protect our rarest turtles. When the list is sorted, the FiA would put it into Fisheries Law. This would help to protect Cambodian turtles.

4.7. Student support

We would choose four BSc students and two MSc students. The BSc students would do 3-month projects and the MSc students would do 7-month projects.

A project example might be studying what Impressed Tortoises eat in the wild. The projects would help conservation, give training and experience to the students, and they would get their thesis. They might even become biologists afterwards.

SECTION V: RESULTS

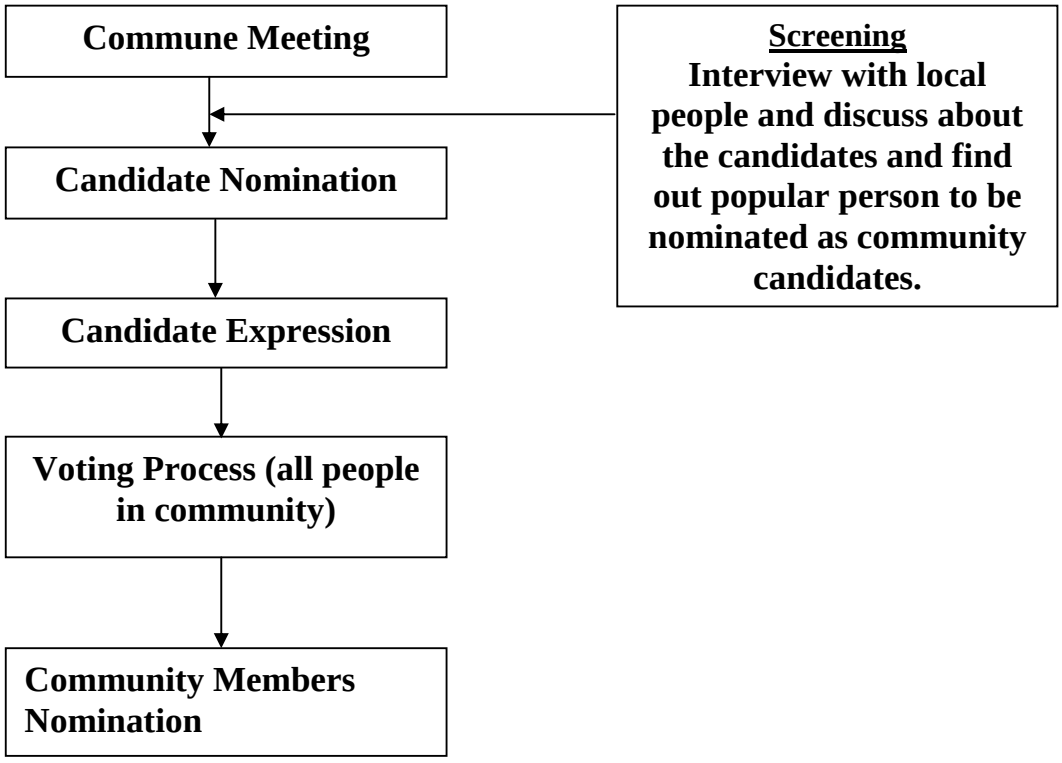
5.1. Community Ranger Program

5.1.1. Community process

- **The Community Ranger Establishment**

Before establishing the community ranger, the Cambodian Turtle Conservation Team had prepared some documents and lesson learnt and meeting with Conservation International, Wildlife Alliance, and authority in Koh Kong province for their cooperation and supports. After meeting with the authority in Tatai commune, the team also met with local people in Koh Andeth in order to show project objectives and plans to establish the community ranger. Moreover, the main purpose in the meeting with the local people was to vote and select the candidates to take the role of community ranger committees.

The diagram below showed the process of Community Ranger initiation to conserve turtle breeding population in Tatai Krom community.



➢ Commune Meeting

In December 2007, the team organized several meetings with Tatai commune authority, Koh Kong district, Koh Kong province. The main purpose in the meeting was to find out how to preserve the wild animals, especially turtle population which found to be rich in 2005 surveys that there are seven species of turtles and tortoises in the community. These species are Yellow Headed Turtle Temple, Black marsh turtle, Asian box turtle, Asiatic Softshell Turtle, Giant Asian pond turtle, Asian Leaf Turtle, and elongated tortoise. Finally, the team decided to establish a community called "Turtle Community Ranger" which located in Koh Andeth village, Tatai Krom commune, Koh Kong district, Koh Kong province. Koh Andeth community is formed by many islands together located very close to the sea. Some areas in this community are annually flooded with freshwater in rainy season and brackish in dry season. This flooded forest found to be the very important site for turtle species and other wildlife to inhabit. According to the village chief and commune council, Koh Andeth community is officially divided into three sites, Koh Andeth, Tung Khan, and Prek Popel. Those sites are very significant habitat for freshwater turtle population. Among seven species, *H. annandalii* is classified as endangered species by IUCN. Other two areas also blooded during rainy season and still remain the water in the lakes and ponds during dry season that is convenience for turtle living and their breeding. So the community ranger should arrange the patrols in and around those three zones.

Figure 4: Meeting with community

➢ Candidate Selection

Figure 5: Meeting to nominate community members

CTCT team had meeting with villagers in the Koh Andet village again to select candidates. The village chief played very important role to select candidates and observed all those candidates that come from three sites (eight candidates from Koh Andeth, three candidates from Tung Khan and four candidates from Prek Popel areas). After selected the name of candidates, CTCP team had observed all candidates through interview with people living in the community in order to select candidates who were the popular person and people respect to them in the village and also avoid the politic stakeholders. The chief and deputy community ranger were not involved with politic. In the final phase, there were 15 persons were selected to be candidates. In the voting process, we wrote the candidate name in the

paper and put it in the box then select it one by one by providing the number for voting. The table below was the candidate list for voting.

Table 1: Candidates List

No	Name	Sex	Age	Area
1	Sam Sinoeun	Male	38	Koh Andet
2	Min Samnang	Male	39	Tung Khan
3	Lay Lik	Male	49	Koh Andet
4	Tri Cheng	Male	35	Koh Andet
5	Morm Choeun	Male	37	Koh Andet
6	Kim Reang	Male	44	Koh Andet
7	Hem Veasna	Male	43	Prak Popel
8	Lann Savoeun	Female	32	Koh Andet
9	Khem Ghnign	Female	55	Tung Kan
10	Yong Sem	Male	52	Koh Andet
11	Horm Heurn	Male	43	Prak Popel
12	Orn Sim	Male	40	Koh Andet
13	Hem Chem	Male	50	Prak Popel
14	Soa Sopha	Male	39	Tung Khan
15	Tun Sokha	Female	38	Prak Popel

- **Voting process**

Figure 6: Candidates for voting

In voting process, CTCP team played very important role in facilitate in the process. Among 15 candidates, five candidates were selected to be community ranger committee. The candidates that got highest votes was selected to be a chief of community ranger committee, the second person was selected to be deputy committee and the other three candidates were the members of CR committee. Each candidates and villagers could vote for 5 candidates by writing the number (For example: 1, 5, 7, 10, and 15) that CTCT team provided to the villagers. If villagers wanted to select someone, they wrote the number on the paper that CTCT team arranged in the list. For convenience, the candidates sit in line and their number in front of villagers so they can know where they come from and villagers can make the right decision.

