DISTRIBUTION, EXPLOITATION AND TRADE DYNAMICS OF ASIAN SMALL-CLAWED OTTER *Amblonyx cinereus* ILLIGER 1815 IN MAINLAND PALAWAN, PHILIPPINES

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ACCEPTANCE PAGE

This thesis attached hereto entitled "DISTRIBUTION, EXPLOITATION AND TRADE DYNAMICS OF ASIAN SMALL-CLAWED OTTER *Amblonyx cinereus* ILLIGER 1815 IN MAINLAND PALAWAN, PHILIPPINES", prepared and submitted by JERIC B. GONZALEZ in partial fulfillment of the requirements for the degree of Bachelor of Science in Aquatic Biology (Resource Conservation) is hereby recommended for acceptance.

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ABSTRACT

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Asian Small-clawed Otter is widely distributed in Southeast Asia, South China and Southern India (Larivie`re 2003). Yet, in the Philippines it is only known to occur in Palawan (Heaney et al. 2002). Its isolated population is the only otter species in the Philippines, locally called "dungon" or "pangkat-pangkatan" (Castro and Dolorosa 2006). Throughout the world, threats on otters had been increasing turning its Near Threatened status (2004) into Vulnerable after four years (Hussain and de Silva 2008). However, no extensive studies on otters all over Palawan had been conducted. This research focused on otter's distribution all over mainland Palawan, otter's exploitation, threats to its habitat, and trade dynamics that was assessed from August 2009 to January 2010. A guide questionnaire was used to gather information on otters in two barangays per municipality and a city of mainland Palawan. Fifteen respondents who lived near otter's habitat were chosen per barangay. Threats on otter's habitat (with spraints and den) were noted. Photo documentation on exploitation of otters and threats to its habitat were obtained. Key Information Interview was conducted to provide the data on trade dynamics. The results of the study revealed that otters are present in all 12 municipalities and a city of mainland Palawan. Sixty out of 201 respondents have killed otters mainly because of curiosity (36.4.9%). Others have caught and killed them for food (24.5%) and considered them as pest (20.4%). Some catch them for pets (17.8%) and trade (0.3%). Slash-and-burn farming (48.3%) was the major threat on otter's habitat. Trading of otters was evident with its increasing demand for pets.

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CHAPTER I

INTRODUCTION

Background of the Study

Asian Small-clawed Otter (*Amblonyx cinereus*) is the smallest among the thirteen species of otter in the world (Geser and Dollinger 2008). Taxonomically, they belong to Class Mammalia, Order Carnivora, Family Mustelidae, Subfamily Lutrinae (Soffer 2001). They are widely distributed in Southeast Asia, South China and Southern India (Larivie`re 2003), yet in the Philippines it is only known to occur in Palawan (Heaney et al. 2002). Its isolated population is the only known otter species in the Philippines, locally known as "dungon" or "pangkat-pangkatan". They are semi-aquatic that feeds on small fishes, crabs, shrimps, and various kinds of shellfishes. In Palawan, otters are observed in the rivers, streams, mangroves, estuary, roads, sand beaches, islands, fishponds, and irrigations. They are nocturnal animals that was observed between 11:00 p.m. to 5:25 a.m. and hides during the day (Castro and Dolorosa 2006).

Throughout the world, threats on otters had been increasing such as habitat destruction due to slash-and-burn agricultural practices, cutting of trees, quarrying, soil erosion, recreation activities, trapping and hunting of wildlife, and human settlements. Interviews revealed that curiosity ranked first among the reasons for catching otters (Castro and Dolorosa 2006) and Canoy et al. (2003) also noted trading of the species. With its Near Threatened status in 2004 it turned to Vulnerable after four years (Hussain and de Silva 2008).

Interviews of Canoy et al. (2003) recorded presence of otters in Narra, Brooke's Point, Española, Bataraza, Quezon, and Rizal. Meanwhile, Castro and Dolorosa (2006) reported sightings in Dumaran, Roxas, and Puerto Princesa City. In addition, survey conducted by the

Palawan Integrated Area Development Project Office (now Palawan Council for Sustainable Development) reported that *A. cinereus* are sighted in three (Malico, Roxas; Inagawan, Puerto Princesa City; and Sumbiling, Bataraza) out of twelve areas studied (PIADPO undated). Yet, no extensive studies pertaining on otter's distribution all over Palawan had been conducted.

Significance of the Study

The study provided a map of otter's distribution all over Palawan. It provided data on otter's exploitation and trade dynamics in Palawan. With otter's dwindling population availability of such information can be used as basis for conservation strategies and protection measures for otter's isolated population in Palawan. The results of this study can also be used as basis for considering more researches on otters' captive breeding in Palawan.

Objectives of the Study

This study aims to:

1. Construct a map of distribution of Asian Small-clawed Otter in Mainland Palawan;
2. Determine the exploitation of Asian Small-clawed Otter ;
3. Identify threats to otter's habitat; and
4. Gather information on otter's trade dynamics.

Scope and Delimitation of the Study

The study was delimited to assess the distribution, exploitation and trade dynamics of Asian Small-clawed Otter in Mainland Palawan through actual interview, Key Information Interview (KII) and photo documentation.

Actual interview was conducted from August 2009 to January 2010. The questionnaire was focused on the profile of respondents, general information of the Asian Small-clawed Otter, exploitation of the species, threats to their habitats and trade dynamics of this animal. In order to verify the occurrence of the *A. cinereus* in the area, the researcher surveyed their habitat and looked for otter spraints and den.

Definition of Terms

Distribution – refers to the occurrence of Asian Small-clawed Otter in all mainland municipalities and a city of Palawan.

Exploitation – is the utilization or use of otters as pets or its body parts for any reason and conversion, destruction, and degradation of its natural habitats.

Habitat – is the natural conditions and environment in which the otters live.

IUCN – International Union for the Conservation of Nature and Natural Resources, which is an international organization dedicated to natural resource conservation. It monitors the current status of wildlife through the researches conducted which serves as basis for listing them in different categories in the Redlist.

Key Information Interview – is a type of interview which targets anyone who can provide detailed information and opinion based on his or her knowledge of a particular issue. In this study, this mainly targets individuals who are known as traders or poachers, and individuals who have direct connection to them.

Mainland Palawan – refers to the largest island in the province of Palawan excluding the island municipalities.

Near Threatened – species that do not qualify for critically endangered, endangered or vulnerable now, but are close to qualifying for or are likely to qualify for a threatened category in the near future based on IUCN.

Spraints – the fecal or droppings of an otter.

Threatened species – animal and plant species which are classified either as critically endangered, endangered, or vulnerable to extinction in the near future in IUCN.

Trade Dynamics – refers to the pattern of trade of Asian Small-clawed Otter in the Philippines.

Vulnerable - IUCN category that refers to species that are not critically endangered or endangered but are under threat from adverse factors throughout their range and are likely to move to the endangered category in the near future.

CHAPTER II

REVIEW OF LITERATURE

Distribution of Asian Small-clawed Otter

The Asian Small-clawed Otter (*A. cinereus*) is naturally occurring in Bangladesh, Bhutan, Borneo, Brunei, South China, Southern India, Indonesia (Java, Karimon Islands and Sumatra), Kampuchea, Laos, Malay Peninsula, Myanmar, Philippines (Palawan), Thailand, and Vietnam (Hussain 1997 and Larivie`re 2003). But due to the exportation and captivation of these animals in zoos, they had also been present in Germany, United Kingdom (Wright 2003) and Ohio (Maslanka and et al. 2002). In England, *A. cinereus* established itself in the wild after escaping from captivity for a recent year (Jefferies 1990 and 1991 as cited by Hussain and de Silva 2008). In the past, they are said to be common in the mangrove forest of east Calcutta and Sunderbans, India (Sanyal 1991 as cited by Hussain and Silva 2008) but is now believed to be locally extinct (Hussain and Silva 2008). The Asian Small-clawed Otter had already been likely extinct in Hong Kong and Singapore (Foster-Turley and Santiapillai 1990; Sebastian 1995 as cited by Larivie`re, 2003).

Otters are unique in the family of carnivores because of their adaptation to, and desire of, aquatic life (Belardo 2001). In Southeast Asia, *A. cinereus* is more abundant in small water bodies (Shariff 1984 as cited by Larivie`re 2003). They inhabit the coastal habitats as well as inland rivers, mangrove forest, rice fields, freshwater marshes, rocky streams in forests (American Zoo and Aquarium Association 2000) and creeks, often near dense foliage (Smithsonian National Zoological Park Undated). The Asian Small-clawed Otter is also adapted to living alongside community (Heap et al. 2008).

Mangrove Forest

The mangrove forest is one of the important habitats to the survival of good otter populations in Southeast Asia. According to the previous natural historians mangroves are important to Smooth Otters. The results of the study also revealed that it is also as important to Asian Small-clawed Otters. Most of their foods came from the mangroves and associated mudflats (Foster-Turley 1992).

Rice Fields

Another important habitat for Asian Small-clawed Otter and Smooth Otters is the Kerian rice fields of Perak, Malaysia. These two otter species use the brushy cover along the dikes and between separate rice fields for denning ground. They use collection of discarded, burnt rice hulls piled along the sides of the road as a drying medium for their coats. The irrigation ditches and canals serve as hunting ground for their food (Shenoy 2003).

Both otter species are adaptable to living in close association with people in rice fields and other rural areas. In these areas, their survival depends on the availability of suitable prey and brushy cover where they can have their den and hide without human intervention (Foster-Turley, 1992).

Rivers and Streams

According to Foster-Turley (1992), there are fewer otters that live in Asian rivers and stream compared to wetlands, such as marshes and mangroves. Asian Small-clawed Otters co-exist with *Lutra lutra*, *L. sumatrana*, and *Lutrogale perpicillata* in several river systems in Thailand and Malaysia (Foster-Turley 1992 as cited by Larivie`re 2003). The presence of these animals in rainforest rivers is fewer compared to their presence in mangrove forest and rice field (Foster-Turley 1992).

Exploitation of *A. cinereus*

Otters are charismatic animals with wide public appeal. They serve as indicator species of healthy aquatic ecosystems. Otters live in clean waters where their food is available and unpolluted by pesticides or industrial waste, where there is good riparian vegetation cover, and where they are unmolested by humans (Foster-Turley 1998).

