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Abstract: This report summarizes surveys for fishing cat carried out in Thale Noi Non-Hunting Area, Pattalung Province between May 2006-February 2007. It is the third such survey since work was initiated in late 2003. Previous efforts have focused on Llongsaeng Wildlife Sanctuary, Surat Thani Province and Maenam Pachi Wildlie Sanctuary, Ratchaburi Province. Site have been selected based on published and unpublished data and reports of past fishng cat occurrence. The Thale Noi site was selected based on a relatively recent (1997) documented occurrence (Jonathan Murray, pers. comm.). The primary goals of the survey were 1) to set up camera traps at selected locations within Thale Noi Non-Hunting Area and 2) to carry out a general reconnaissance of the site for the purpose of planning additional surveys. Four field trips were carried out in the Kuan Ki Sian and the Klongyuan areas. Surveys consisted of sign surveys for scat and tracks, general habitat assessment, and setting up and running camera traps. Additional surveys consisted of extensive interviews with local residents and protected area officials. Total field survey effort consisted of approximately 120 days of sign surveys and 80 "trap-nights" with the camera traps. Interviews were conducted at 3 villages and 2 protected area stations and involved approximately 4 people. Tracks thought to be those of fishing cat were observed at several locations on the southern part of the Thale Noi and camera trap results detected a fishing cat photo at one of these areas. No other carnivore species were captured by camera traps. Other species detected (with various degrees of certainty) during sign survey were small-clawed otter and smooth-coated otter, and Large Indian Civet. We also found a dead small-clawed otter assume to be snared near the protected area headquarters. Interviews revealed that leopard cats and Common Palm Civet are regularly captured and either consumed for food or kept as pets. These reports were corroborated by our own observations of captive animals at a village in the western part of Thale Noi.



Surveys for Fishing Cat (Prionailurus viverrinus)

in Thale Noi Non-Hunting Area,

Pattalung Province, Thailand
May 2006-February 2007

Report to Smithsonian's National Zoological Park and Cincinnati Zoo:

Submitted by
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Executive Summary

This report summarizes surveys for fishing cat carried out in Thale Noi Non-Hunting Area, Pattalung Province between May 2006-February 2007. It is the third such survey since work was initiated in late 2003. Previous efforts have focused on Llongsaeng Wildlife Sanctuary, Surat Thani Province and Maenam Pachi Wildlie Sanctuary, Ratchaburi Province. Site have been selected based on published and unpublished data and reports of past fishng cat occurrence. The Thale Noi site was selected based on a relatively recent (1997) documented occurrence (Jonathan Murray, pers. comm.).

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Introduction

Fishing cats are medium-sized nocturnal felids ranging throughout tropical Asia from India, Sri Lanka and Nepal through western India and Burma to Thailand and Indochina. A number of populations are also found on the islands of Sumatra and Java. Their habitat is mostly brush or scrub near water (Lekagul and McNeely 1977) They feed on fish, crabs, rodents, birds, hard-shelled freshwater mollusks, and any other animals they can catch (Lekagul and McNeely 1977).

Fishing cats are listed as near threatened on the IUCN Red list and in Appendix 2 of CITES. The frequent development, conversion, and over-fishing of their wetland habitats has resulted in a high degree of habitat loss and population fragmentation throughout their range.

Little is known about the habits of fishing cats in the wild but from observations of captive animals, they are known to be secretive and relatively aggressive. Blanford (1888-1891) cites a case where a fishing cat

killed a leopard twice its size, and there is a report of a fishing cat killing a small child in India.

In Thailand, available range maps show fishing cats ranging throughout the northern areas of the country down to Isthmus of Kra. A recent record from Thale Noi wetland area in Pattalung represents a significant southern extension of the previously recorded range. Although there are historical records of fishing cats occurring in southernmost Thailand and peninsular Malaysia there are no recent records from this area.

The aim of this project is to provide concrete documentation of the present distribution of fishing cats throughout Thailand starting with the peninsular region in hopes that these new data will better inform conservation and management efforts for the species.

The project's specific objectives are:

1. To review current and historical records of fishing cats in Thailand.
2. To assess the current distribution of fishing cats in Thailand.
3. To identify threats to the species in Thailand.
4. To obtain high quality photographs of fishing cats in areas where they presently occur.

Secondary objectives are to provide information on which methods are most effective for detecting fishing cats in an area and how much effort is necessary to do so.