- **Community Ranger Nomination**

Under presidency chief of Tatai commune and the participation from Wildlife Alliance, Fishery Administration and Forestry Administration and strong supported form Cambodia Turtle Conservation Team, Conservation International, the voting process was finished. The commune chief admired that it was very grateful with the process of community establishment. The community ranger was part of the commune that involved with the natural resource management especially wildlife protection. All the CR activities would help

the sustainable resources in the commune. Through the voting process, five candidates were nominated by the chief of Tatai commune under participation from the stakeholder and NGOs in Koh Kong district, Koh Kong province. The table below showed about the community ranger committee.

Table 2: Community ranger members selected from people

No	Name	Age	Position	Responsible
1	Sam Sinoeun	38	Chief of community ranger	CR Management
2	Try Cheng	35	Deputy chief of community ranger	Accountant
3	Hem Chem	50	Member of community ranger	Patrolling management
4	Min Samnang	39	Member of community ranger	Educator
5	Yong Sem	52	Member of community ranger	Conflict Resolution

The community ranger committees were responsible for patrolling in and around the community (Koh Andeth village) and spread all information related to fishery, forestry and natural resource law. The community chief was responsible for general management and monthly report to CTCT team, report to Tatai commune and authorities in every three months such as Wildlife Alliance, and district police. He also responded for arranging the patrolling schedule, meeting and led the community. The deputy chief was responsible for managing the finance in community. The financial report was monitored by CTCT team. Other three members were responsible for individual work such as patrolling management, education, and conflict resolution.

5.1.2. Community Ranger Training

The Cambodian Turtle Conservation Team, Conservation International, conducted the community ranger committee training to build up the capacity before starting the patrolling. The team conducted five-day training along with field practice to all selected community members. The important information that CTCT trained were fishery law, forest law, the illegal fishing gears, turtle identification, threats, and turtle ecology, and other resources that that useful during project implementation. They were also trained on map reading, GPS usage, camera, datasheet entry, report, and administration management in the community. Moreover, all the community committee members learned how to write the report because it was very importance to the community committee to fill out what they saw and

Figure 7: Training on field patrol technique

confiscated the illegal fishing gears, wildlife snares and other wildlife that they met then report to CTCT.

5.1.3. Community Ranger Monitoring

Community Ranger was under the CTCT monitoring. The team always checked the activities the CR members had done. There was always a three months meeting between CTCT team and CR member regarding patrol report. The team coordinated their activities by checking their daily patrol on the GPS and camera and there was normally one of our team joining in the patrol. Moreover, CR needed to write the monthly report for their patrol and sent it to CTCT team. They were also responsible for report to local authority, such as police, commune, and Wildlife Alliance in every three month so that they are all aware of what we are doing.

5.1.4. Patrol result

Regarding to situation and turtle habitat in the area, the community ranger had conducted the patrol in many sites as divided into three significant habitat according to the geography and turtle habitat. There are Prek Chin, Tung Kan and Prek Popel sites. All those three areas are divided into small locations. First in Prek Chin which consisted of Sre Knung (0297067/1257748), Prek Maisi (0296932/1274469), Kam Opchit (0298072/1275248), and Prek Takim (0297992/1275333). The second area were Tung Kan which which included Srei Tathok (0297545/1274662), Tro Ping Kandal (0296436/1272074), Kbalsrei tathok (0297100/1274995), Beung Trorping Koungkang (0296435/1272062); and third place were Prek Popel site which included Matt Prek Popel (0292592/1270809), Peam Bombek, Prek Popel krom (0292405/1270876), and Kbalkoh Sakrai (0293393/1268707).

Figure 8: Patrolling activity

Four people were selected to patrol every trip. They are one from community ranger committee, 2 people were selected from villagers in Koh Andet village and another one from local police in Tatai commune.

According to habitats and geography in Koh Andeth village, CR had divided the patrol by the seasons. During the dry season, the CR conducted patrol 5 days for one trip and two times per month. So it equal to 10 days/month. To ensure no illegal activities in the rainy season CR extended three patrols in the rainy season because there were more illegal activities so CR did the same 5 days patrol but they extended 3 times per month so it equal to 15 days per month.

The CR team needed to stay in forest to look for and confiscate the illegal traps and other fishing gears that harm to the turtle and soft-shell turtle and other wildlife snares which the

hunter set along the stream and in the forest during their trip. Moreover, if they met turtle, they needed to identify, mark, measure, and photo the turtle into data sheet then released it into suitable habitats.

After finished the trip patrol, CR committee needed to write the report into data sheet and send it to the chief of the community ranger. The chief of CR needed to compile the monthly report and send it to CTCP, authority in Tatai commune, and Wildlife Alliance in Tatai commune either.

5.1.5. Results

As the result, community ranger conducted 14 patrols (70days) in and around Koh Andeth vcommunity, Tatai commune, Koh Kong district, Koh Kong provincewhich focused on the important habitat that present the fresh water turtle (See appendix 1 and 2). CR committee has defined the three core locations for patrolling. The most significant areas were Prek Chin (UTM: 0296932/1274469), Thong Khan (UTM: 0297545/1274662), and Prek Popel (UTM: 292592/1270809) and these areas were put into protection plan and identification map for turtle breeding site and habitat protection in coastal zone considering as seasonal flooded habitat.

Prek Chin site: Community Ranger, through four trips patrolled, had confiscated 139 snares of Wild pig from Sre Knung (0296397/1276185), 9 snares of wild pig from Kam Opchit (0298072/1275248), and 2 illegal fishing gears from Troping Kork (0294857/1272879). Both of the fishing gears were fishing hook and turtle trap. Those snares were set in the forest for hunt the wild pigs, turtles and other wildlife. In addition, CR found very significant turtles during field patrolled. They found two Asian Leaf Turtles *Cyclemys atripons* from Sre Knung; three *C atripons* and one Asiatic Soft-shell Turtle *Amyda cartilaginea* from Prek Maisi (0296461/1274779) stream. Moreover, CR also found 5 Long-tailed Macaques *Macaca fascicularis* in Kam Opchit (0298072/1275248), 10 macaques in Sre Knung, one Red Muntjac *Muntiacus muntjak* at Troping Kork (0294857/1272879). The Prek Chin area, in addition, still remain a lots of illegal activities such as logging timbers that people cutting for sell and clear the land for farm then sell it to another.