However, it is believed that the population of these animals is shrinking due to loss of habitat and intensive trapping (Hussain 1997). In India, the major threats to the population of Asian Small-clawed Otter as well as to other otter species are the loss of their natural habitat, pollution, decreasing biomass of their prey (Shenoy 2003), habitat destruction due to developmental projects, reclamation of wetlands for settlement, agriculture, poaching and contamination of waterways (Shenoy et al. 2006).

Cauvery River is one of the important habitats of *A. cinereus* as well as to the other otter species of India. However the Cauvery region is highly populated, hence, human disturbance is inevitable all along the river (Shenoy et al. 2006). Poaching was also evident from the residents in the area. The resident fishermen practice illegal fishing methods such as using dynamite which causes otter's death. The river has substantial sand resources, which is exploited heavily in many places. Sand mining is rampant in the area where some of the otters make their den on sand. Agriculture also contributed threats to the otters. A large part of the river flows through agricultural land, including plantations, where otter's den in the river bank usually occurred. Cattle are common feature in Indian villages. All along the Cauvery belt, large populations of cattle were widespread. Grazing cattle destroy the brushy grass which serves as otter's habitat and covers the entrance of their den. The healthy vegetation along the riverbanks has an important function as well. It serves as a buffer between the riverine ecosystem and the adjoining

community. Falling/ uprooted trees also expose the otters a dangerous condition. Most of the local people wash their clothes and utensils, and take their bath in the river. This could result to the poisoning of otters, as well as to the other aquatic organisms (Shenoy 2003).

Misuse of pesticides in agriculture and aquaculture, conversion of natural habitats and, to a lesser extent, hunting are the main threats to *A. cinereus* in Java, Indonesia (Melisch et al.1994). In Java and Sumatra, Indonesia and Kalimantan, Borneo, the local people are hunting the otters, looking for the magical stone. They believe that this stone helps the otter to hold its breath for a long time and therefore, it is able to swim fast underwater. Apparently, possessing and wearing this stone was believed to give similar effect to humans. Therefore, this stone was very much sought after by people (Lubis 2005).

Asian Small-clawed Otter is also threatened due to the hunting pressure triggered by the value of their skin and meat. Poaching of otters for their skin is rampant in New Delhi, Calcutta, Kota, Kanpur, Lucknow and Bongalor. The skins reach in international markets through Nepal and Bangladesh routes (Hanffe and Ahmed 1999 as cited by Meena 2002). The skin of otters is good source of pelts use in making of foot wear (Anonymous 2004). It is believed that the organs of otters have medicinal value in China, Burma, Nepal and Vietnam, which is a reason why they are being hunted (Carnivore and Pangolin Conservation Program 2008). The over exploitation of their habitat is also a major threat to the otters in Cambodia, Thailand and Vietnam (Kanchanasaka et al. Undated and Long 2000).

In Palawan, conversion of their natural habitat to other uses mining, logging activities constructions of different infrastructures, and proliferation are the major threats to these animals (Foster-Turley and Santiapillai 1998). Some of the residents of Palawan also hunt otters for food,

pets, curiosity and some of them considered it as pests because they are perceived to damage agricultural crops and competitor in harvesting fishery resources (Castro and Dolorosa 2006).

Like human, otters are also prone to several diseases such as pneumonia, liver-lobe torsion, and rickets. These diseases were recorded in Asian Small-clawed Otters in captivity (Lancaster 1975; Warns-Petit as cited by Larivie`re 2003). Urolithiasis is also a widespread disease in captive populations of *A. cinerues* (Karesh 1983; Nelson 1983; Petrini et al. 1999 as cited by Larivie`re 2003).

Otters and Other Wildlife Trade

Medan City in Indonesia is one of the Southeast Asia's major centers for domestic and international trade of wildlife where several wildlife species including otters are being sold in the local markets. Keeping birds and other animals as pets is very popular in Indonesia. The Act of the Republic of Indonesia on Conservation of Living Resources and Ecosystems, known as the Conservation Act (No. 5) of 1990, provides the legal basis for the control and regulation of wildlife trade. In spite of this Conservation Act, several species of wildlife (both domesticated and internationally endangered) are still being displayed and sold in their markets. Fifty four (54) families of birds were sold mainly because of their meat value in several restaurants, for medicinal purposes, and as novelty pets. Fifteen species of reptiles representing the 11 families were also present because of the turtle meat value, high value snakes' skin, and lizards kept as pets especially iguanas. In addition, they are believed to have medicinal uses. There are also thirty four (34) species of mammals in fifteen families recorded in the Medan City market which includes *A. cinereus*. They were traded mainly because of their meat, kept as pets because of

their charismatic appeal, and medicinal uses such as in pangolin, skunk and other wildlife. These wildlife species were exported to the different countries for zoo display (Shepherd et al. 2004).

In the Philippines, trading of wildlife also exist even though it is against R.A. 9147 or known as the Wildlife Act, the Act providing for the conservation and protection of wildlife resources and their habitats. In Balabac, Palawan illegal trading of sea turtle is rampant. They were traded because of their eggs, their meat as main source of protein especially for Chinese and for their high price carapace that is used as jewelries and combs. They were being traded up to the international market (Antonio 2009). In Quezon, Palawan, illegal trading of several wildlife species also exists. Last June 22, 2009, with the combined efforts of the PNP Maritime and the Palawan NGO Network, Inc. (PNNI), a member of the Global Legal Action on Climate Change (GLACC) has confiscated several wildlife amounting to at least P2,847,000 including Asian Small-clawed Otter (Galili 2009). On November 3, 2008, The Philippine Star also reported that the DENR team had confiscated several wildlife animals without permits and certification from the government which included one *A. cinereus*. It was also found out that 18 of the 33 unregistered animals confiscated by agents of the National Bureau of Investigation from a pet collector in Pampanga were classified as "vulnerable" species. Under the Republic Act 9147, the mere possession of wildlife species classified as "vulnerable" is punishable with a maximum jail term of one year and a fine of as much as ₱ 100, 000.00 (Adraneda 2008). Canoy et al. (2003) also said that *A. cinereus* were transported to Metro Manila and Cebu.

Conservation Status

In 2004, Asian Small-clawed Otter was categorized as near threatened by International Union of Conservation on Nature (IUCN) Red list (Hussain 2004). In just four years, the status

of *A. cinereus* turned into Vulnerable. The declining population of this species is due to the exploitation and conversion of their habitat. This was also the reason of IUCN for moving their category into the threatened status. Based on published literatures last decade, the range of *A. cinereus* in western part of India had shrunk. The vulnerable status of the species is based on past population decline rates under criterion A2acd. In South and Southeast Asia, rampant poaching and degradation of habitat of Asian Small-clawed Otter has been observed which is the main reason for their population decline (Hussain 1993; Melisch et al. 1996; Hussain 2002 as cited by Hussain and Silva 2008). In western part of India, otter's threats had started sixty years ago. Its range had shrunk considerably moving west to east from Himachal Pradesh to Assam, India (Hussain 2007 as cited by Hussain and Silva 2008). Before, they are common in the mangrove forest of east Calcutta and Sunderbans, India (Sanyal 1991 as cited by Hussain and Silva 2008) but it is now believed to be locally extinct (Hussain and Silva 2008).

In Palawan, records on otter's population are still lacking. Last 2006, the conservation status of *A. cinereus* was assessed along Pinamualan and Ilian Streams in Ilian, Dumaran. Yet, only 16 individuals of otters were observed during the survey. The major threats to *A. cinereus* include intensive trapping and hunting, human settlements and destruction of otter's habitat such as slash-and-burn farming, cutting of trees, quarrying, soil erosion and recreation activities. The study also revealed that curiosity was the main reason for catching otters. Continuous hunting and killing of otters indicate the poor implementation of RA 9147 (Castro and Dolorosa 2006).

Conservation measures

In India, the hunting, trapping and killing of otters are prohibited because the Indian government offers protection to all species of otters found in their country under the Wildlife

Protection Act of 1972 (Shenoy et al. 2006). In Ecuador, the otters are protected by the CITES. However, the protection is practically non-existent because of lack of funding supports, lack of qualified personnel and poor commitment of the persons in authorities towards conservation (Suarez and Garcia 1986 as cited by Utreras and Araya 2002). Similar situation were also observed in the Philippines. Although, Republic Act 9147 (Wildlife Act) was created to protect all wildlife including otters, hunting and killing of Asian Small-clawed Otters in Palawan still exist, indicating that the law is not well implemented by the law enforcers (Castro and Dolorosa 2006).

In thirteen zoos in North America, there are 40 individuals of Asian Small-clawed Otter that were maintained in captivity during 1985. After two years, it has increased into 63 individuals (Foster-Turley and Engfer 1988 as cited by Larivie`re 2003) and during June 1989 it increased up to 117 *A. cinereus* individuals (Samuels and Cook 1991 as cited by Larivie`re 2003).

Due to habitat destruction and environmental pollution, the population of Asian Small-clawed Otters in the wild decreased. This turned them into vulnerable category (Hussain and Silva 2008) and they are recognized as ‘‘of local conservation concern’’ by the Otter Specialist Group of the International Union for the Conservation of Nature (Mason and Macdonald 1990 as cited by Larivie`re 2003). Over the years, the Otter Specialist Group has developed a cadre of biologist across Asia to conduct field surveys and has popularize otter conservation by promoting otter as ambassador of the wetlands. However, concerted effort to conserve this species is needed. The plans for long term survival of the species, policy based action, research on factors affecting its survival, habitat-based action on creation and expansion of protected areas, and communication and awareness building actions are needed (Hussain and Silva 2008).

CHAPTER III

METHODOLOGY

Locale of the Study

This study was conducted in all municipalities which are located in mainland Palawan including Puerto Princesa City (Figure 1). Palawan was divided in two district, first district (Northern Palawan) and second district (Southern Palawan). There are twelve municipalities and one highly urbanized city in mainland Palawan.