This report covers the third period of the project which has focused on Thale Noi Non-Hunting Area, in Pattalung Province. Results are summarized for surveys in two focal survey zones (see below). Additional surveys are planned for this area.

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Project Goals

1. To carry out a regional review of documented fishing cat occurrence to provide a clearer picture of where the species has actually been shown to occur
2. To document the presence or presumed absence of fishing cats at sites of highest likelihood of occurrence throughout Thailand.
3. To provide information on which methods are most effective for detecting fishing cats in an area and how much effort is necessary to do so.
4. To refine survey, ecological research, and community-based conservation approaches centered on fishing cats through the implementation of a long-term, adaptive conservation and research project at Thale Noi.
5. To develop the capacity of Thai rangers and local residents to manage all aspects of a coordinated conservation effort at Thale Noi.

This report covers the third period of the project which has focused on Thale Noi Non-Hunting Area, in Pattalung Province. Results are summarized for surveys in

two focal survey zones. Additional surveys will be carried out pending funding to continue the work of the third period.

Study area and selection of survey sites

Thale Noi (7°43'-8°00'N, 100°05'-l00°15'E), located in Pattalung Province, Southern Thailand, covers approximately 457 km² and includes Thailand's first RAMSAR site, Kuan Khi Sian, chartered August 26, 1997—also known as globbally inportant wetland area. Thale Noi is state-owned and althought being a non-hunting area, the area is open for public uses. Surrounding and inside the the area boundary are mainly small, private holdings. All remaining forests are designated National Reserve Forest-where cutting is officially prohibited (see Appendix 2 and 3)

Extensive Melaleuca freshwater swamp forests surround the Thale Noi area's most recognizable feature, a large open-water lake. Roughly 5 km by 6 km in size, the lake is located at the northern end of a system of lakes in the Songlkhla Basin which include Thale Luang, and Lake Songkhla. Thale Noi lake is surrounded on three sides by areas of open swamp vegetation, sedge beds, and rice paddies. The principal inflow to the lake drains the forested slopes of the Banthad mountain range to the west. The Khlong Nang Riam and Khlong Yuan rivers flow out from Thale Noi into Thale Luang and Lake Songkhla. "Kuans", small islands that occur in the swamp forest, provide habitat to a wide range of wetland species. Thale Noi Lake also supports the endangered Nieuhof's walking catfish (Prophagorus nieuhofi).

The lake and its marshes are the most important area in the entire Lake Songkhla basin for waterfowl. They support the only remaining breeding colony of Painted Stork (Mycteria leucocephala) in Thailand and is one of very few breeding sites Purple Heron (Ardea purpurea) (Anon, 1981). Black-headed Ibis (Threskiornis melanocephalus) have also been recorded. Up to one thousand egrets (Egretta spp.) occur in winter, but it is not known whether any breed. Both Lesser Whistling-duck (Dendrocygna javanica) and Cotton Pygmy-goose (Nettapus coromandelianus) breed in the area, and concentrations of up to 10,000 and 20,000, respectively, have been reported (Anon, 1981). Several species occur which are primarily associated with wooded habitats and which are of particular conservation significance, including Grey-headed Fish Eagle (Ichthyophaga ichthyaetus), Cinnamon-headed Green Pigeon (Treron fulvicollis), Wreathed Hornbill (Rhyticeros undulates) and Buffy Fish-Owl (Ketupa ketupu).

Larger lakes to the south, contiguous with Thale Noi, are also known for their biological significance. Songkhla Lake is the only site in Thailand where rare Irrawaddy dolphins (Orcaella brevirostris) (the status of which has recently been upgraded to CITES Appendix I) occur and is the only known breeding site for Black-winged Stilt (Himantopus himantopus) in the Malay Peninsula (see Appendix 4)

The village of Ban Thale Noi is situated on the western shore. The Thale Noi area is home to more than 5,000 families, many of whom rely primarily on fishing as a livelihood. Fishing is undertaken with gill nets, traps and electro-shocking. Aquatic vegetation is harvested for cattle fodder, and in some areas, Bulrush sedge (Scirpus mucronatus) are planted and harvested for weaving. The principal activities in surrounding areas are the cultivation of rice and cattle grazing, especially around the Kuan Khi Sian area. The site hosts more than 200,000 foreign and local visitors annually, primarily birdwatchers (see Appendix 5).