Thong Kan site:

Figure 10: CR member (policeman) removing snare

CR had removed 11 traps of pangolin *Manis javaica* that the hunter set for pangolin and also found two Asian Box Turtles *Cuora amboinensis*, one Black Marsh Turtle *Siebenrockiella crassicollis* from Sre Tathok (0297545/1274662) and they also found two *S crassicollis*, one *C atripons* and some carapaces and plastrons of Asian Leaf Turtle at old camp at Troping Kandal (0296436/1272074). In addition team also met the illegal activities such as logging the trees, and forest burning at the Beung Troping Koung Kang (0296435/1272062).

Prek Popel site:

The CR removed 40 snares of *M. javaica*, one bear trap and other two turtle traps from Kbalkoh Sakrai (0293393/1268707). During these patrolled, one *A cartilaginea;* and 2 carapaces and plastrons of *C atripons* was found at Matt Prek Popel. Moreover, they also confiscated 15 pigeon from the hunters at Matt Prek Popel (0292592/1270809); and team also saw lots of illegal activities such as logging timbers and forest burning for farm and wildlife purpose in these areas.

Figure 9: CR team releasing turtles into their

In total, through the patrolling, CR removed 204 snares. Most of the snares were 148 wild pig snares, 51 pangolin traps, 4 turtle traps (fishing hooks and traps), and 1 bear traps from each individual areas. All snares were keeping in the community after patrolling then gave it to Wildlife Alliance station in Tatai commune, Koh Kong district, Koh Kong province. In addition, CR found 16 turtles during patrolling. There were nine *C. atripons*, two *S. crassicollis*, two *A. cartilaginea* and two *C. amboinensis* (Table below: The confiscated snares and Turtle species found). After identification, marked, photographed, weighed, sexed, and aged on those turtles, CR had released it into the same habitat.

Table 3: The confiscated snares

Snares/Traps	Number	Removed site
Pangolin	51	Sre Knung, Mat Prek Popel
Wild pig	148	Sre Knung, and Troping Kork
Bear	1	Kbal Koh Sakrai,
Turtle	4	Troping Kork
Total	204	

Table4: Turtle species found

Species	Number	Found
Asian Leaf Turtle *Cyclemys atripons*	9	- Sre Knung, Prek Maisi, and Troping Kandaul
Asian Box Turtle *Cuora amboinensis*	2	Srei Tatok
Black Marsh Turtle *Siebenrockiella crassicollis*	3	Srei Tatok and Troping Kandaul
Asiatic Soft-shell Turtle *Amyda cartilaginea*	2	Prek Maisi and Kbal Koh Sakrai
Total	16	

5.1.6. Community Agreement

In addition to the patrolling to protect breeding site and habitat for freshwater turtles and tortoises, CTCT also initiated conservation agreement which was included some articles requiring them to protect the breeding sites and in return some incentives would be provided to ensure that all community household would be improved.

Figure 11: CTCT giving tractor to community

According the agreement, CTCT through sponsored from CLP provided one tractor for using in agriculture field, agricultural crop such as corn, been, and vegetable seeds to farmers to use in their product. Training regarding livestock raising were also provided to all community members to make sure that they can improve their living standard more better to not catching turtles and other wildlife for their consumption and trading in the future.

As the results, one tractor was provided to Tatai community to rotate between all households for their agriculture. Three boats and three engines were bought for their community to ensure that they can use them effectively for their daily works and for patrolling team. Significantly, gasoline was also provided in each amount of volume in each month to fill the boat engines.

Three trainings on livestock were also offered to the community members whom we got expert from local NGO which is working on the agriculture field. Significantly, in the agreement stated that every month, CTCT would provide a money package of 50$ to community ranger team to use for administration works such printing, purchasing pen, paper, local travel, snack, etc. The team also provided a package of 30$ each month to store in the community box to use as unplanned works required in their community.

5.2. School Awareness Program

5.2.1. Introduction

To improve the effectiveness of turtle conservation in the selected target area, the project was also initiated another program called community and awareness raising to local schools in and along the proposed protected sites to ensure that they understood about turtle conservation efforts in their community. The overall aims of the program were as below:

Figure 12: CTCT teaching lesson to local kids

On 21st- 24th March 2008 and 03rd - 06th December 2008, the Cambodian Turtle Conservation Team funded by the Conservation Leadership Programme conducted another training regarding turtle conservation to local schools in 3 communes such as Chmakaloung, Andongtek, Trapaing rong, and Tatai kroum in Koh Kong province. These schools were given two lessons per school as Introduction to Cambodian turtles and Threats and importance of turtles in culture and ecology along with our board game distribution. The reason we chose these areas for awareness raising because these areas are found to be rich with turtles and tortoises from our previous surveys in 2005. Further more, all students in the primary schools are chosen for the education because we hopefully think that kids are the core generation to preserve their invaluable resources such turtles and other wildlife. Also, according to our interview found that 90 percents of people in the area are relying on extracting natural resources to generate their incomes. The surveys resulted that people always come to clear forest for their rice field, hunting wildlife for trade and food, and resin collection.

5.2.2. Objective

The lesson objectives are:

- Helping students to know that there are12 species in Cambodian and 9 in locality
- Helping students on interesting things about turtles
  - Long life more than 100 years
  - Different species live in different habitat
- Interesting characteristics (big head, hinge)
- Turtle and tortoise is Reptile, cold blooded.
- Turtle and tortoise are Shell protection.
- Helping students understanding about threats and importance of turtle in Cambodian culture and encourage them to protect their species.

- Stimulating all students that turtle are under threats because of local collection, illegal trade and habitat loss
- Understanding about the importance of turtles (food web, culture and religious value association with turtle)
- Encouraging them finding the way to protect their species

5.2.3. Training area

The lessons have been given to students in 6 primary schools such as Ka Ong (Cham karloung Commune), CT Kompong Siela (Kompong Siela Commune), Andongtek (Andongtek Commune), Trapaingrong (Trapaingrong Commune), Tatai (Tatai Krom Commune), Chamnar (Chamnar commune) in Koh Kong provice.

5.2.4. Methodology

Figure 13: Student showing about food web in the nature

Students were selected from grade 4 - 6 in primary schools for the courses because they have appropriate knowledge for understanding the lessons and can read messages in boxes of turtle board game and lessons. Each session was spent about 45 minutes to 1 hour. The trainers needed to pronounce clearly what objective of each lesson to make students understanding easily. Before starting every new lesson students were asked some questions what they have learnt and remembered from our previous class. This was the way to remind them and make sure they can easily catch up with new lesson. Board games were used to engage with the lesson for students to play a role in the game to improve the course. Students were divided into groups for playing game called Lucky Turtle Game. In team of playing, there were 4 students for one game.