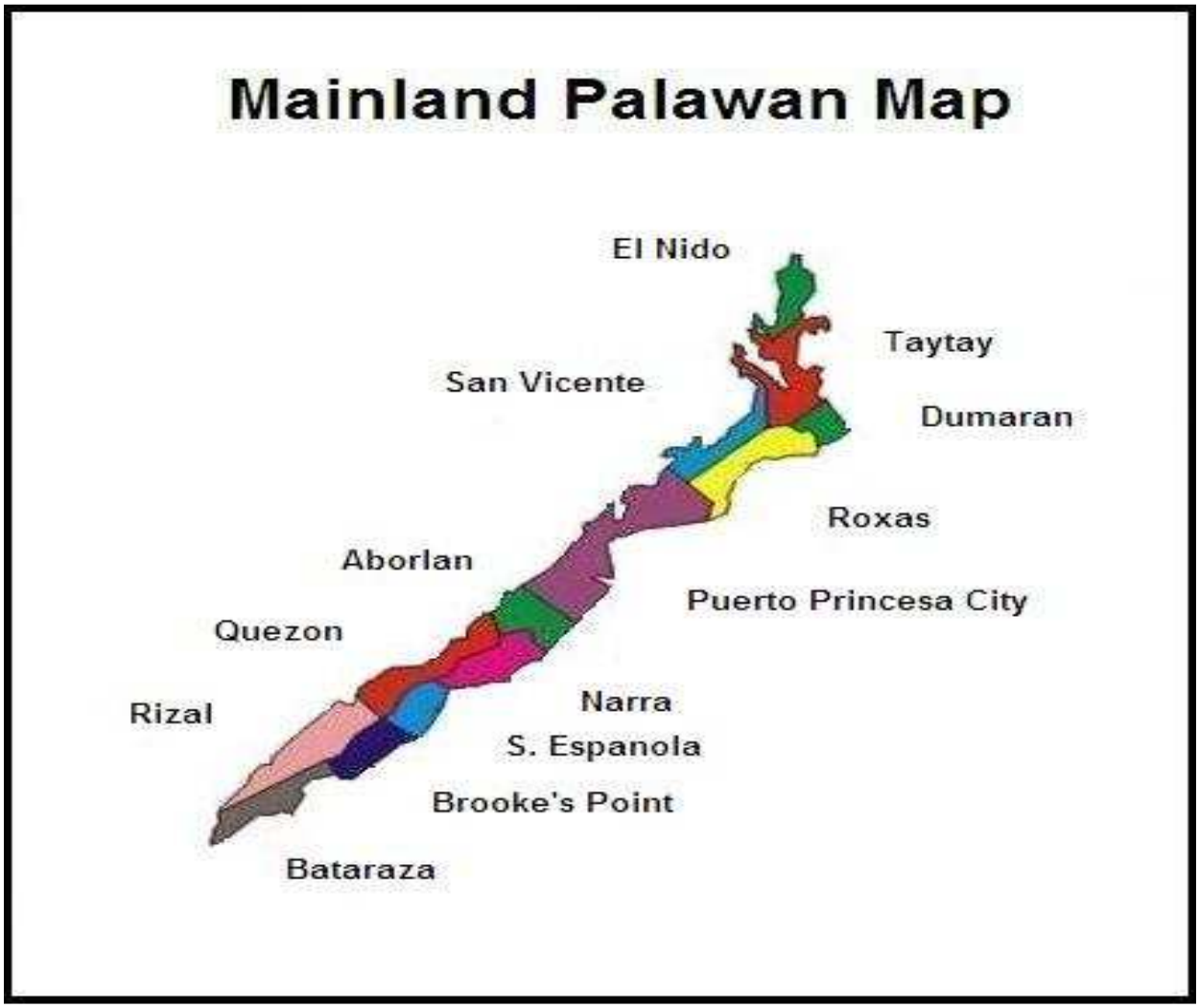

Fig 1. Map of mainland Palawan showing the location of twelve municipalities and Puerto Princesa City.

Research Design

A descriptive research design method was used in this study wherein distribution and trade dynamics of *A. cinereus* in mainland Palawan were presented in maps. A structured questionnaire was also used to gather the information on trade dynamics of Asian Small-clawed Otter.

Sampling Procedure

Site Selection

Only two barangays per municipality with ten household per barangay were chosen as sampling site in this study.

Respondents Selection

Local residents that live near the otter's habitat such as along the rivers and streams, rice fields, fish ponds, and along the coast were chosen as respondents. Only those who have seen otter and have direct knowledge on the animals were interviewed.

Interview

Using a guide questionnaire, all information about the profile of the respondents, general information regarding Asian Small-clawed Otter, and exploitation of the species were asked to the respondents. However, the questionnaires were only filled up by the researcher every after the interview to avoid reserve answers from the respondents. Key Information Interview (KII) was also conducted in order to provide data on the trade dynamics of *A. cinereus* in the identified municipalities of Palawan. It was conducted in the municipalities of Narra, Quezon and Rizal through informal interview with the Barangay Captains, local hunters and traders.

Photo Documentation

The exploitation of *A. cinereus* and its habitat were photographed using Cannon digital camera with 7.1 mega pixels. The presence of spraints and dens were also documented after the interview.

Data Analysis

Map of distribution of *A. cinereus* in mainland Palawan

The distribution was presented in a map based on the data gathered from the interview. The triangle shape legend indicated the presence of Asian Small-clawed Otter in each of the barangays in mainland Palawan (Fig 2).

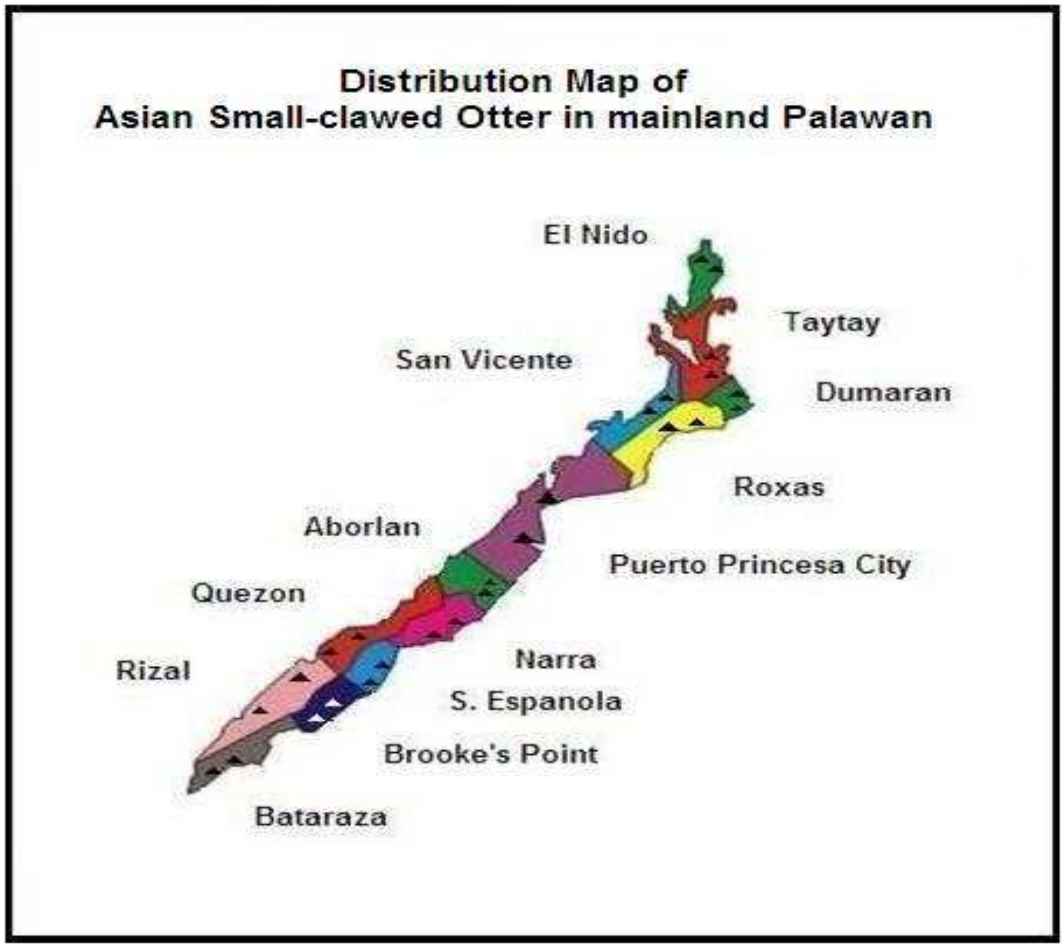

Fig 2. Sample map of the distribution of Asian Small-clawed Otter.

Exploitation of Asian Small-Clawed Otter

The information that was gathered from the interview were discussed and elaborated. Photos of threat to Asian Small-clawed Otters such as otters taken cared as pets, killed and captured for trade were photographed.

Threats to Otter's habitat

Habitat threats that were observed in the area were incorporated in the results and discussion. The information that was gathered from the interview were discussed and elaborated.

Trade dynamics of Asian Small-clawed Otter in Mainland Palawan

All information that was gathered from Key Information Interview (KII) were analyzed and plotted in a flow chart to determine the routes of *A. cinereus.*

Questionnaire

Information gathered in the interview questionnaire were tabulated. The responses to the questions were assigned numerical values. The number of response to a certain question is expressed as totals, percentages, and relative frequencies. Weighted means were also computed and presented in tables. All information presented in tables and graphs were analyzed and discussed.

CHAPTER IV

RESULTS AND DISCUSSION

Distribution of Asian Small-clawed Otter

The study revealed that Asian Small-clawed Otter (*A. cinereus*) is widely distributed all over Mainland Palawan. It was confirmed to be present in all the 12 municipalities and a City (Fig. 3). *A. cinereus* is widespread and common in parts of its range, but its distribution is poorly known or unknown in several countries (Foster-Turley et al. 1990) such as Philippines.