Survey Methods

Survey site selection

Kuan Ki Sian area—based on Jonathan Murrey camera trap photo of a fishing cat and preliminary interviews carried out during our survey including a number of other zones, including Klongyuan, and Hua-Pakiew within the non-hunting area were identified as representing the most likely areas of fishing cat occurrence. Given the time and resources available for this preliminary survey period, these sites have been selected as focal areas (see Map in Appendix 6).

Sign surveys. We conducted searches for carnivore sign (particularly tracks of fishing cats) at the edge of water features, along dirt roads, and at various sites such as emergent mud shoals. Where detected, tracks thought to be that of fishing cat would be measured and permanently recorded by taking photos and making plaster casts.

Camera trap surveys.Within the two pre-selected survey zones, Six Camtracker© and 7 DeerCam© camera traps were set for a period of 10-20 days at locations that met at least one and usually several of the following criteria (in order of significance):

1. Areas least disturbed by human activity.
2. Areas where signs of recent carnivore activity were detected.

Camera trap surveys were conducted by a team made up of one team leader and 2-3 team staff provided by the Klong Saeng Research Station, the Thale Noi Non-Hunting Area staff and villagers from Thale Noi village. Pairs of camera traps were set up at locations where tracks thought to have been made by fishing cats were found or at sites found to be model fishing cat habitat. Camera trap locations were baited with killed and live chickens or scent bait such as bobcat urine (both found to be effective in previous surveys). Schedules for collecting camera traps dependent upon how active human activiteis were at each site and wheather it was risky to have the cameras stolen. Some locations, such as around Klongyaun and Klong Baan Klang streams (where we found fishing cat tracks) represented high human activities—so camera traps would be collected every morning to avoid theft and they were set back in the evenings. Some locations with less human disturbance, such as around Kuan Ki Sian area, camera traps would be left for a longer period of time or at least 15 trap night per period but over all for approximately 10-20 nights from the time of deployment and transferred to another site. Currently, 200-400 ASA negative film is used in all traps as these films were available in the town closest to the surveyed site

Results

Interview Survey

Interview survey was carried out in order to gather general information about fishing cat occurrence and wildlife species that people hunt for food or capture to sell in local markets. We showed photos of a fishing cat and a leopard cat side by side when we asked people to test if they could tell a fishing cat from a leopard cat. We observed that many people pointed to leopard cat thinking that they were talking about fishing cat. They also mistook otter tracks for fishing cat tracks.

According to the interviews, there were a few people known to have captured these small carnivores, using snares or box-trap with live chickens as bait. Many wildlife were reported to have been spotted along the edge of water, therefore they were captured or killed as by-catch products for fishermen.

Howerver, regardless of wheather these animals were targeted for poaching—they were considered specielty and can be sold for a relatively good amount of money (see table below).

Our interviewees were ex-poachers and some who were still active poaching. Cattle herders were also interviewed as they spent a lot of time herding their cattle in the area, some have reported detecting cat tracks and even direct sightings of animals that looked like cats. Animals that were commonly poached were Civets, leopard cats, fishing cats and otters (see table below).

We also asked around for people who might happen to have fishing cats as pets—we were sent to several houses to where there might be fishing cats or the alike animals. As a result, during our search for wildlife pets, we observed three common palm civets and two leopard cats being kept as pets in villages around Thale Noi, no fishing cats were found.

As reported by the owners of these pets—the civets were captured by the owner himself in his own rubber plantation, but the leopard cats were sold to him by a poacher—they were also captured around rubber plantatio around the protected area. (see Appendix 7).

Species	**Purpose of use**	**Capture Method**	**Price (local market)**
Fishing cat (*Prionailurus viverrinus*)	Food	Shoot, trap	~$5/kg
Leopard cat (*Prionailurus bengalensis*)	Food/pet	Shoot, trap	~$5/kg
Common palm civet (*Paradoxurus hermaphroditus*)	Food/pet	Shoot, trap	~$5/kg
Otter (*Lutra spp)* (baby)	Pet	Trap	~$1/animal
Snake (cobra)	Food	Trap	~$3/snake

Sign Survey

Twenty six locations of tracks of what we thought were fishing cat were detected around Klong Baan Klang and Klongyuan areas in the southern part of the lake. Within this focused area, one set of tracks which we thought were a fishing cat offspring were found traveling side by side with a set of adult cat tracks. This particular location was located under the Huapa-Saikling road-the part that is elevated over Klong Baan Klang canal, about one kilometer south of the edge of the lake. This set of tracks were heading towards the lake, no return tracks were detected (see Appendix 8).