5.2.5. Results

Figure 14: Group picture with students

356 students were participated in the training from six primary schools (See appendix 2). Twenty five to sixty five students were selected from each school. We explained them about turtle species in their area and Cambodia, turtle description, and threats to turtle. The team significantly stimulated and encouraged them about the important of turtle in Cambodia related in Buddhist and culture and asked them to find the ways protecting turtles. More importantly the team, after every question giving to students to

answer, notified the main factors that are threatening on turtles and tortoises such as habitat loss, hunting for food, trading in local and China markets. On the other hand, the team explained the importance of turtle for food web in the nature and culture, especially the Royal terrapin - *Batagur affinis* is the national symbol in the Kingdom of Cambodia in reptile species. The team also explained how to play board games related to turtle threat as well to improve the training. At the end of the training, the team gave each student a set of evaluation paper consisting of question related to the trainers, lesson, and course. As the results it came to conclude that 95 percents of students participated the course understood that turtles are in big trouble to survive due to many threats happening to them. The results also showed that the game included in the lesson could help hundred percent of students to easily understand the lesson and they are willing to protect their species in the future. Also, they have expressed their important idea to meet the CTCT team in the next training again. They strongly promised to share the knowledge to their friends, relatives, community, and family members. They said that they will stop hunting, eating, and trading all kinds of turtles and tortoises. We also took a group picture for turtle conservation and friendship.

5.3. Impressed Tortoise

The team with participation from an MSc student conducted four surveys in four different sites to capture Impressed Tortoise for fitting with Radio transmitters to study its behavior, habitat requirement, food, and weather preferences. 12 tortoises were found of which 8 tortoises were obtained from local people and 4 tortoises were found by the team in the wild. After that, the student from Royal University of Phnom Penh started fitting transmitters on the carapaces which was considered as a very rich and abundant habitat for this species. According to the survey and monitoring of this species, the site now is putting into the protection habitat in the community agreement of CI's CSP program.

Figure 15: Impressed tortoise sticking with

Figure 16: MSc student releasing M. impressa with transmitter

The study of Manouria impressa took place in the Central Cardamom Protected Forest of Cambodia which consists of three main methodologies: community interview, seeking and relocating

tortoises, and radio telemetry research. According to interview with 14 local people, this species faces sever threats from local consumption, wildlife trade, and traditional medicine. The population significantly decreased from 1975 to the present time. The interviewees did not know about the value of the present of this species in their areas. Some ecology information was provided by the experience of the local people such as clutch size, diets, habitats, microhabitats, and behaviour in guarding the nest like hissing to scared predator which is never been reported.

Figure 17: CTCT team tracking M. impressa

Eleven tortoises were fitted with radio transmitters, of which seven of them were obtained from local people and four were found in the wild. The habitats were evergreen and bamboo forest at high elevation from 668-755m with 150C-370C temperature during the study period. Micro-habitats of M. impressa were found under logs, in leaf litters, under bamboo canes, and in holes. The micro-temperature of the hiding place was significantly lower than the ambient temperature. Humidity of the habitat was 85% average with 60% min and 96% max and canopy cover was not important for habitat preference.

M. impressa spent most of the time hiding, and it preferred to move from one hiding place to another at night. In one day, an individual could travel about 150m, and on average, moved 16m strait line distance. Breeding behaviour was described, but it requires more study to find out breeding and nesting seasons. Other aspect of ecology like feeding behaviour is also described. This species mainly consumed wild mushrooms and some of small plants and fruits.

Male has a significantly bigger tail than female, but there was no significant difference between the sexes in shell length. Body mass was not correlated to home range size. Home range sizes of male and female did not show a statistically significant difference. This tortoise occupied a home range size of 0.07 to 0.35km2.

5.4. Turtle Field Guide, Release Protocol,National Redlist

Cambodian Turtle Field Guide is currently in the process of final revision and that it will be finished by August 2011 and publication is planning for the next two months. The field guide was included not only all turtle species information in Cambodia gathered from survey information through CLP grants but also included our Release Protocol in a section of the field guide. The release protocol focused on how to handle a turtle, confiscated turtles,

habitat preference, observation of health check before releasing, where to release for each species to make sure no turtle would be released into a wrong habitat. The field guide will include other information such as IUCN Redlist status, CITES status, Cambodian redlist, regulation and law.

5.5. Student Support

Cambodian Turtle Consecration Team through financial supports from CLP has supported two BSc students for their research thesis focusing on "turtle distribution and threats" at two different sites of Rattanakiri and Prey Long proposed protected area.
Two MSc students were also supported by the team to conduct their research in Mekong on the Feeding Behavior and Food Preferences of the hatchlings Asian giant softshell turtle and a research and monitoring at the Central Cardamom Protected Forest (CCPF) entitled "Behavioral ecology of Impressed Tortoise via telemetry".

5.6. Species Research

Through the CLP's Conservation Leadership Award, CTCT team had conducted several surveys to find the presence of other possibly species outside Southwest Cambodia in Prey Long located n central Cambodia, Virachey National Park, and Mekong River.

In addition to the previous findings through CLP's grant, in February 2007, the team successfully rediscovered the almost forgotten endangered species of Asian Giant Softshell Turtle- *Pelochelys cantorii* in one stretch of Mekong River which was considered extinct in Cambodia for the past two decades and the species is currently known to be very rare in Thailand, Laos, and Vietnam. Since then, the team started to more focuses to protect this species by initiating a nest protection program to involve fishermen to be part of conservation team based in their villages.

Figure 18: Group picture with the finding of *P. cantorii*

Furthermore, in May 2007, the team also conducted a 10-days survey in Prey Long Forest located in three provinces of Kraite, Stung Treng, and Kampong Thom which is considered as the last remaining untouched forest in Cambodia. As the result, the team identified four species of turtles and tortoise such as Asiatic Softshell Turtle- *Amyda cartilaginea,* Giant Asian Pond Turtle- *Heosemys grandis,* Asian Leaf Turtle-*Cyclemys oldhamii.* All of these species have no record in this forest before which is very excellent result to confirm the

Figure 19: First record of *Cyclemys oldhamii* in Cambodia- May 2011

species in this area. Significantly, *C. oldhamii* is also the first record not only for this area but also it is the first record in Cambodia because this was no other research found this species before which it is known to have presented in Vietnam and Laos.