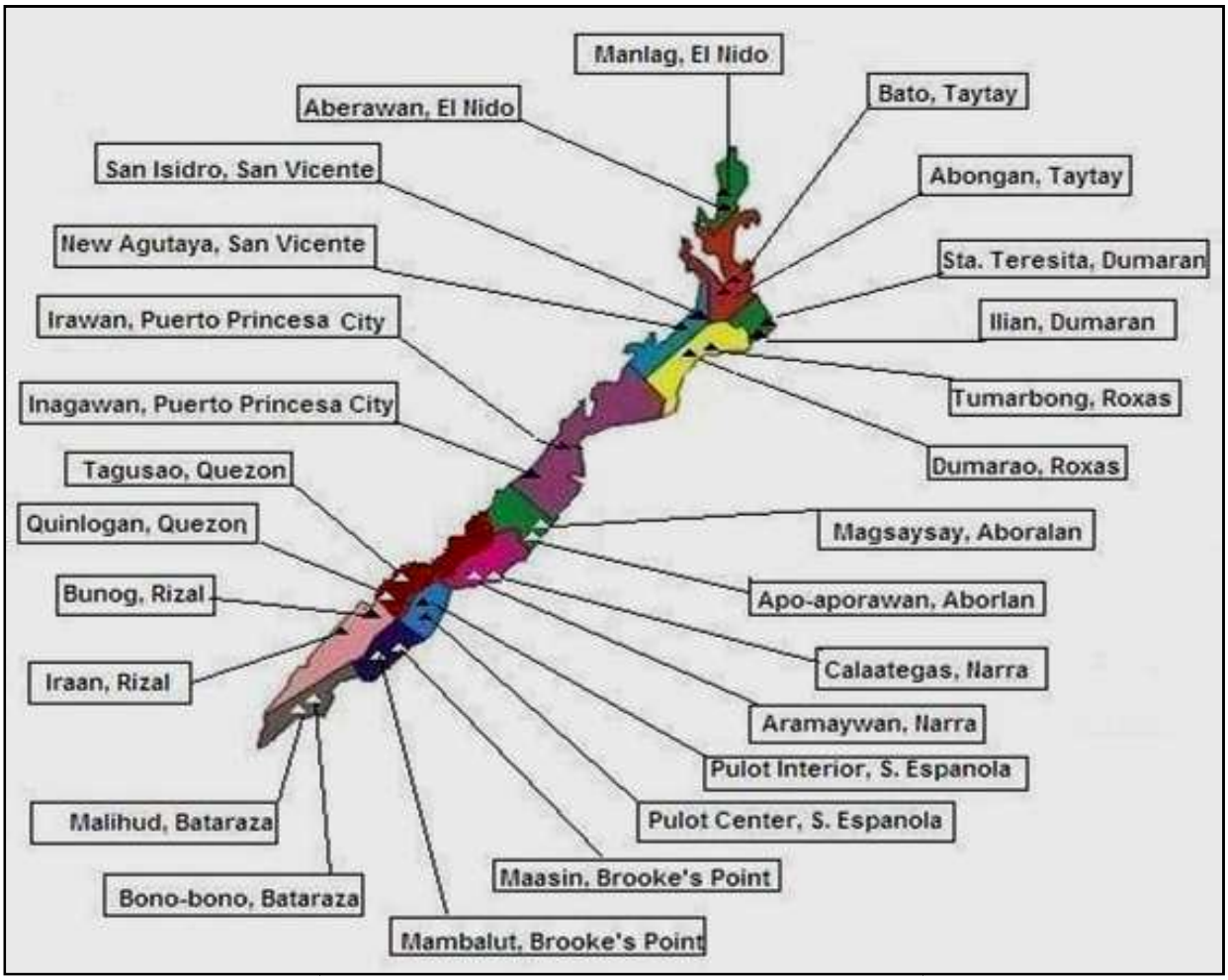

Fig 3. Distribution map of Asian Small-clawed Otter in Mainland Palawan, Philippines. The triangle shape indicates the specific occurrence of *A. cinereus* in all the 12 municipalities and a City.

In the Philippines, *A. cinereus* is only known to occur in Palawan Island (Heaney et al. 1998). Hence, confirming its distribution throughout their range is an important baseline data for monitoring its isolated population.

Interviews of Canoy et al. (2003) and Castro and Dolorosa (2006) reported sightings of otters in both selected areas of Southern and Northern Palawan, respectively. Both studies also reported that *A. cinereus* were observed by the respondents in several areas of Puerto Princesa City. These reports compliments with the records of PIADPO in their otter survey which were further verified in this study.

The presence and sightings of otters in their place were confirmed by all the respondents which they locally called dungon (100%), pangkat-pangkatan (2.31%), or fisher dog (1.03%) (Table 1). The first two local names were mentioned by Belardo (2001) while fisher dog is a new term used by the respondents from El Nido. They said that it was called fisher dog since otters look like dogs and they hunt fish.

Table 1. Percentage of response to Asian Small-clawed Otter's local name known to the respondents

Local Name	Northern Palawan (n=150)	Southern Palawan (n=210)	PCC (n=30)	Weighted Mean (%)
Dungon	100	100	100	100
Pangkat-pangkatan	0	0	30	2.31
Fisher Dog	2.67	0	0	1.03

All otter species including *A. cinereus* are associated with aquatic habitats. The need of human beings for water also drove them closer to settle along river valleys, alluvial plains, or along coast. Majority of the respondents observed otters along the rice field/rice paddies (Fig. 4). They were also seen by other respondents in their natural habitats mostly along the streams (32%) in Northern Palawan, along streams (24.29%) and mangrove forest (23.33%) in Southern

Palawan, and along the brooks (23.33%) in Puerto Princesa City. They were also found in the estuaries, marshes, fishpond, canals, seashore, and temporary pools.

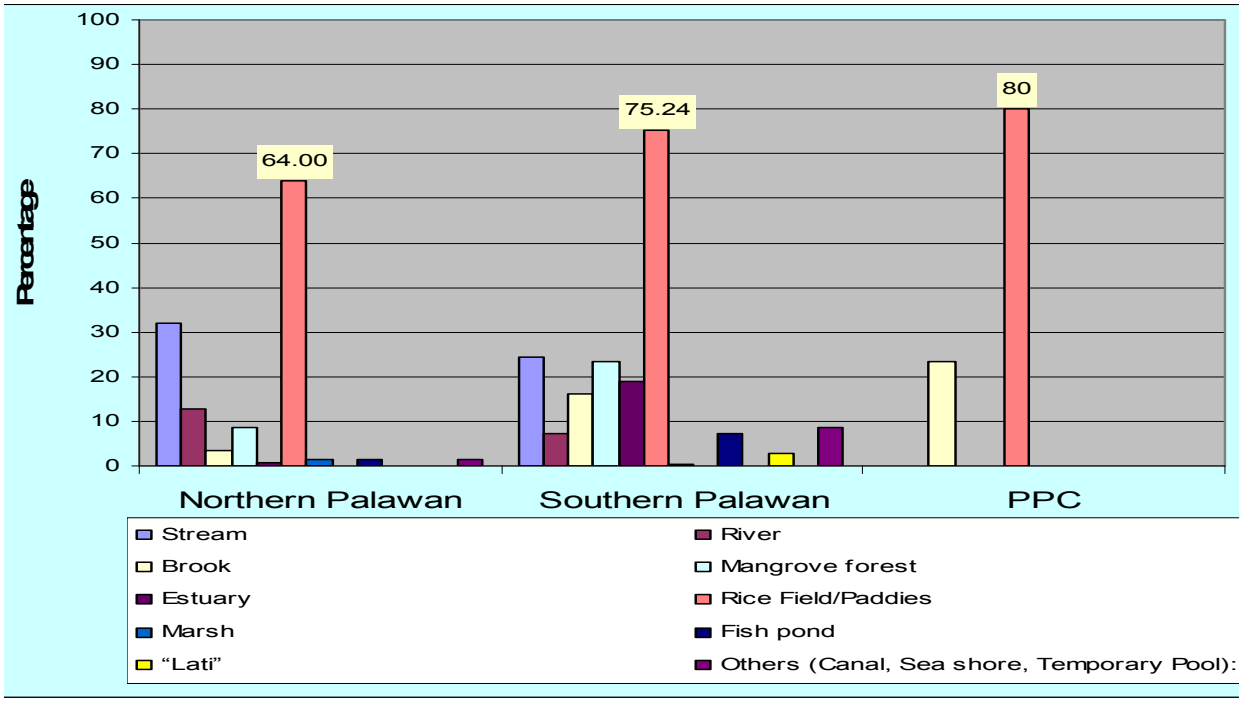

Figure 4. Percentage of respondents who have sighted otters in various ecosystems/ habitats.

Rice field/rice paddies are man-made ecosystems. *A. cinereus* is said to be adapted to living alongside community (Heap et al. 2008), but threats on them had been increasing since some of the residents of Palawan hunt otters for food, pets, curiosity and some of them considered it as pests because they are perceived to damage agricultural crops and competitor in harvesting fishery resources (Castro and Dolorosa 2006).

Most of the respondents said that otters mainly eat fishes and crabs. All (100%) the respondents in Puerto Princesa City and majority (92.67%) of them in northern Palawan confirmed that otters preferred fish diet. In Southern Palawan, they were observed to eat both (91.90%) fishes and crabs alike. Some respondents also said that otters feed on shells, shrimps, hermit crabs, mud lobsters, and even insects and frogs (Fig. 5).