Reference materials

Most of the casts made from what we thought were fishing cat tracks collected from the field were found on muddy substrate. Tracks were compared to those of captive fishing cat tracks collected from Khao Pratab Chang Wildlife Breeding and Research Center Ratcha Buri Province—most tracks show distictive claw marks. Howerver, some tracks that were found on harder substrate look similar to the track presented by Kanchanasaka et. al. (1998) which does not represent claw marks (a trait visible in both the clay and sand reference tracks) (see Appendix 8.1). Although this may simply represent the range of natural variability in tracks of the species due to such environmental variables as substrate and size of the individual cat, it is likely--given the habitat preferences of the species--that tracks found in the field would display claw marks. Fishing cats also have webbed paws but the web did not show on tracks that we made plaster casts off.

Three sets of tracks might be of a large Indian civet were found next to a patch of Melaleuca forest, surrounded by rice paddy, about 6 kilometers north of the lake. Howerve, the evidence is inconclusive and the size of the tracks can overlap with those thought to be fishing cats, so our observation is made based on best guess, eventhough these tracks were made on muddy substrate and they did not show distinctive claw marks like those of fishing cats. (see Appendix 8.2).

Tracks of other animals frequently found during our survey were small-clawed and smooth-coated otters. Their tracks could be found all around the lake and even in the rice field 6 kilometers north of the lake). Local people sometimes mistook tracks of otters for fishing cats. They even called civets fishing cats (see Appendix 8.3).

Feces

Locations where feces of carnivores found were recorded and samples were collected for comparison and further study for contents. Feces have similar sizes to three female captive fishing cats taken at the Smithsonian's National Zoological Park, sizes range from 17-20 centimeters in diameter.

One of the feces collection contains a lot of grass which we thought could be from a civet, however the diameter of the overlaps with those we thought were fishing cat feces but its color was darker. This particular scat was found next to a scat that we assumed to be from a fishing cat. All of the feces collected were found along the edge of the lake. Otter feces were also detected at various places around the lake (see Appendix 8.4)

Camera Trap Survey

Survey effort. 13 camera traps were active at 2different survey areas during 5 distinct periods for a total of 78 trap nights (see Table below).

Period	Location	Dates
1	Kuan Kisian Area	May 26- June 15, 2006
2	Kuan Ki Sian Area	June 28 – July 14, 2006
3	Ramsar Site, Kuan Ki Sian	July 25 – August 15, 2006

4	Klong Baan Klang	February 14 – 24, 2006
5	Klongyuan	March 1-9, 2006

Note: The period between September – December 2006 was when there was a big flood and also a military coup and the new government has caused many political changes within the DNP. Our project, being operated under this department, had to temporarily suspend the survey.

Summary. During approximately 80 trap nights of active camera trap survey captured 4 photos of a male fishing cat, 3 species of birds, and some are fishermen and tourists. No other species of carnivores detected on these camera traps.

Fishing cat occurrence. During this phase of the project four camera trap photos of a male fishing cat were taken (see Appendix 9). The triggered camera trap location was on a dirt path around Klong Baan Klang stream area (see Appendix 10). This dirt path will soon be circled around the lake and turned into a nature path, the result of a recent local development project to promote local tourism.

Threats

Threats to this particular protected area are posed by current development projects, continued clearance of Melaleuca for plantation, paddy, including burning or removal of swamp vegetation, over fishing and cattle grazing. Bird, mammal, and reptile species are regularly hunted. Our observations have found evidence that fishing cats, otters (Lutra spp), leopard cats (Prionailurus bengalensis), large Indian civets (Viverra zibetha), and common palm civets (Paradoxurus hermaphroditus) were hunted for food and/or captured for the pet trade (see Appendix 11)

Some amounts of nylon fishing net discarded in the lake also posed an additional threat to the area's wildlife. These activities have become a chief conservation concern of officials there. The protected area authorities are trying to work with villagers to reduce these activities. Educational program is part of their current work undergoing in the area. However, because this protected area covers several overlapping jurisdictions (under Reserve Forest, Water Supply and Non-Hunting Area Jurisdictions) this makes law enforcement complicated to act .