In October 2007, the team joined a survey trip organized by CI with other herpetologist conducted a mountain survey using trap and time-search in Virachey Nation Park in far northeast of Cambodia near Laos border to find the presence of turtle species that might be possibly there. As the results, the team found Impressed Tortoise-*Manouria impressa* in the deep and high mountain in the park. The species was first recorded in Central Cardamom Protected

Figure 20: CTCT team trapping *C. oldhamii*

Forest (CCPF) in Southwest Cambodia in 2004 by CTCT through the first grant of CLP (Sitha et al, 2005). So this was the second record of this species in outside CCPF in Cambodia which is showing a good result of different home range of this species which is so far between the two habitat. The survey also trapped two individuals of Asian Leaf Turtle-*Cyclemys oldhamii* which was first recorded in Prey Long Forest by CTCT team in May 2007 (Sitha Som and Sokhorn Kheng, 2007). So this is the second habitat identified in Cambodia for this species.

SECTION VII: CONCLUSTION AND DISCUSSION

According to the patrol result it was concluded that Koh Andeth village is a good habitat for turtle and soft-sell turtle to breed their population. Through the patrol, CR found a great turtle habitat area such as Prek Maisi and Srei Knung. These two sites are seasonally flooded forest and full of the turtle food. Even though in the dry season, the areas still remain the water in the large pond and low wetland.

Moreover, CR had defined the most illegal activities were happen during dry season because the villager enter into forest and hunt the animals. The hunters used the snares to hunt the wildlife especially wild pig and pangolin. Sometime, the villagers went to the forest for other purpose but they found the turtle incidentally and sometime they went fishing but they caught the turtle and soft-sell turtle.

The Community Ranger team was formed whom they are working to protect their natural resources by themselves with technical support from CTCT and financial support from CLP from 2007 to 2009. Significantly, CTCT together with CR team have identified potential habitat for future protection which is considered as the suitable habitat for turtle breeding site with seasonal flooded in rainy season. However, the team thinks that when the provided grant is ended there will be a problem for them to continue their patrol work in the future and it might be a good idea to find some other sources to continue support this kind of work to ensure the long-term conservation for this breeding site. See Figure 21

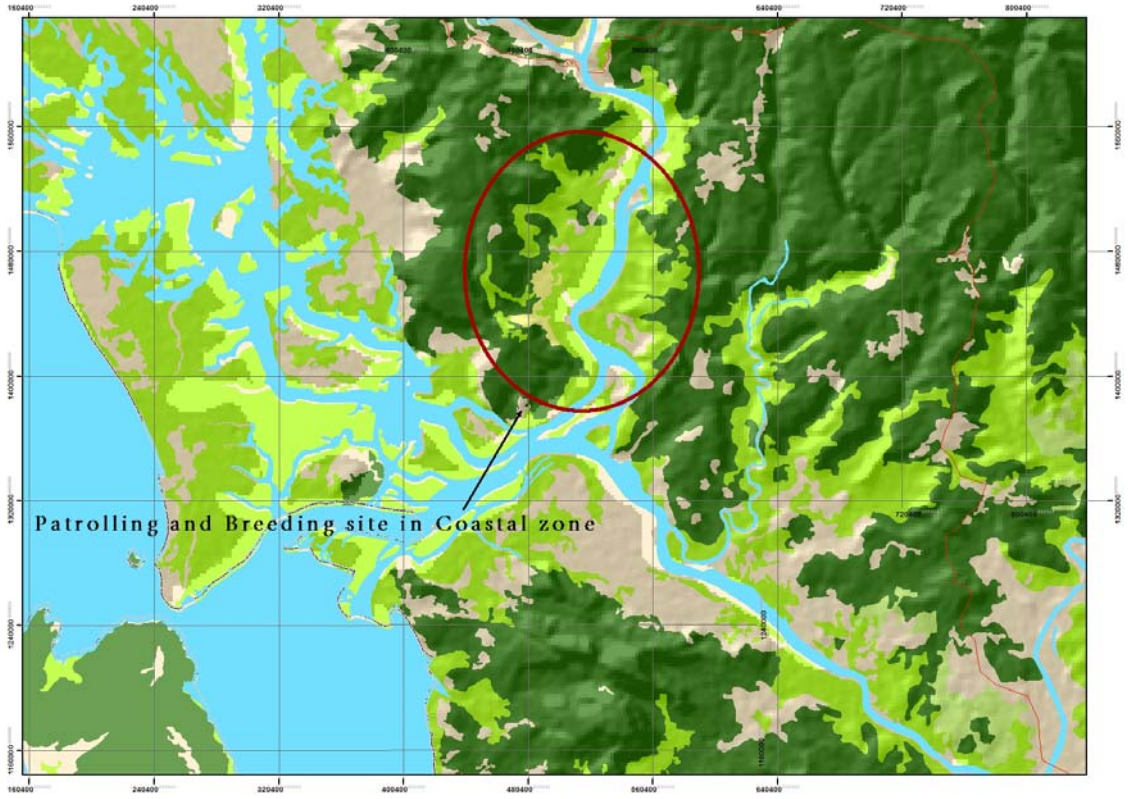


Figure 21: Proposed Protected breeding site in Tatai Community

Through the meeting and patrol result, the community committee had defined that the most illegal fishing was occurred in dry season. In the dry season, villagers came to cut the flooded forest and fishing in the small upstream and lake. Some villagers used the illegal methods pumping the lake and flooded area to catch turtle, long line hooks, and wild traps. All of the activities above were the main threats to turtles and also wildlife around the area especially in the Koh Andet boundary. To reduce the illegal fishing gears and wild trap, more patrols are needed to take more patrols in dry season than in the raining season. Patrols should be conducted in various parts of the area to guard and remove illegal snare an traps.

The result showed that the area is still under presures of illegal hunting activities because the team still found turtle traps, snares, and logging activities. Most of the snares that CR removed were wild pig that people came to hunt around Koh Andeth village. As the result the team found 16 fresh water turtles without any traping which can be concluded that the area is still having abundance of turtle population for putting into breeding site which is required to take immediate action to stop any illegal activities that can lead to the degradation of the wildlife especially the fresth water turtle and tortoise species in and around Koh Andet village.

According to project implementation, the team concluded that giving education conservation through lesson training and class participation by students are the effective methods to undertake for any conservation because they can clearly know about the wildlife conservation, especially the turtle significance in nature. It is the best action to reduce illegal activity in the present and the future. They clearly understood lesson on wildlife value and promises to stop using wildlife. Students and teachers need our team to meet them again. School directors are welcome the program. They thought that it is more knowledgeable for their school, and they did hope that this program will continue in their school again.

Impressed tortoise monitoring through radio tracking to study about its home range, food preference, and behavior was considered as part of the team's effort to protect this species and for future monitoring. All of these information is now written up by the MSc student which will be published soon and that it will be so much of interest to many scientists around to world to have more ideas on home range and food preference. The species is now putting into CSP's agreement with local community in CCPF through CI management. However, further efforts to conserve this rare is needed in the future to ensure that there is no threat to this species such as no snares, no logging, and hunting dog into the forest and that their habitat is conserved for long-term conservation.