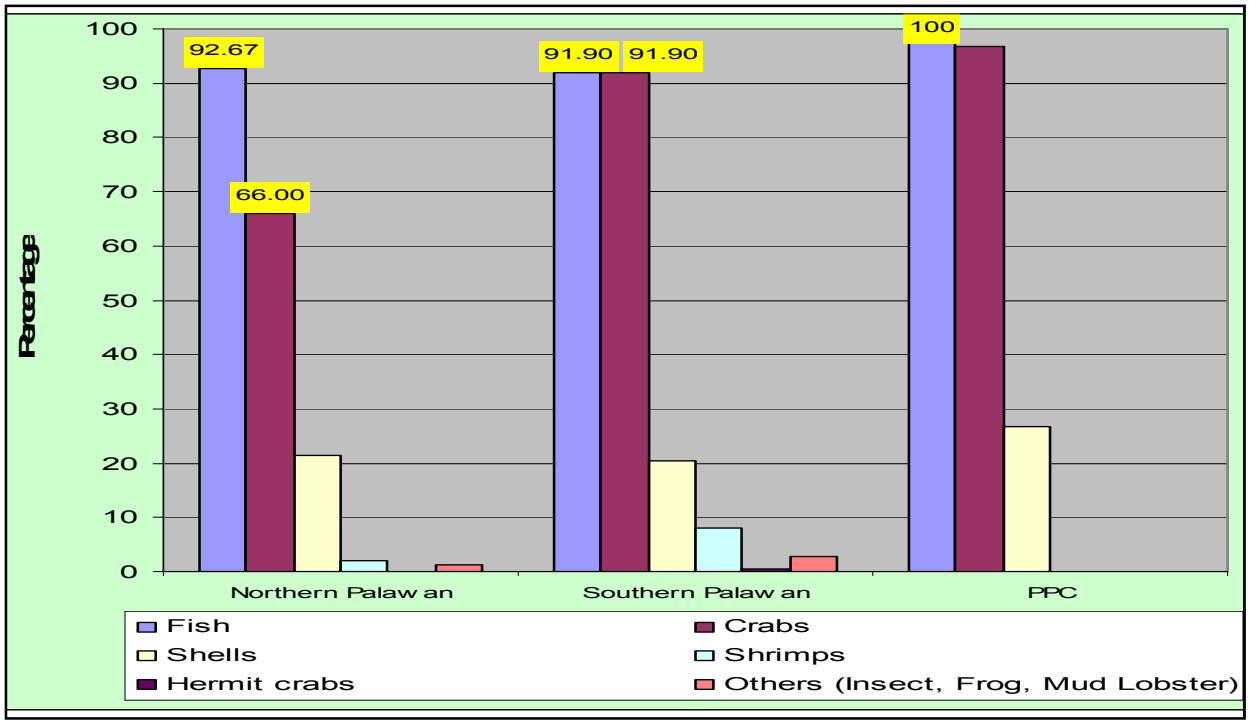

Figure 5. Percentage of respondents' perception on otter's food preferences.

Otter's food preference as observed by the respondents may be due to food availability in the kind of habitat where they are found. Thus, distribution of otters may also be affected by prey availability since animals are known to follow their food abundance gradient (Macdonald 1983 as cited by Shenoy 2003). However, otters prefer to live in clean waters with available food supply and unpolluted by pesticides or industrial waste, good riparian vegetation cover for their shelter, and a place where they are unmolested by humans (Foster-Turley 1998).

The otters need to come to land for various activities such as feeding, sleeping, grooming, playing, and territory marking (Shenoy 2003). Most of these were also observed by the respondents as they have seen otters hunting their food (56.4%), making noise (38.2%), eating (37.9%), playing (21.5%), and swimming (16.4%) (Table 2). Presence of spraints and potential dens/dens of *A. cinereus* were also noted in all the sampling areas that verified the occurrence of otters in each barangay (Plate 4).

Table 2. Percentage of the respondents who have observed otter's activities.

Otter Activities	Northern Palawan (n=150)	Southern Palawan (n=210)	PPC (n=30)	Weighted Mean
Food hunting	75.33	36.67	100	56.4
Playing	6.00	35.71	0	21.5
Eating	11.33	61.90	3.33	37.9
Making nsoise	30.00	49.52	0	38.2
Swimming	3.33	28.09	0	16.4

Exploitation of Asian Small-clawed Otters

Otters are naturally appealing animals (Foster-Turley et al. 1990) that catches human attention. With the enormous growth of human population, human settlements have reached the forest areas and concentrated along the rivers, streams, coast and other wetland habitats. All otter species are associated with aquatic habitats (Foster-Turley et al. 1990) and being in close association with them made otters easily at hand of human. Out of 390 respondents, 148 of them (38%) said that they have caught otters by using leg-hold trap (nylon trap) or locally called "siud" or "tapak". Some also used woods/bamboo traps to catch them alive. Other respondents said that they also used air guns, bolos, dogs, and hand picking in catching otters (Fig. 6).

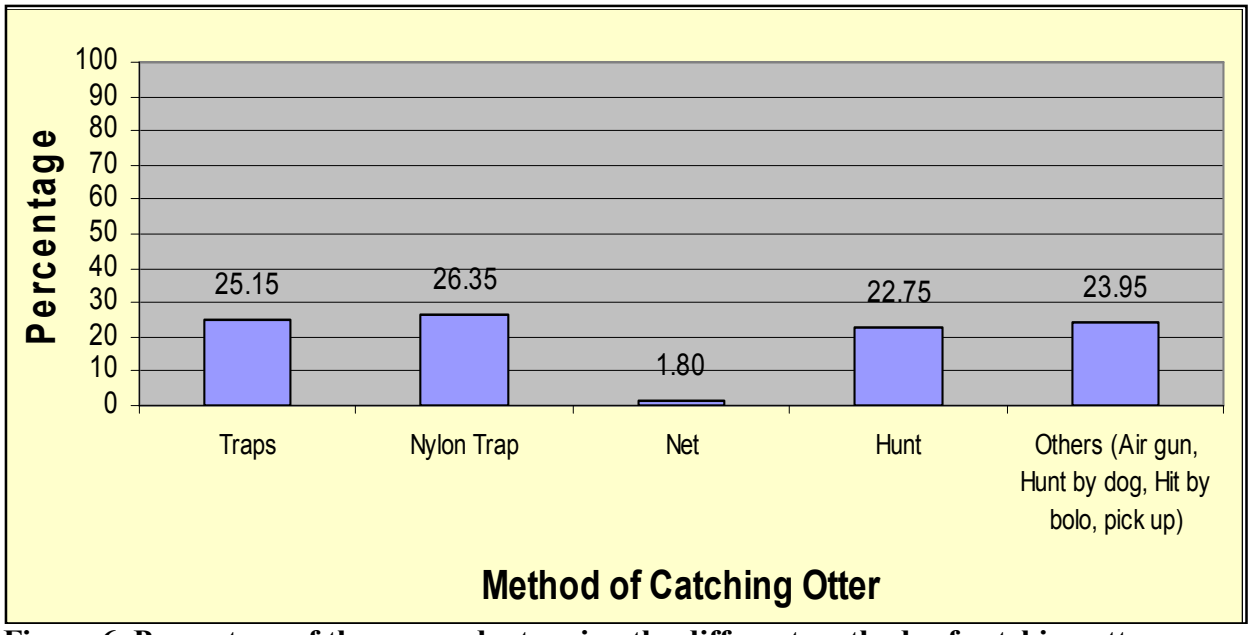

Figure 6. Percentage of the respondents using the different methods of catching otters.

It is evident that exploitation of *A. cinereus* exists in all municipalities of mainland Palawan. They are hunted by the respondents for the several purposes. Among these, curiosity still ranked first among the reasons of the respondents for catching otters (36.9%) which was similar with the results of Castro and Dolorosa in 2006 (29.6%). Poor knowledge about the importance and role of otters in the ecosystems threatens their survival. Most respondents in all municipalities of Southern Palawan and Puerto Princesa City, and in two municipalities (Roxas and Taytay) of Northern Palawan also affirmed that they are catching otters for food (24.5%). This was higher compared to the recorded 18.2% of the respondents who have eaten *A. cinereus* mainly from Inagawan and Sta. Lourdes (Castro and Dolorosa 2006). Among all municipalities, Aborlan has the highest number of otters caught with 21 individuals recorded. Most of the respondents said that they were not intentionally hunting *A. cinereus*, but they catch them when seen in their fields and cooked it "adobo" for their viand. Some respondents considered them as pest (20.4%) to their fishponds and farms, since otters are viewed as competitors and destroyers of the rice paddies. This is in contrast with otters being trained in Bangladesh and Nepal which help them fish, and in many areas with rice paddies where otters control pest infestation (Foster-Turley 1990). One of the respondents also said that he is hunting otters to sell them alive to the local buyers/middle man for trade (0.5%) (Table 3).

Table 3. Reasons of the respondents for hunting Asian Small-clawed Otter.

Purposes	Northern Palawan (n=150)	Southern Palawan (n=210)	Puerto Princesa City (n=30)	Weighted Mean
Food	18.18	32.52	0	**24.5**
To sell them alive	0	0.61	0	**0.3**
Pets	0	33.13	0	**17.8**
Considered as pest	24.24	9.20	80.0	**20.4**
Curiosity	57.58	24.54	20.0	**36.9**

Out of 196 otters caught by the respondents, 72% of these were caught dead and 28% were alive (Table 4).

Table 4. Number of otters caught alive and dead by the respondents in Mainland Palawan.

Municipalities	Otters caught alive	Otters caught dead	Total
North			
Roxas	0	8	8
San Vicente	0	6	**6**
Dumaran	0	1	**1**
Taytay	0	16	**16**
El Nido	0	2	**2**
South			
Aborlan	13	27	**40**
Narra	10	12	**22**
S. Espanola	2	20	**22**
Brooke's Point	2	16	**18**
Bataraza	5	12	**17**
Quezon	14	14	**28**
Rizal	9	7	**16**
Puerto Princesa City	0	5	**5**
TOTAL	**55**	**141**	**196**
AVERAGE	**4.6**	**12.6**	**17.1**
PERCENTAGE	**28%**	**72%**	**100%**

Majority of otters were easily caught dead by hitting them with bolos, chased by the dogs, and shot by air gun. In New Delhi, Calcutta, Kota, Kanpur, Lucknow and Bongalor, *A. cinereus* hunting are triggered by the value of their skin and meat. Hence, poaching of otters for their skin is rampant and had even reached international markets through Nepal and Bangladesh routes (Hanffe and Ahmed 1999 as cited by Meena 2002). Otter's skin is a good source of pelts use in making foot wears (Anonymous 2004). However, in the Philippines only their meats were eaten. Otter's pelts are burned by the respondents to easily clean them for cooking. Other respondents who have just killed *A. cinereus* because of curiosity and otters died in captivity were only thrown dead anywhere (Plate 1).

Plate 1. *A. cinereus* killed due to curiosity (left) and otter died in captivity at the stocking station (right).

In Southern municipalities of mainland Palawan, most respondents caught otters alive (Table 4) since they hunt these animals for pets and for trade. During the conduct of this study, an otter was observed in a family residing in the Municipality of Sofronio Española. They said that this otter pup was left out by its parents when the river flooded. They picked it up, kept it as pet, and tamed it as it stayed with them in the house together with their dogs and cats (Plate 2). They feed it with fish (Plate 3) three times a day and it also swims in the nearby river but returns back to their house to eat and play with the dog and the owner's child (Plate 2).

Plate 2. Tamed *A. cinereus* in Sofronio Española (left) and playing with their dog (right).