Conclusion and Recommendations

Although the survey around the Kuan Ki Sian area did not show signs of fishing cats due to high level of water which made both the sign and camera trap survey difficult to operate, therefore more surveys should be carried out in other times of the year or when the water level has dropped and sign and camera trapping surveys can be carried out.

Our survey results show that at least one or more fishing cats occurred in Thale Noi , but because of the high level of human activities, including cutting and clearing of forest patches and development projects undergoing in the site, this will pose a major fragmentations to the cat habitats. We also observed that a number of fishing cats might be isolated in patches of sedge groves in the lake. Poaching also causes direct threats to these animal as they're considered high-priced product and some are sold for the pet market. The project team is currently working closely with personnel from the Department of National Parks, Wildlife and Plant

Conservation's Klong Saeng Research Station and rangers from Thale Noi Non-Hunting Area to raise conservation awareness with the local people. A number of these personnel have initially been trained to assist with the surveys. We have also established collaboration with other community outreach teams working on environmental issues in the area to help promote the conservation of fishing cats and other carnivores.

Recommendations:

- More comprehensive surveys for fishing cats and other carnivores should be continued cover the whole protected area in order to understand their distribution and to identify further threats. The data obtain can later be used to promote conservation of the species and its habitats
- Local people should be included as a major component of our project as they are directly associated with fishing cat habitats. Whenever possible we should try to hire local people to assist with our surveys. Our last experience has shown that recruiting local villagers living around Thale Noi Non-Hunting Area-most of whom ex-hunters had benefited the project and other conservation scheme because these people already have broad knowledge of where and how to find wildlife signs, especially fishing cats as they were specifically targeted. We feel that broad education of local residents on the detailed ecology and conservation significance of fishing cats will only expand their options for becoming part of the region's growing tourism industry
- Although Thale Noi is officially a non-Hunting Area, the site is actually a multiple use area with a broad range of human uses and impacts such as hunting of protected wildlife, so establishing cooperation and gaining interests from local people should be an important part of the project.
- Educational material such as posters should be produced to promote conservation of fishing cats and should be distributed to homes and official buildings throughout the area. An educational team should be set up and send to visit local schools to talk with teachers and students about the role that fishing cats and other species play in the local ecosystem.
- There should be plans to raise both local and national appreciation for fishing cats and other carnivores in the area through newspaper and television coverage of the project. To date, we have found that local residents responded well to having their support for the project celebrated in Powerpoint projects that can be shown in a variety of settings.

Acknowledgements

Generous funding for this project was provided by the Smithsonian's National Zoological Park, the Cincinnati Zoo. I am grateful to Jo Gayle Howard and William Swanson for their encouragement. Busabong Kanchanasaka also provided encouragement, logistical support and much important information based on her extensive experience. The chief of Klong Saeng Research Station, Kriangsak Sri-buarod provided both logistical support and experienced advice on surveys. I am also grateful to the Chief of the Thale Noi Non-Hunting Area for his interests and permit to carry out the surveys and provided field assistants. Pete Cutter provided both field assistance and help in preparing the maps for this report.

This survey would not be possible without the thoughtful and professional field assistance of all staff from Klong Saeng Research Station, especially Rittirong Rittikul whose was highly engergetic and his high interest in the surveys had majorly benefited the project, and Tanya Subansong—a villager of Baan Thale Noi who's provided all of his knowledge about wildlife tracking and because of him, we obtained the photos of the fishing cat. A lot of thanks go to Somjai Jaeng-chusak, a ranger from Thale Noi who has provided a lot of asistance bothin the field and as a friend. A lot of thanks to the whole community around the Thale Noi Non-Hunting Area who has provided me with a lot of assistance, food, shelters and friendship. Their warm welcome is very much appreciated.