Cambodian Turtle Field Guide is going to finish in the next two months which is around September 2011. The field guide will include all freshwater turtles and tortoises that have been found during the three phases of projects from 2004 to 2009. The team has worked hard with Cambodian Fisheries Administration and Forestry Administration for past few years to include all these species into Cambodian red list to make sure that they are becoming priority species for conservation and as the result, all species are included into current FiA's and FA's protection list except the three common species of *Cyclemys* species.

SECTION VIII: RECOMMENDATION

Community Ranger is a key to the habitat and breeding site protection for the seven species of freshwater turtles and tortoise identified in the Koh Andeth community and that the team recommend to all conservation donors to consider this place for priority area for turtle protection and that they should continue providing fund to this team to protect their natural resources.

Government rangers in many protected areas in Cambodia have been trained about the threats to turtle, ecology, identification, and habitat preference for each species. However, this kind of training is still important in the future to help enforce the law and that no turtle will be released in the wrong habitat in Cambodia.

Education has been given to many students in and around the conservation area but this kind of awareness should further give to other next upcoming students to ensure that they are all aware of our conservation work in their area and that they are the key to make our planet clean and green for generation.

Impressed tortoise is the very rare species not only in Cambodia but also in all countries in Asia. It was found to have quiet abundance in CCPF but catching for local consumption and habitat loss are the main threats to make this species extinct in the wild. Law enforcement and community incentive to protect this species is needed in the area and which will fall to the job of Conservation International-Cambodia to strengthen their enforcement team to patrol frequently in the habitat. Significantly, monitoring using radio transmitter is still the best methodology to study in details about this species so that conservationist can work on strategy to conserve this rare species in the future.

Asian Giant Softshell Turtle is first rediscovered in the stretch of Mekong River which is bringing hope for CTCT to take immediate action to protect this species. The team identified some conservation strategies for this species which is included nest and beach protection through incentive by involving local fishermen to be part of conservation. Further survey is needed to find out if they are present in other places in Cambodia.

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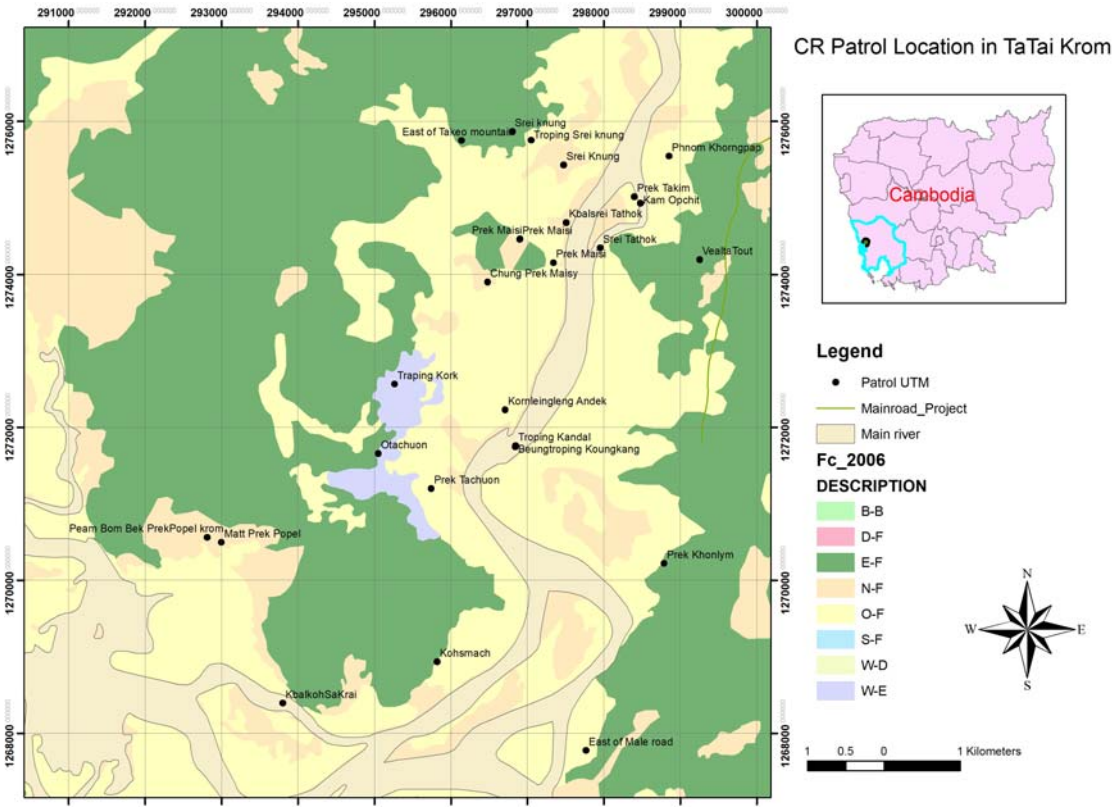
APPENDIXIES

Appendix 1: Patrolling area

Patrol Area	**UTM**	
Srei Tathok	0297545	1274662
Prek Khonlym	0298382	1270534
Matt Prek Popel	0292592	1270809
Chung Prek Maisy	0296071	1274216
Srei Knung	0297067	1275748
Prek Tachuon	0295333	1271513
Peam Bom Bek PrekPopel krom	0292405	1270876
Kohsmach	0295413	1269248
Prek Maisi	0296932	1274469
East of Takeo mountain	0295729	1276065
Kam Opchit	0298072	1275248
East of Male road	0297360	1268086
Srei knung	0296397	1276185
Prek Maisi	0296496	1274779
KbalkohSaKrai	0293393	1268707
Otachuon	0294642	1271972
Troping Kandal	0296436	1272074
Troping Srei knung	0296640	1276071
Prek Maisi	0296493	1274775
Traping Kork	0294857	1272879
Kbalsrei Tathok	0297100	1274995
VealtaTout	0298846	1274508
Prek Takim	0297992	1275333
Phnom Khorngpap	0298445	1275863
Beungtroping Koungkang	0296435	1272062
Kornleingleng Andek	0296303	1272546

Appendix 2: Map of CR patrolling areas



Appendix 3: List of Student Names

Samdach Hun Sen Ka Aong primary School, Chamkaloung commune, Kampong Seila district, Koh Kong province

No	Name	Grade
1	Kim Rith	6
2	Hin Mpearak	6
3	Kim Sreyrun	6
4	Chann Lai	6
5	Oeung Sokpol	6
6	Poeung Rany	4
7	Kim Sreymom	4
8	Sok Sreymich	4
9	Tin Chinda	4
10	Tin Sokpol	4
11	Eark Bunsrun	4
12	Voeun Srynearng	4
13	Sok Seang	4
14	Ly Channy	4
15	Soun Chankimpea	4
16	Kun Peapikdou	4
17	Hing Dynang	5
18	Searng Bunnakk	5
19	Ly Chinda	5
20	Sem Chandara	5
21	Oerng Supon	5
22	Saroeun Thop	5
23	Nim Kimchandara	5
24	Nuon Lyheang	5
25	Chom Dararoeun	5
26	Chom Sreynich	4
27	Chhmeang Patvy	4
28	Chon Stalin	5
29	Non Kimly	5