In captivity, cases of pneumonia and liver-lobe torsion, rickets, urolithiasis, renal calculi, and cystic calculi were recorded in otters (Larivie`re 2003). Like other otters, *A. cinereus* is also susceptible to feline enteritis and canine distemper. Asian Small-clawed Otter can also catch jaundice and hepatitis from humans and other diseases from their domesticated animals (Anonymous 2004).

Without the basic hygiene, the risk of *A. cinereus* to have diseases increases (Anonymous 2004). After less than a month, a boil was observed in the otter's rhinarium (in between the eyes) (Plate 3). However, since the pet owner lacks knowledge on otter's biological and ecological needs, they have not done anything to cure the otter's boil. After a week, they said that the otter died due to road kill.

Plate 3. *A. cinereus* photo during the sampling in Sofronio Española (left) and after about three weeks where a boil was observed in between the eyes (right).

Otters are carnivores with rabies that can bite human. They also leave wet footprints and spraints everywhere as observed by the family who cared for the otter in Sofronio Española. In which, sometimes they also find difficulties cleaning for the footprints and spraints of their otter pet. It is hard for otters to adapt in their new environment, thus, placing their lives in a crucial situation. In 2004, the otters in Inagawan and San Manuel also died after a month in captivity

(Castro and Dolorosa 2006). Since otters are charismatic and tamable animals, exploitation on them also increases due to pet trade. In September 2009, the GMA TV program "Kapuso Mo Jessica Soho" featured otters in Subic Safari Zoo that can do acrobats as well as the otter cared as pet in Sofronio Española, and the hunting activities in Narra, Palawan in which they cooked otters in "adobo". They also mentioned about R.A. 9147 or Wildlife Act that protects them. However, more TV viewers were enticed more by the beauty of otters featuring them as good tamable pets that can do acrobats and different plays. While we can use media in massive information campaigns, it is essential that effective educational programs on otter protection and conservation be developed (Foster-Turley 1990).

Threats to Otters Habitat

Asian Small-clawed Otters dwell in swampy mangroves, freshwater wetlands and lazy streams (Soffer 2001), that was also confirmed in this study (Plate 4).

Plate 4. A swampy mangrove that was converted into rice field (left) and a fresh water wetland that was also converted into rice field (right).

The presence of spraints and dens of *A. cinereus* along the sampling areas verified the occurrence of otters in each barangay (Plate 5).

Plate 5. *A. cinereus* spraints recorded in Aborlan (left) and den (right).

Otters can dig their own dens in riversides, but can also make use of the abandoned dens of other animals, or dense vegetation for shelter (Soffer 2001). However, most of the river banks and dense vegetation along the rivers were already exploited with slash-and-burn farming, reclamation, deforestation, and fish pond and rice field conversions. This was confirmed by the respondents who said that slash-and-burn farming (50.6%) was the leading threat to otter's habitat. Some of the respondents also said that reclamation and cutting of mangroves (16.74%) were existing in their areas. They also affirmed that freshwater wetland conversion to fishponds and rice fields threatens otters and destroys their natural habitat (30.13%). Rapid proliferation (2.07%) due to migration and increase of their garbage volume dump in the wetlands (0.80%) may also affect otter's presence in the area. Most of the slash-and-burn activities were noted in Northern Palawan (81.93%) mostly in Dumaran. In the municipality of Aborlan, it was observed that human activities in the area such as dumping of garbage pollutes otter's habitat (Table 5).

Table 5. Human activities that threatens otter's habitat identified by the respondents.

Human Activities	Northern Palawan (n=150)	Southern Palawan (n=210)	PPC (n=30)	Weighted Mean
Garbage dumping	0	1.19	0	**0.64**
Wetland conversion (Rice field & Fishpond)	10.84	33.93	100	**30.13**
Rapid Proliferation	1.20	2.98	0	**2.07**
Slush and Burn	81.93	35.12	0	**50.42**
Others (Reclamation & Cutting mangroves)	6.02	26.79	0	**16.74**

Foster-Turley and Santiapillai (1998) reported habitat threats to *A. cinereus* in Palawan such as conversion of their natural habitats, mining and logging activities, construction of different infrastructures, and rapid proliferation. Additional threats to otter's habitat were identified in Northern Palawan such as slash-and-burn farming and cutting of trees along the riverside; quarrying that result to erosion of the river banks; and streams used as laundry, bathing and recreation area that pollutes their sources of food. With this, slash-and-burn farming was also observed as the main threat to otters and their habitat (Castro and Dolorosa 2006). It is believed that the population of these animals is shrinking due to loss of habitat and intensive trapping (Hussain 1997). Pollution (Shenoy 2003), habitat destruction due to developmental projects, reclamation of wetlands for settlement, agriculture, and contamination of waterways were the major threats to the population of *A. cinereus* and other otter species in India (Shenoy et al. 2006). Otters in different parts of its range have similar requirement for a healthy ecosystem. Hence, status of otters in the Philippines could also serve as indicator of healthy aquatic environments. Otters are sensitive to degradation of water quality, aquatic food chains, and terrestrial habitat adjacent to water systems. Hence, the decrease of their population alone can cause an alarm (Foster-Turley et al. 1990). Based on the results of the interview, most (99%) of the respondents also agreed that *A. cinereus* should be protected and conserved. Out of 390 respondents, only four (1%) of them believed that otters should not be protected since they are pest in the rice fields (Appendix 3). More than half of the respondents also said that environmental campaigns (56.7%) were present in their areas which were mostly conducted by the DENR, and NGO's such as Katala Foundation in Narra and ELAC in Rizal (Appendix 4). However, they said that otters are not included in the wildlife campaigned by the government and non-government organizations that should be protected and conserved. Hence, this calls to

strengthen environmental campaigns for the otters. Otters are naturally appealing animals (Foster-Turley 1990) that can be used as umbrella species for the protection of wetland habitats.

Trade Dynamics of *A. cinereus*

Informants confirmed that the illegal trading of *A. cinereus* still persist in Palawan. They are being traded as pets going to several destinations in different parts of the Philippines and may be even outside the country. The isolated population of this only otter species in the Philippines is easily caught by the hunters looking for their spraints. Otters are territorial animals that leave vigorous scent to mark their territorial boundaries and communicate their identity, sex, and reproductive state. They usually leave spraints or urine marks as additional scenting. Social otters, such as *A. cinereus* also use communal latrines, where urine and feces of all group members are thoroughly mixed and trampled into the substrate (Anonymous 2001) that was confirmed in the study along Pinamualan Stream in Ilian, Dumaran (Castro and Dolorosa 2006). Hence, the otter hunters set traps along these areas where otters frequently visited. The leg-hold trap (nylon trap) locally known as "tapak" was the most common method used by the hunters to capture *A.cinereus* within the territory of their habitat (Plate 6).

Plate 6. A hunter checking the leg-hold trap of *A. cinereus* (left) and focused picture of leg-hold trap (right).

According to the hunter pictured above (Plate 6), he had noticed that after he had caught four individuals of otter in one spraint site at different days. After that, no more otters were caught in that same area in the following days. It indicates that all the otters in that group were already depleted. Otters regularly and consistently visit their spraint sites and may use them over several decades (Sivasothi 1995 as cited by Shenoy et al. 2006) and an otter pair only produce up to 2 litters of pups per year (Larivie`re, 2003).

Trade of *A. cinereus* were noted to start from the municipalities of Narra (Aramaywan), Quezon (Calumpang, Malatgao, Quinlogan, Sowangan and Tagusao) and Sofronio Española where the local hunters are catching otters in the wild. From these areas, the hunters brought the captured *A. cinereus* to the buying sites in two municipalities of Palawan: Quezon (Quinlogan and Tagusao) and Rizal (Iraan). In these areas, the hunters sell *A. cinereus* to the middle man/local buyers. However, buying can also happen directly in the sub-stocking sites or centers. These sub-stocking sites are also found in Quezon (Quinlogan and Tagusao) and Rizal (Iraan). The otters will then be stocked in this place for 1-3 days before it will be transferred to the main stocking sites located in Quezon (Quinlogan) and Rizal (Punta Baja). Otters will remain in the main stocking sites for a month or more until such time that there are enough number of wildlife including otters for one shipment (Plate 7).

Plate 7. Stocked *A. cinereus* at the main stocking center in Punta Baja, Rizal (right) and an otter died at the main stocking center.

According to the informants, exit points of otters together with other wildlife species were found in one barangay in Quezon (Quinlogan) and two barangays in Rizal (Bunog and Iraan). From these barangays, otters were shipped through puppet boat and double engine pump boat to Batangas and Zamboanga. From Batangas, otters will then be transported to Manila and will be brought to zoos and pet shops (Fig 7).