Survey team

Somjai Jaengchusak
Thale Noi Non-Hunting Area ranger

Tanya Subansong
Villager/ex-hunter

Rittirong Rittikul
Klongsaeng Wildlife Research Station

Passanan Cutter
Principle Investigator

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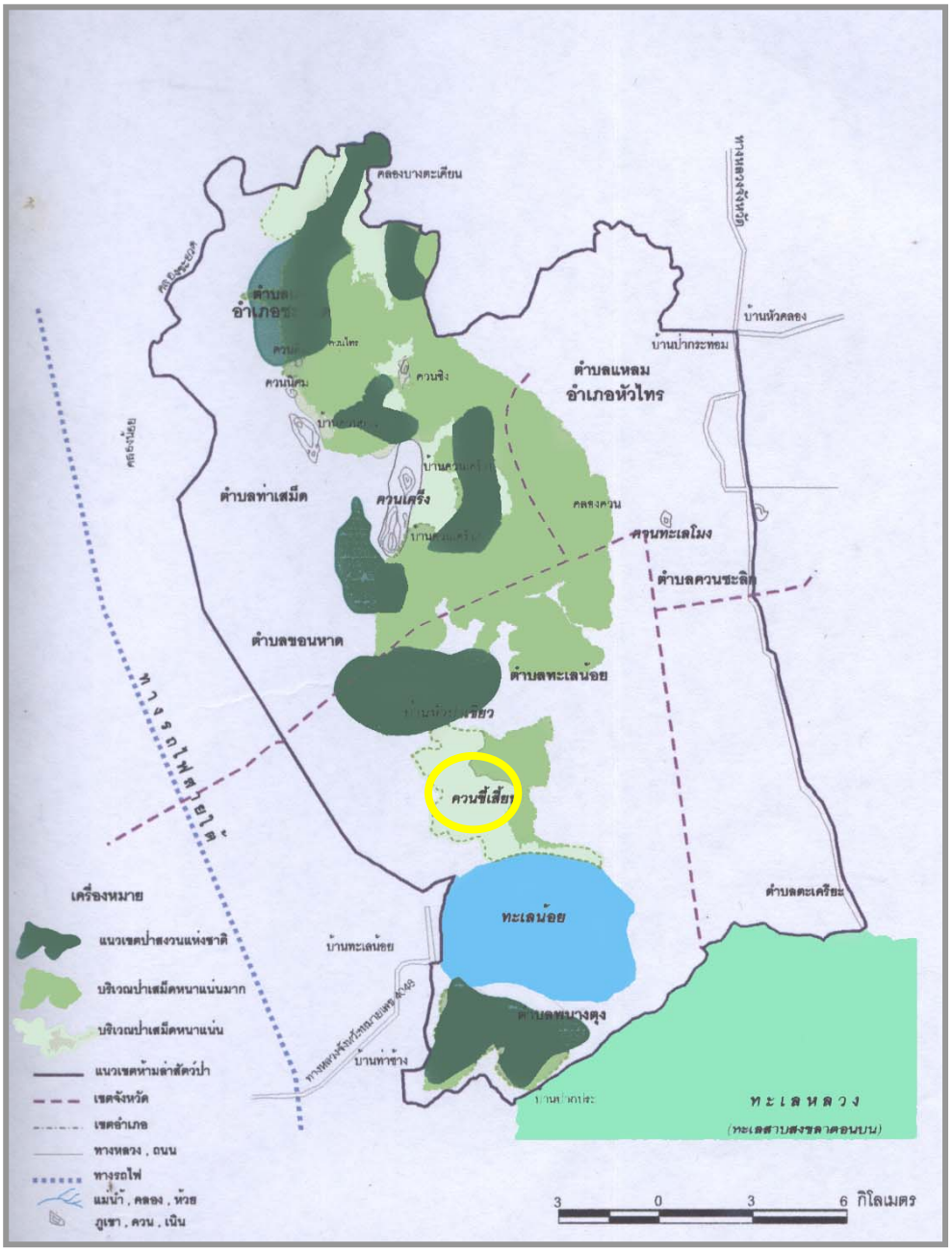
Appendix 1