30	Prom Vuthy	5
31	Ly Chunthai	5
32	Kuon Suopann	4
33	Chhmeang Sreynuch	4
34	Pang Lyly	4
35	Pom Sreynuo	4
36	Meas Makkara	4
37	Peach Chantrea	6
38	Kim Kmin	6
39	Nom Vannak	6
40	Nom Nouen	6

Tatai Krom Primary School, Tatai Kom Commune, Koh Kong district, Koh Kong Province

No	Name	Grade
1	Huon Chan	4
2	Nao Chantou	4
3	Sok Sor	4
4	Nat Soktean	4
5	Sim Somsmay	4
6	Chhuon Navy	4
7	Chuon Chansokvanlit	4
8	Hun Sreyneang	4
9	Sok Py	4
10	Heng Sokkun	4
11	Ly tatt	5
12	Sok Oearng	5
13	Sok Tit	5
14	Pann Samat	4
15	Ly Tou	4
16	Nguon Raksmey	4
17	Ouk Oen	4
18	Sao Lakhikna	4
19	Seam Narach	4

C T Primary School, Kampong seila commune, Kampong seila district, Koh Kong province

No	Name	Grade
1	Suy Vanheng	3
2	Yun Yan	3
3	Chhun Bun	3
4	Hin Sokhuo	3

5	Chum Sitha	3
6	Yun Sun	3
7	Van Chanhanva	3
8	Songha Pisey	3
9	Chhit Chhoeun	3
10	Suy Vanthorn	3
11	Chhit Chhon	3
12	Chhit Teav	3
13	Lay Vilay	3
14	Chan Theara	3
15	Tim Chansoka	3
16	Dam Sokrat	3
17	Peach Ravuth	3
18	Lay Sokbin	3
19	Doeuk Dann	3
20	Peach Ravy	3
21	Thou Chantoeun	3
22	Peach Chantou	4
23	You Sreylab	3
24	Khorn San	3
25	Yun Rithy	4
26	Bo Chantha	4
27	Chom Kaknika	4
28	Ngan Channa	4
29	Chhy Otdom	4

Andongtek Primary School, Andongtek Commune, Botoum Sakor district, Koh Kong province

No	Name	Grade
1	Hung Chanleng	6
2	Kha Sreymao	6
3	Thea Opyrady	6
4	Pong Sokvy	6
5	Ly Linda	6
6	Neang Sinuoy	6
7	Chiv Muysuon	6
8	Ki Chhiely	6
9	Suon Ny	6
10	Bul Sreyoun	6
11	Pa Chhayching	6
12	Seng Kagna	6
13	Nget Kunthea	6

14	So Sreypin	6
15	Leang Nyta	6
16	Sao Sokvannman	6
17	Seng Heng	6
18	Oeun Som At	6
19	Ya Navy	6
20	Uo Lung	6
21	Yin Sitha	6
22	Khao Buy	6
23	San Kimlay	6
24	Chan Lakkna	6
25	Ouk Chheng	6
26	Thy Channoeun	6
27	Pong Sikla	6
28	Yin Bunma	6
29	Suan Chhay	6
30	Teng Syna	6
31	Hann Bunheng	6
32	Ngit Sokpin	6

Rung Plam kea SornPrimary School, Trapaingrong Commune, Koh Kong District, Koh Kong Province

No	Name	Grade
1	Orng Thuna	6
2	Bory Taktor	6
3	Kean Chanda	6
4	Pech Meta	6
5	Sun Kunthea	6
6	Yoeun Vanntha	6
7	Leang Sokchin	6
8	Vat Searlin	6
9	Norn Chealy	6
10	Pov Mork	6
11	Lok Luan	6
12	Meas Samorn	6
13	Heng Peng	5
14	Ny Vasna	5
15	Cheang Nang	5
16	Sorn Sat	5
17	Thung Saravut	5
18	Min Sokchit	5
19	Niv pagna	5
20	Lung Chhokvikchhay	5

21	Bing Dara	5
22	Kim Chann	5
23	Pech Senghour	5
24	Nguon Lyda	5
25	Ny Sreyneang	5
26	Nom Sok Eang	5
27	Ly Kimsorn	5
28	Pan Piksey	5
29	Leang sokCheat	5
30	Chuong Otdom	5
31	Nguon Sivit	5
32	Norn Lythen	5

Ka Ong primary School, Chamka Lung commune, Kampong Seila district, Koh Kong province

No	Name	Grade
1	Chann Lay	6
2	Chon Stalin	6
3	Kim Rith	6
4	Chum Dareon	6
5	So Vandet	6
6	Horn Lyheing	6
7	Niem Chandara	6
8	Logn Deth	6
9	Leong Sophun	6
10	Chum Sreynou	5
11	Kuon Souporn	5
12	Sok Sreymich	5
13	Ngom Chinda	5
14	Pheong Rany	5
15	Srey Lux	5
16	Khun Kapikdou	5
17	Mein Makara	5
18	Soun Chankimhear	5
19	Veong Sreyneng	5

20	Khim Sreymom	5
21	Sok Searn	5
22	Lun Sreyleam	5
23	Chum Sreynich	5
24	Pang Lyly	5
25	Ly Borey	5
26	Sok Son	5
27	Eak Sun	5
28	Sok Chorn	4
29	Eak Lyhai	4
30	Seang Voony	4
31	Chhmorng Patvy	4
32	Logn Pov	4
33	Sok Gnugn	4
34	Thuk Chanrith	4
35	Dum Hy	4
36	Cheng Yeon	4
37	Deor Bo	4
38	Deor Kdann	4
39	Hin Hour	4
40	Vann Pov	4
41	Yun Kit	4
42	Logn Duy	4
43	Ly Seyra	4
44	Pon Pheaktra	4
45	Chhum Lak	4
46	Chann Mouty	4
47	Sok Sung	4
48	Prang Pal	4
49	Gnim Tokla	4
50	Pos Nil	4
51	Dum Ay	4
52	Sous Lyna	4
53	Horn Sreymom	4
54	Prum Visit	4

55	Sok Neang	4
56	Searng Hay	4
57	Bang Nounlorng	4
58	Pun Thairy	4
59	Vis Chhei	4
60	Srey Nich	4
61	Minear	4
62	Or Rear	4
63	Houng Vuthy	4
64	Cheng Dy	4
65	Houng Vutha	4
66	Siem Thairy	4
67	Gnim Kusorl	4
68	Srey Lak	4
69	Seim Sreyroth	4
70	Chhin Sokhem	4

