



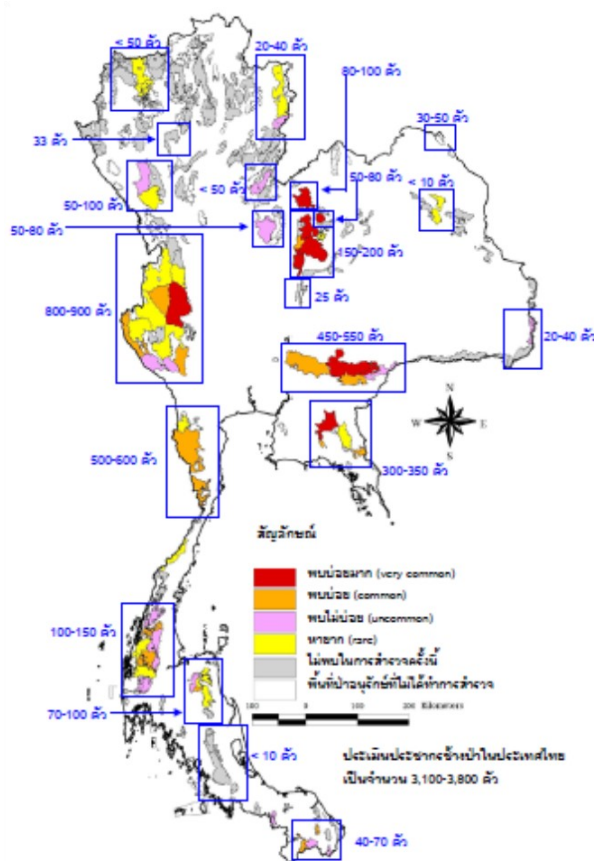
©WCS/MANDON PLOSUNGNOEN

## OVERVIEW OF THAI ELEPHANT STATUS

### Number of Elephants in the Wild

*Roughly 3,100 - 3,800 wild elephants found in 68 PAs.*

The Department of National Parks, Wildlife and Plant Conservation (DNP) reported that 3,100 - 3,800 wild elephants live in 68 protected areas (PAs) of Thailand, including 30 wildlife sanctuaries (WS) and 38 national parks (NP).



↑ Rough distribution of wild elephants from a survey in Thailand. Red-colored areas are PAs where elephants are frequently observed and grey-colored areas are PAs where elephant was absent.

### PROBLEMS AND THREATS OF WILD ELEPHANT IN THAILAND

DNP identified 2 main problems (threats) which are: (a) Human-Elephant Conflict or HEC and (b) direct poaching of wild elephants.

### DNP'S SOLUTIONS FOR HEC

#### EMERGENCY ACTIONS

- Fund of Wild Animal Rescue
- Propose to two Ministries to encourage responsibility in HEC compensation
- Set specific team in each site
- Improve habitats in PAs

#### MID-TERM PLAN

- Intense law enforcement for illegal acts land encroachment
- Construct barrier to obstruct elephants, e.g., ditch and electric fence in high-risk sites

#### LONG-TERM PLAN

- Land use re-planning
- Improve human attitude in HEC areas regarding elephant presence
- Conduct wild elephant movement study
- Wildlife corridor
- Translocation of some problematic elephants
- Serious punishment

### DNP'S SOLUTIONS FOR WILD ELEPHANT POACHING

#### EMERGENCY ACTIONS:

- Use quality patrols
- More checkpoints

#### MID-TERM PLAN

- More ranger stations
- Inspect illegal elephant, e.g., captives
- Genetic database of all wild elephant sources

#### LONG-TERM PLAN

- Improve elephant acts

*Uncertain number of domestic elephant reported from two different departments. DPA reported 3,200 elephants where as DLD reported 4,200 elephants.*

## Domestic Elephants, how many are they?

There are some confusions in number of domestic elephants. Those confusions derived from departments who have different roles in elephant management. Department of Provincial Administration (DPA), Ministry of Interior who is in charge of elephant identification ticket reported a total number of 3,200 elephants in captivity. On the other hand, Department of Livestock Development (DLD), Ministry of Agriculture and Cooperatives who has finished running the genetic database for animal health check reported a total number of 4,200 domestic elephants.