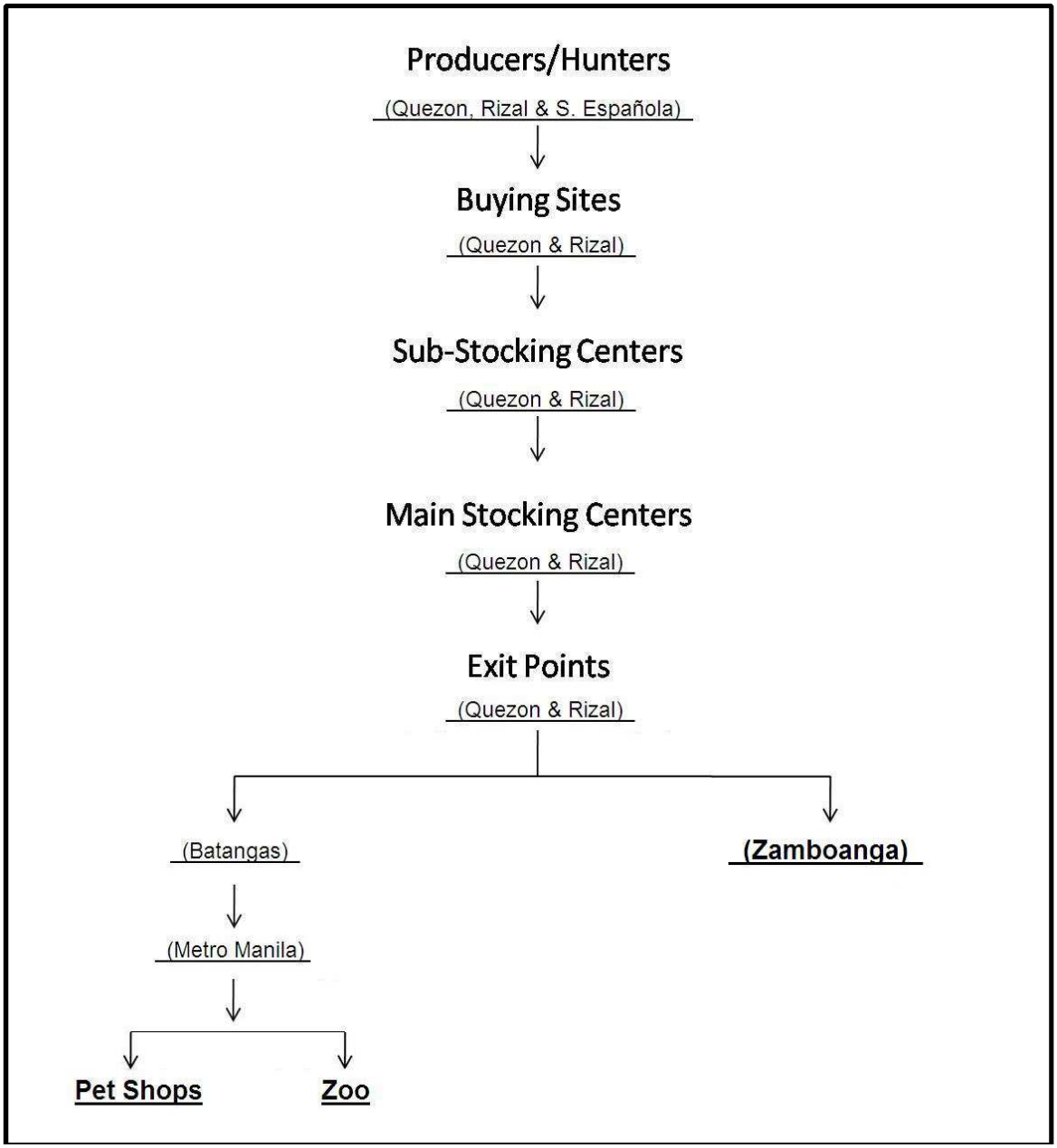

Fig 7. Flow chart of trade dynamics of *A. cinereus* from producers/hunters to pet shops and zoos.

Illegal trading of wildlife in Quezon, Palawan was further proven by the July 6, 2009 issue of Palawan Times News, wherein last June 22, 2010 several wildlife species amounting to at least ₱2, 847, 000.00 which includes one Asian Small-clawed Otter were confiscated by the combined efforts of the PNP Maritime and the Palawan NGO Network, Inc. (PNNI) in Barangay Maasin, Narra. Based on the complaint, the suspects were going to be sued for collecting, possessing and trading forest wildlife without securing necessary permits and licenses from competent government agencies. The confiscated wildlife were then deposited in the custody of Palawan Wildlife and Rescue and Research Center (PWRRC) (Galili 2009).

Another news report from The Philippine Star on November 3, 2008 confirmed that otters were shipped out from Palawan and have reached the piggery farm of a certain Eugene Koh in Barangay San Juan, Magalang town where the DENR team had confiscated several wildlife animals without permits and certification from the government which included one Asian Small-clawed Otter. The wildlife authorities have also found out that 18 of the 33 unregistered animals confiscated by agents of the National Bureau of Investigation (NBI) from a pet collector in Pampanga were classified as "vulnerable" species. The DENR also suspected that the seized animals were likely sourced from wildlife poachers or smugglers. Under the Republic Act 9147, the Wildlife Resources Conservation and Protection Act of 2002, the mere possession of these wildlife species classified as "vulnerable" is punishable with a maximum jail term of one year and a fine of as much as ₱ 100, 000.00. Wildlife species listed as vulnerable are those that are facing a high risk of extinction in the wild (Adraneda 2008). According to Canoy et al. (2003), *A. cinereus* were also transported to Metro Manila and Cebu. However, the informants did not mention specific zoos and pet shops in Manila where the otters were traded.

In the visit to the stocking sites, it was observed that a greater number of otters (8 individuals) died at the main stocking site since the animals were already stressed upon reaching in this area wherein they have to stay longer for more than a month (Fig. 8). This was followed by the otters died as early as in the actual catching/hunting done by the producers/hunters (6 individuals). In the sub-stocking sites, lesser number of otters (4 individuals) died since they only stay here for 1-3 days. The risk of otter's death as it is caught and transported from one site to another indicates that *A. cinereus* were unable to adapt to the new conditions of the sites and the changes in their environment. Survival of wildlife species are dependent upon their habitat for food, shelter, protection, breeding sites, and rearing and nesting sites for their young (Davison 1995). Keeping wildlife such as otters as pets was noted to be hazardous (Castro and Dolorosa 2006) to the wildlife species.

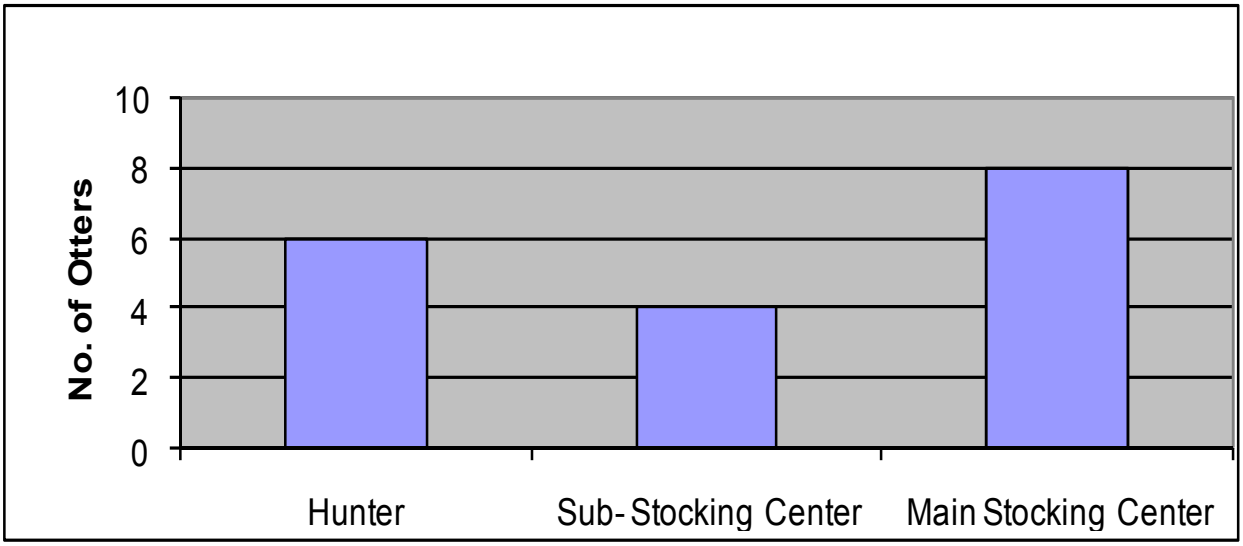

Fig 8. Records of otters died during the stocking from December 2009 to January 2010.

In Medan City, Indonesia, they have also observed that otter pups find difficulties in surviving since their young eyes were not yet opened or had just only opened. Otter pups in their display did not stay long for they were not able to feed themselves. Hence, often otters die and

does not survive in the market (Shepherd 2004). Most of the otter easily caught by the respondents were pups. The same reason was also caught observed why most of the otters kept as pets (in captivity) find difficulties in surviving. Most of the pups were not yet opened or had just opened and rely on their mother for milk.

Table 6 . Prices of *A. cinereus* in different stages (in Philippine peso).

Otters Stages	Hunters –local Buyers/Middle Man	Local Buyers/ Middle Man-Pet shop
Pups	600.00	10,000.00
Adult	400.00	6,000.00

Otters are sold by the hunters to the local buyers at 600 pesos per individual for the pups and 400 for the adults. The local buyers sell these otters to pet shops at 10,000 pesos each for the pups and 6,000 pesos for the adults (Table 6). With the increasing demand for otters as pets, their prices also become higher. The increasing demand forces the producers/hunters to try their best to catch more. Hence, this poses greater threats to otter's population. In the United States, *A. cinereus* are much expensive compared in Philippines. According to Ken's Exotic (2010), the young otters raised by their parents is worth $4000 while otter pups raised by bottle feeding is worth of $4500. In addition, the pups of unrelated breeding pairs of otters were more expensive which has a worth of $7500 per individual (Ken's Exotic 2010).

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

A. cinereus is the smallest otter species in the world. They are categorized by the IUCN as Vulnerable last 2008. Hence, this study was conducted to document otter's distribution in mainland Palawan, otter's exploitation, threats to its habitat, and trade dynamics from August 2009 to January 2010. A guide questionnaire was used to gather information on otters in two barangays per municipality and a city of mainland Palawan with 15 chosen respondents per barangay. Threats on otter's habitat were noted. Photo documentation on exploitation of otters and threats to its habitat were obtained. Key Information Interview was also conducted to provide the data on trade dynamics.

Otters are confirmed present in all the 12 municipalities and a City of mainland Palawan. *A. cinereus*, is locally known as "dungon", "pangkat-pangkatan" and fisher dog. The last local name was a new term used by the respondents from El Nido. The respondents usually observed otters in food hunting activity mainly in their rice fields where otters primarily feed on fishes and crabs. Asian Small-clawed Otter were also often seen along the streams, mangrove forest, and along the brooks. Some respondents also said that otters feed on shells, shrimps, hermit crabs, mud lobsters, and even insects and frogs.

Otters in Palawan are exploited mainly because of curiosity. They are hunted for food and considered as pest by most farmers. However, other respondents catch them for pets and trade.

Majority of the respondents identified slash-and-burn farming as the main threat to otter's habitat. They have also identified reclamation and cutting of mangroves, freshwater wetland

conversion to fishponds and rice fields, rapid proliferation due to migration, and increase of their garbage volume dump in the wetlands as threats to otter's habitat.

Illegal trading activity of wildlife including *A. cinereus* exists in Palawan. Municipalities of Sofronio Española, Quezon, and Rizal were involved in the trade.