Tatai Krom Primary School, Tatai Kom Commune, Koh Kong district, Koh Kong Province

No	Name	Grade
1	Mein Sopheap	6
2	Sok Thit	6
3	Duy yi	6
4	Ngoun Kongkar	6
5	Leim Chhoun	6
6	Sour Chann	6
7	Sok Heorn	6
8	Orn Sok	6
9	Ien Okbun	6
10	Ou Sachhivisal	5
11	Chann Thuna	5
12	Pann Samat	5
13	Nao Chantou	5
14	Chhuon Navy	5
15	Chuon Chansovanlida	5
16	Nguon Raksmey	5
17	Hour Hak	5
18	Seam Narach	5
19	Vann Sierey	4
20	Dok Sombat	4
21	Na Lon	4
22	Theorn Thaira	4

23	Sou Tup	4
24	Sou Lakkna	4
25	Bil Sreynang	4
26	Gnok Duch	4
27	Navy	4
28	Reorn Sokha	4
29	Phut Thim	4
30	Seng Chann	4
31	Tak Poun	4
32	Prom Meita	4

C T Primary School, Kampong Seila commune, Kampong Seila district, Koh Kong province

No	Name	Grade
1	Lay Sokbin	4
2	Hy Kimchet	4
3	Peng Pan	4
4	Peach Ravuth	4
5	Deor Pann	4
6	Chhun Bon	4
7	Heart Heorn	4
8	Nang Lyhour	4
9	Chum Sitha	4
10	Suy Vanthorn	4
11	Chorn Ngeit	4
12	Dum Sreyratt	4
13	Ngan Channa	4
14	Pov Kolap	4
15	Gnan Sreyda	4
16	Lay Vilay	4
17	Peach Chantou	4
18	Bo chantha	4
19	Yun Vuthy	4
20	Ngan Thaira	4
21	Suy Vanheng	4
22	Chhi Ortdom	4
23	Chhi Vandy	4
24	Chhit Chhern	3
25	Chhit Chhorn	4
26	Boch Vet	4

Andongtek Primary School, **Andongtek Commune, Botomsakor District, Koh Kong Province**

No	Name	Grade
1	Ngoy Nary	6
2	Vy Pa Eim	6
3	Chorn Shou	6
4	Chum Bunteorn	6
5	Ngoy Narin	6
6	Mein Rattana	6
7	Phin Searvmiegn	6
8	Khann Sokha	6
9	Veorn Kuynong	6
10	Gnagn Chantha	6
11	Seng Vichhi	6
12	Sourn SreySros	6
13	Ol Vichhai	6
14	Chum Sreymou	6
15	Nann Sreymoch	6
16	Thearn Tangchhay	6
17	Virak Visalteroth	6
18	Sourn Sreypeng	6
19	Li Chanthy	6
20	Bo Mey	6
21	Sy Bolas	6
22	Horng Sokhung	6
23	Seng Kieleng	6
24	Seng Sokny	6
25	Tour Buntourn	6
26	Khourn Sreymom	6
27	Norn Sreyna	6
28	Say Piksey	6
29	Seng Sreyroth	6
30	Khann Chann	6
31	Lay Senghap	6
32	Chheng Hearng	6
33	Nourn Somnang	6
34	Siem Nguntha	6
35	Sung Borin	6
36	Orksman Kiplis	6
37	Chhourn Sombearv	6
38	Sim Thaira	6
39	Mok Kakkada	6
40	Lay Paris	6
41	Horn Bunla	6
42	Srun Lun	6
43	Eang Sarat	6

Rung Plam Kea Sorn Trapaingrong Primary School, Trapaingrong Commuce, Koh Kong District, Koh Kong province

No	Name	Grade
1	Chearn Piksey	6
2	Thung Saravuth	6
3	Ly Kimsrorn	6
4	Son Tina	6
5	Am Sok Eng	6
6	Ny Sreyneang	6
7	Norn Lythen	6
8	Nguon Sivit	6
9	Leang sokcheat	6
10	Chuong Otdom	6
11	Bing Dara	6
12	Tiv pagna	6
13	Lung Chhokvikchhay	6
14	Heng Peng	6
15	Ny Vasna	6
16	Sorn Sat	6
17	Kim Chann	6
18	Shun Rotha	5
19	Long Ly	5
20	Chun Sreynam	5
21	Yean Vanthorn	5
22	Then Beorn	5
23	Khorn Sokhorn	5
24	Thap Kny	5
25	Chann Sreypov	5
26	Vorn Chanmony	5
27	Sok Cham	5
28	Tiv Lyna	5
29	Keov Saravy	5
30	Sok Serey	5
31	Ieng Sokheng	5
32	Pov Chin	5
33	Then Chran	5
34	Khon Chantheorn	5
35	Sruy Searvmey	5

Appendix 4: Project Activities

Training Photo



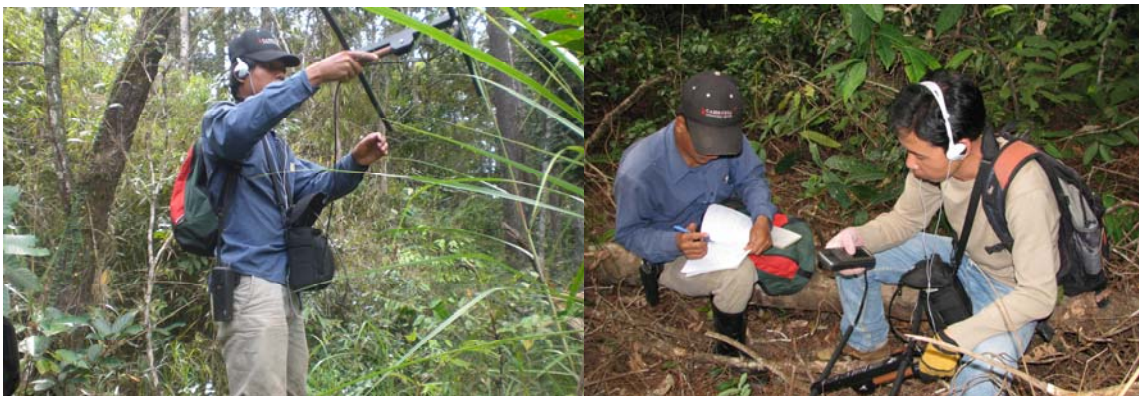

Patrolling Activities





Impressed Tortoise Monitoring


Impressed Tortoise fitting with transmitters and released for monitoring



Tracking Impressed Tortoise and Recording information into datasheet

Species Survey

Community Interview to find Asian Giant Softshell Turtle in Mekong River

Trapping and the turtle caught in the trap

Trapping in Virachey National Park and Asian Leaf Turtle caught in the trap