Fishing cat range map

Appendix 2

Thale Noi Non-Hunting Area map of forest



Reserved forest

Densed Melaleuca forest

Thale Noi Lake

Non-Hunting Area Boundary

Ramsar site

Appendix 3

Private-owned lands within the boundary of the Thela Noi-Non Hunting Area

Private lands

Thlale Noi

Non-Hunting Area Boundary

Ramsar site

Appendix 4

Map of Thale Noi Lake contiguous to Thale Luang and Songkhla Lake in the South

Ramsar Site

Thale Noi Non-Hunting Area Boundary

Appendix 5

Some common wildlife speices in Thale Noi Non-Hunting Area

Purple Swamphen

Black-winged Stilts

Herons

Great egret

Common Bronze-backed snake preying on a frog

Smooth-coated otter

Thale Noi community livelihoods

Drying fish

Shrimp farming

Snell processing

Drying Bulrush sedge

Bulrush sedge weaving

Tourism

Appendix 6

Map of Thale Noi Non-Hunting Area and the focal surveyed areas

Appendix 7

Wildlife kept as pets in villages around Thale Noi Non-Hunting Area

Leopard cat

Leopard cat

Common palm civet

Capture equipment and poached animals

Local made fishing cat

A villager demonstrated how to make a snare

Location where a snared small-clawed otter was found dread

A snared small-clawed otter

White collared king fisher trapped on fishing net

Rescuing king fishers

Rescued king fisher

Another bird rescued from a fish trap

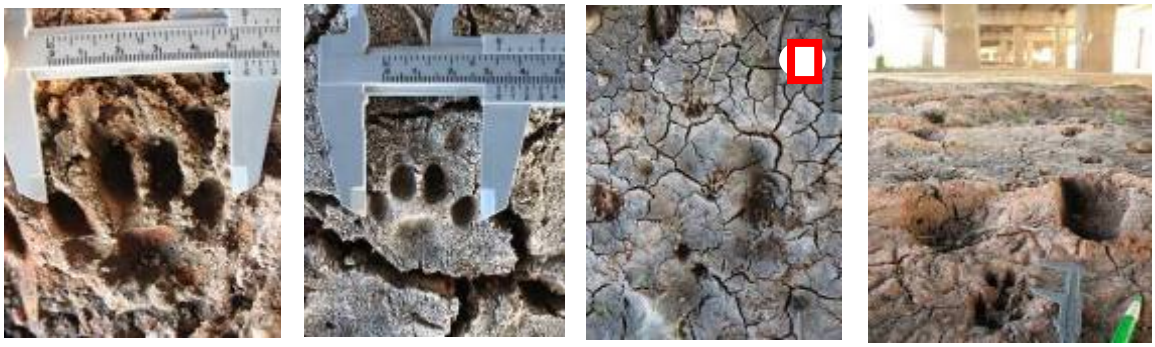
Another bird found in a fish trap

Nature Path construc

Trapped squirrel

Appendix 8

Adult and offspring cat tracks found next to each other under the Sai Pa-Hua Kling elevated road, south of Thale Noi Lake



Appendix 8.1

Fishing cat track comparison

Kanchanasakha's reference photo compare with field reference

Track reference from a captive fishing cat

Track reference from field surveys

Appendix 8.2

Large Indian Civet tracks and the feature of locations where tracks were detected

Appendix 8.3

Smooth-coated otter tracks



Small-clawed otter tracks



Appendix 8.4

Carnivore feces found in the field

Small carnivore feces collected from the field

Wild carnivore feces

Captive leopard cat

Measurement of feces collected in the field

Measurement of feces collected in from a female captive fishing vat

Appendix 9

Camera trap photos

Remains of a live bait after taken by what we thought was a

Examining bite marks

Location features where camera trap photos were taken

Appendix 10

Surveyed locaitons

Non-hunting Area boundary

Fishing cat camera trap photo locations

Signs and camera trap surveyed locations

Surveyed route

Ramsar Site

Appendix 11

Threats to wildlife habitats

Dirth path dug up to turn into a nature path

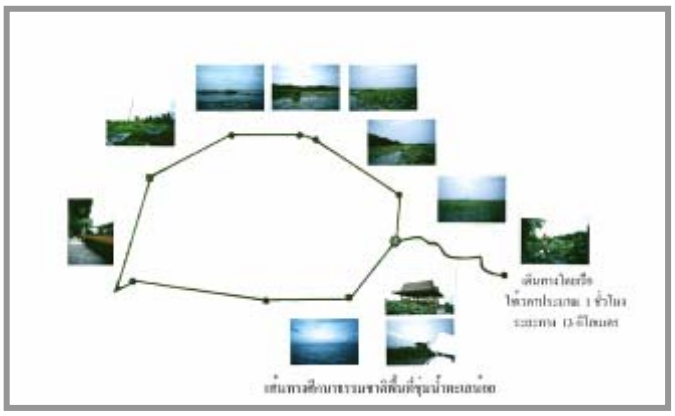
A fire buffer path

Melaleuca forest clearing

Over fishing

Another type of fishing

Domestic buffalos



Nature Path construction project which will eventually circle the Thale Noi Lake

Completed Saipa-Huakling Road which penetrates through the protected area

Field activity photos