Conclusions

Based on the result of the study *A. cinereus* is widely distributed all over mainland Palawan, Philippines. Rampant hunting and catching of these animals in Southern Palawan is persisting mainly because of curiosity and for food consumption. Most of their habitats were already degraded with slash and burn farming that may cause the decline of their population. Because of their charismatic appeal, it brings them high demand to the public. Hence, illegal trading of wildlife including otters exists in Palawan.

Recommendations

The researcher recommends that an extensive study on the abundance of *A. cinereus* all over Palawan, Philippines be conducted to determine its population in the wild.

Since *A. cinereus* is in demand for pets because of its charismatic appeal to the public, researches on its biology and captive breeding is necessary to start with an otter husbandry.

Strict law enforcement in our province is needed in order to stop illegal trading of wildlife in the province as well as protection of otter's natural habitat.

Lastly, it is strongly recommended to conduct Information Education Campaigns (IEC) regarding the importance of otters especially in the rural areas and to the farmers and fishermen communities. The DENR should also lead in the campaign for the conservation of otters.

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APPENDICES

APPENDICES

Appendix 1. Questionnaire.

Respondents #: _____Age: _____ Sex: ☐ Male ☐ Female Date: _____

Respondents Name: (Optional)_____

Address:_____

A. What is your primary source of income?

Name of source of income	(X)	How many years	Annual income from this
Farming			
Fishing			
Copra			
Cashew			
Charcoal making			
Government employee			
Private employee			
Self employed/ Business			
Other (Specify):			

B. How many years have you been living in this place?

Range of Year	(X)	Location	Remarks
Less than 1 year			
1-5 Years			
6-10 Years			
11-20 Years			
21-30 Years			
31-40 Years			
41-50 Years			
50 Years and above			

1. Have you seen this animal? ☐ Yes ☐ No

2. What do you call them?

☐ Dungon ☐ Pangkat-pangkatan ☐ Others (specify) _____

Continuation Appendix 1.

3. Where do you find them? And what do these animals usually eat? What months/ seasons do they often come out?

Habitat	(X)	Food	(X)	Seasons do they often come out	
River		Fish			
Brook		Crabs		Dry season	
Stream		Shells		Wet season	
Mangrove forest		Shrimps		In any month:	
Estuary		Hermit crabs		Specific month:	
Rice Field/Paddies		Others (Specify):			
Marsh					
Swamp					
Fish pond					
Lake					
"Lati"					
Road					
Others (Specify):					

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4. How many times have you seen otters? _____

Date	Number of otters	Otter's activity	Remarks

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5. Have you catch this animal?

☐ Yes ☐ No

6. How do you catch them?

	(X)	Materials	Purposes	(X)
Traps			Food	
Silo			To sale them alive	
Net			Pets	
Pinapalo at Hinahabol			Considered as pest	

Continuation Appendix 1.

Others (specify)			Medicinal purposes	
			Curiosity	
			Others (specify):	

7. Do you know someone in this place taking one of these animals?

☐ Yes ☐ No

If there is who and where (if possible): _____

8. Do you think the changes on the condition of their habitat could affect on their population?

☐ Yes ☐ No

9. What are the human activities on their habitat have you observed in your barangay?

Activities	**(X)**
Garbage dumping	
Wetland conversion (Specify):	
Rapid Proliferation	
Slush and Burn	
Others (specify)	

10. Do you think there is a need to protect and conserve these animals?

☐ Yes ☐ No

11. What activities in your barangay protect these animals?

Activities	**(X)**	**Organizer**
Environmental campaigned		
Livelihood project		
Declaring a protected area		
Others(specify):		

Appendix 2. Analysis of questionnaire. Given are the totals and the percentage of answers for each question.

	SITES					
	Northern Palawan (n=150)		Southern Palawan (n=210)		Puerto Princesa City (n=30)	
	∑	%	∑	%	∑	%
Age: (Range)	25-78		21-76		20-63	
Sex: Male	136	90.70	149	71	29	96.70
Female	14	9.30	61	29	1	3.30
Total	150	100	210	100	30	100
A. Primary source of income						
Farming	150	100	173	82.40	30	100
Fishing			16	7.60		
Copra			6	2.90		
Cashew						
Charcoal making						
Government employee			2	1		
Private employee			3	1.40		
Self employed/ Business						
Furnature maker			2	1		
Carpemter			1	0.50		
Miner			1	0,50		
Pawid maker			10	4.80		
Total	150	100	213	101.60	30	100
B. Years have you been living in the area						
Less than 1 year			1	0.50		
1-5 Years	5	3.30	20	9.50		
6-10 Years	7	4.70	18	8.60	1	3.30
11-20 Years	11	7.30	48	22.90	7	23.30
21-30 Years	33	22	63	30	12	40.00
31-40 Years	52	34.70	48	22.90	7	23.30
41-50 Years	25	16.70	11	5.20	2	6.70
50 Years and above	17	11.30	1	0.50	1	3.30
Total	150	100	210	100	30	100
1. Have you seen the otter						
Yes	150	100	210	100	30	100
No						
Total	150	100	210	100	30	100
2. What do you call them						
Dungon	150	100	210	100	30	100
Pangkat-pangkatan					9	30
Fisher Dog	4	2.70				
Total	154	102.70	210	100	39	130
3. 1Where do you find them						
River	48	32	51	24.30		
Brook	19	12.70	15	7	7	23.30
Stream	5	3.30	34	16.20		
Mangrove forest	13	8.70	49	23.30		
Estuary	1	0.60	40	19.1		

Continuation Appendix 2.

	SITES					
	Northern Palawan (n=150)		Southern Palawan (n=210)		Puerto Princesa City (n=30)	
	∑	%	∑	%	∑	%
Rice Field/Paddies	96	64	158	75.	24	80
Marsh	2	1.30	1	0.50		
Lake						
"Lati"			6	2.9		
Road			2	1		
Canal	1	1.30	12	5.7		
Sea shore			1	0.50		
Temporary pool	1	1.30	3	1		
Total	188	127	387	183.50	31	103.30
3.2 What do otters usually eat						
Fish	139	92.60	193	92	30	100
Crabs	99	66	193	92	29	96.70
Shells	32	21.30	43	20.5	8	26.70
Shrimps	3	2	17	8.		
Hermit crabs			1	0.50		
Insects			2	1		
Frogs			3	1.		
Mud lobters			1	0.50		
Total	273	182	453	215.50	67	223.40
3.3 Months/ seasons do they often come out						
Dry season	56	37.30	78	37	12	40
Wet season	14	9.30	69	33	3	10
In any month:	83	55.30	111	53	15	50
Total	153	102	258	123	30	100
4. 1 Number of otters have you seen	1470		3912		324	
Total	1470		3912		324	
4.2 Otter's activity						
Making noise	45	30	104	49.5		
Food hunting	113	88.70	77	36.8	30	100
Eating	17	11.30	131	62.4	1	3.30
Swimming	5	3.30	59	28.		
Playing	9	6	75	35.70		
Total	189	139.30	446	212	31	103.30
5. Have you catch this animal						
Yes	31	20.60	113	53.80	4	13.30
No	117	79.30	97	46.20	26	87.70
Total	150	100	210	100	30	100
6. 1 How do you catch them						
Traps	3	2	2	1		
Silo	21	14	23	11	3	10
Net			3	1		
Pinapalo at Hinahabol	1	0.70	37	17.60		
Air gun	4	2.70	9	4.		
Hunt by dog	1	0.70	12	5.70		
Hit by bolo	1	0.70	9	4.30	1	3.30

Continuation Appendix 2.

	SITES					
	Northern Palawan (n=150)		Southern Palawan (n=210)		Puerto Princesa City (n=30)	
	∑	%	∑	%	∑	%
Pick up			4	2		
Total	**31**	**21**	**99**	**46.6**	**4**	**13.30**
Pets	**0**		**54**	**25.70**		
Considered as pest	**8**	**5.30**	**15**	**7**	**4**	**13.30**
Curiosity	**19**	**12.7**	**40**		**1**	**3.30**
Total	**14**	**22**	**123**	**58**	**5**	**16.60**
7. Do you know someone in this place taking one of these animals						
Yes			**3**	**1.40**		
No	**150**	**100**	**207**	**98.60**	**30**	**100**
Total	**150**	**100**	**210**	**100**	**30**	**100**
8. Do you think the changes on the condition of their habitat could affect on their population						
Yes	**150**	**100**	**209**	**99.5**	**30**	**100**
No			**1**	**0,50**		
Total	**150**	**100**	**210**	**100**	**30**	**100**
9. What are the human activities on their habitat have you observed in your barangay						
Garbage dumping			**2**	**1**		
Wetland conversion (Specify):	**9**	**6**	**57**	**27**	**12**	**40**
Rapid Proliferation	**1**	**0.70**	**5**	**2.40**		
Slush and Burn	**68**	**45.30**	**59**	**28**		
Reclamation			**6**	**3**		
Cutting of trees	**5**	**3.30**	**39**	**18.6**		
Total	**83**	**55.30**	**168**	**80**	**12**	**40**
10. Do you think there is a need to protect and conserve these animals						
Yes	**150**	**100**	**206**	**98**	**30**	**100**
No			**4**	**2**		
Total	**150**	**100**	**210**	**100**	**30**	**100**
11. What activities in your barangay protects wildlife as well as these animals						
Environmental campaign	**101**	**67.30**	**111**	**53**	**16**	**53.30**
Livelihood project						
Declaring a protected area						
Tree planting	**10**	**6.70**	**13**	**6.20**		
None	**49**	**32.70**	**87**	**41**	**14**	**46.60**
Total	**160**	**106.70**	**211**	**100.20**	**16**	**100**

Appendix 3. Percentage of respondent's answer to otter's need for protection and conservation.

Answer on if there is a need to protect and conserve these animals	∑	**%**
Yes	306	99
No	4	1

Appendix 4. Percentage of wildlife protection activities identified by the respondents in their area.

Wildlife Protection Activities	**Northern Palawan (n=150)**		**Southern Palawan (n=210)**		**Puerto Princesa City (n=30)**		**Weighted Mean**
	∑	%	∑	%	∑	%	
Environmental Campaign	101	63.13	111	52.61	16	53.33	56.71
Tree planting	10	6.25	13	6.16			5.72
None	49	30.63	87	41.23	14	46.67	37.57