↑ Elephant bathing at Ayuthaya Royal Elephant Kraal.

*Thailand committed to improve existing elephant acts and relevant laws to eliminate legal ivory trade in the country addition to improve collaborations among countries to stop poaching and illegal wildlife trades.*

## Thailand—the Ivory Trade Cross Road

Thailand is long known as wildlife trafficking crossroad including live animals and ivory trades. To help control ivory trade among countries, legal ivory trade in Thailand should no longer authorized. As domestic elephants in Thailand are taken care by DPA and DLD, not further concerned as wildlife by laws, the owners are authorized to sell all parts of elephants as their own properties. In CITES CoP 16 held in Bangkok, Thailand committed to CITES that they will improve existing elephant acts and relevant laws to eliminate legal ivory trade in the country addition to improve collaborations among countries to stop poaching and illegal wildlife trades.





©WCS/MANON PUSUNGNOEN

## WCS ACTIVITIES IN KKNP

□ **2001 - 2002:** Studied distribution and population of some large carnivores and other mammals using camera traps.

□ **2004 - 2006:** Conducted an elephant distribution and threat survey, started addressing Human-elephant Conflict (HEC) in Pa La-U site and comparing effectiveness among different mitigation fences.

□ **2007:** Constructed conservation framework for KKNP using the Living Landscape Species Concepts. The framework suggested 5 target species which are Asian Elephant, Asiatic Black Bear, Siamese Crocodile, Dusky Langur, and Blyth's River Frog.

□ **2010 - 2011:** Conducted a research on Siamese Crocodiles, one of KKNP living landscape species, along c.a. 30 km of Petchburi River.

□ **2011 - 2012:** Examined existing elephant trail network in Pa La-U area to generate rough idea of their movements in association with crop damage incidents.

□ **2011 - 2013:** Under collaboration with Khao Nang Ram Wildlife Research Station and KKNP, WCS carried a tiger survey and monitoring in KKNP core area using camera traps.

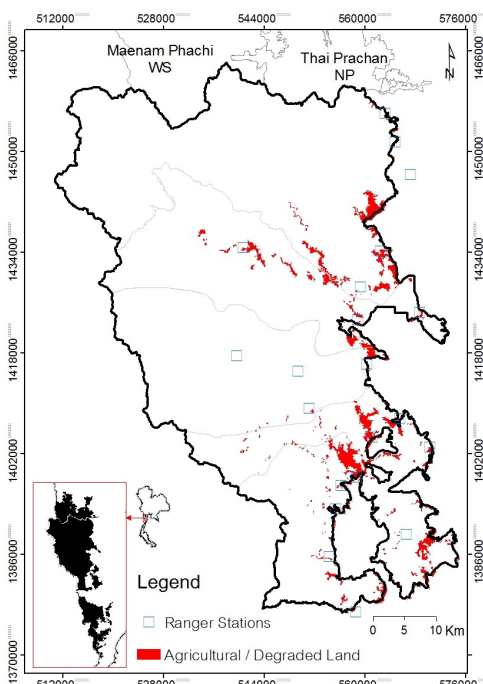
□ **2013 - present:** Patch occupancy survey in WEFOM has been extended to KKFC. Field survey in KKNP has been recently done in March, 2014.

## KAENG KRACHAN NATIONAL PARK (KKNP): ITS FASCINATION & WILDLIFE CONSERVATION ACTIVITIES

### The Largest National Park in Thailand and ASEAN Heritage Site

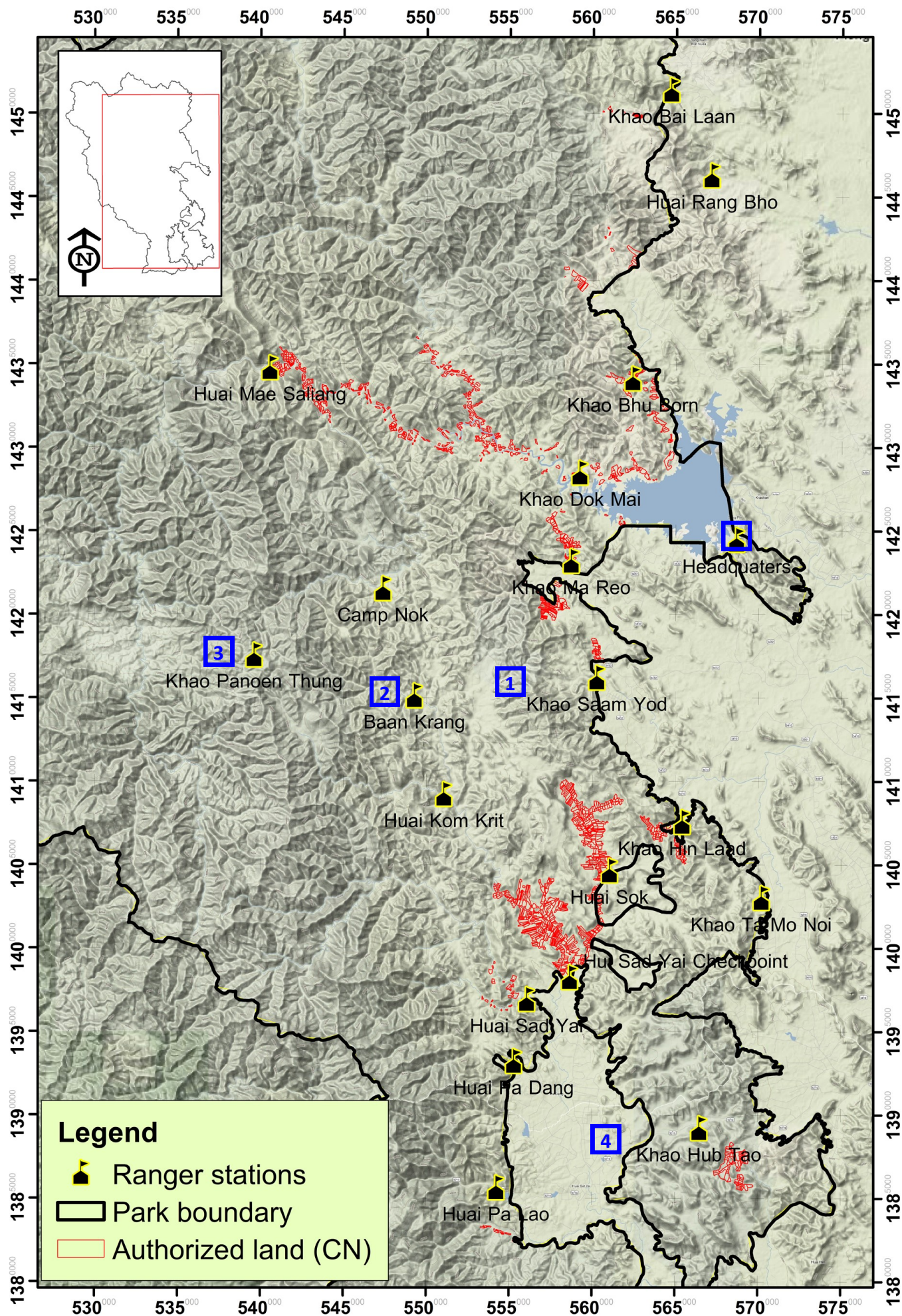
KKNP has been designated as the biggest National Park in Thailand with an area of 2,914.7 km<sup>2</sup> since 1981. KKNP is situated within the Tenasserim Mountain range (12° 55' 10", 99° 22' 51") and surrounded by three main protected areas: Mae Nam Phachi Wildlife Sanctuary, Thai Prachan National Park in the north and Kuiburi National Park in the south. All forest patches in this whole landscape together are named **Kaeng Krachan Forest Complex (KKFC)**. It is a highly important landscape for conservation, concerned as a biodiversity hotspot and listed as ASEAN Heritage site in 2005.

*KKFC is a biodiversity hotspot highly important for conservation and listed as ASEAN Heritage site in 2005.*



← Inset presenting KKFC location in Thailand map and big KKNP map showing management sectors, ranger stations and agricultural or degraded land inside the park.





↑ A terrain map of KKNP presenting some key locations and noticeable land use inside the park.



# SIGHTINGS IN KAENG KRACHAN

## 1 KM 10 - 11: Natural and Artificial Salt Licks



↑ A salt lick complex scatters in the middle of KKNP together with a year-round stream. This area is a KKNP core area, home to many wildlife species. By visiting one large salt lick called “Pong Bhrom” next to the road, we may see some signs of large mammals like Sambar Deer, Elephant and Guar. This salt lick was originally a natural one but, after degradation, KKNP improved it by adding up additional nutrients, salt and bones in order to maintain its utilization.

## 2 KM 15: Baan Krang Camp



↑ This is another area that's rich in wildlife. There's a good chance to see some of them here, especially in the morning at fruiting trees. The camp is famous because of its accessibility and splendid nature. A couple kilometers from the camp, people like to stop at the stream for bird and butterfly watching. Commonly seen wildlife are such as Dusky Langur, White-handed Gibbon and Hornbill while carnivores like Leopard and Dhole are occasionally spotted.

## 3 KM 30: Phanoen Thung Viewpoint



↑ Though accessibility here is quite limited because of steep slope and road condition, it is a very attractive tourist viewpoint. They have to drive up in early morning to see sunrise and thick layer of mist covering dense canopy of large pristine forest patch extending to Burma, feeling fresh air among various sounds of nature.

## 4 HEC Site in Pa La-U, South of KKNP



← This site is very well known for its Human-Elephant Conflict (HEC) history. WCS keeps monitoring HEC, assessing crop damage situation and promoting standardized mitigation techniques. On the road before entering the village, you may have a chance to see Wild Elephant and Stump-tailed Macaque.





# SAVING WILDLIFE IN KAENG KRACHAN 2 FOREST COMPLEX

MARCH 2014



©KAENG KRACHAN NATIONAL PARK

## SMART PATROL QUALIFICATIONS

- ☐ Adequate number of patrol staff
- ☐ Good equipment and support
- ☐ Quality training
- ☐ Standardized law enforcement monitoring
- ☐ Supported by strong intelligent networks
- ☐ Law Enforcement Monitoring (LEM) data fully integrated into strategic planning and development of patrol

## IMPROVE AND MONITOR LAW ENFORCEMENT USING SMART PATROL SYSTEM

### What is SMART Patrol System?

The Smart patrol system refers to the implementation of a suite of components necessary for effective law enforcement as follows: adequate numbers of patrol staff trained with enforcement techniques, supports by strong intelligent-networks and necessary infrastructure, equipment and resources needed for patrolling, standardized Law Enforcement Monitoring (LEM) protocol implementation and LEM data fully integrated into the strategic planning and deployment of patrols.

The effective Smart patrol promotes “good governance” and “best practice” by empowering park rangers to fully engage in decision making process with park managers.

### Implementing SMART Patrol in KKNP

In 2009, WCS and KKNP authorities started implementing SMART patrol system in KKNP as the first national park in the country. All patrol information is transferred into the database of the spatial Management Information System (MIST). Patrol results and situations in the field are integrated into strategic planning and development of patrol through monthly meetings. Though patrolling in KKNP has not met all defined qualifications yet, their current performance is proven effective.



©KAENG KRACHAN NATIONAL PARK

↑ A patrol leader is making decision using a map and GPS.

*Managers and conservation scientists try to modernize the patrol activity with science and technology. In Thailand, we call it “Smart patrol”.*

*Patrol results and situations in field are integrated into strategic planning and development of patrol through monthly meetings.*

## SUPPORTED BY



LIZ CLAIBORNE  
ART ORTENBERG  
FOUNDATION

**zoo!**  
ZÜRICH

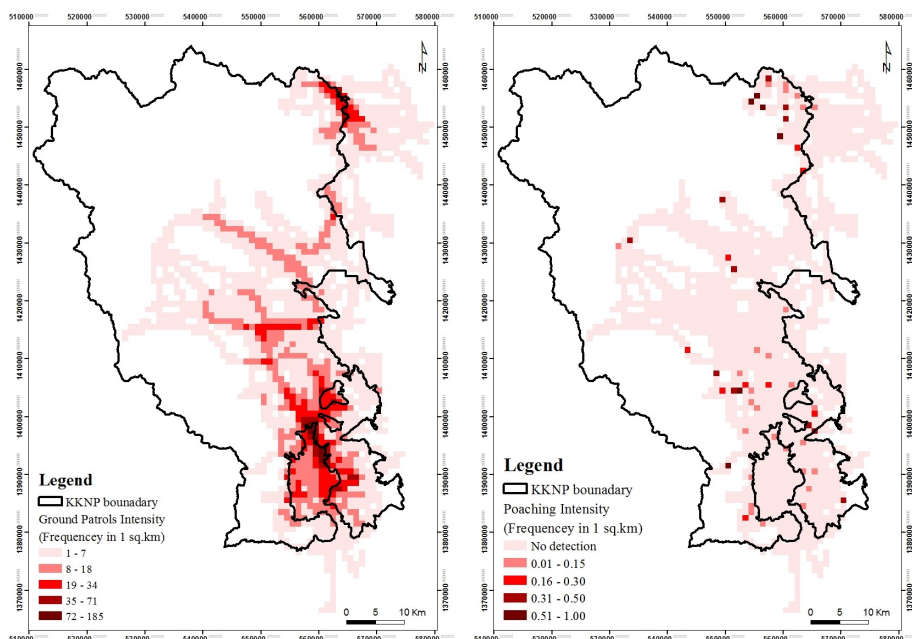


Patrol effort, especially monthly patrol distance, was gradually increased from ca. 300 to 550 km per month. Most of the effort was in the northeast and in the south of the park.

## Monitoring Patrol Effectiveness

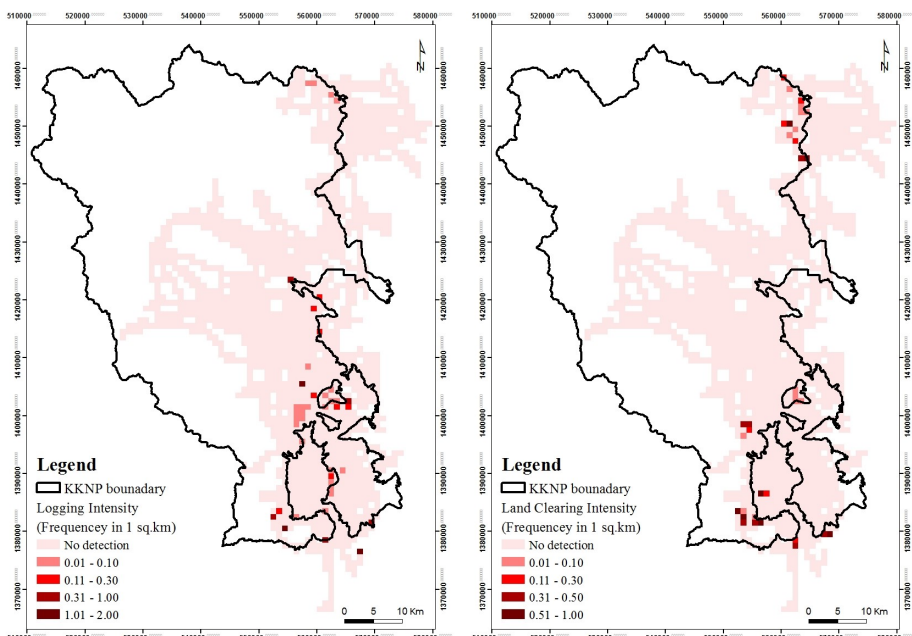
Given 1-year patrol data from August 2012 to July 2013, enforcement teams made 586 ground patrol trips, covering a total distance of ca. 5,600 km, which were mainly concentrated on the eastern side of the park with a focus in the southern region of management zone 5. Patrol effort especially monthly patrol distance was gradually increased, starting from about 300 km per month to 550 km per month. (see map and graph below)

→ **Patrol coverage and intensity map** shows the patrol effort covering about 50% of the park area. The higher frequency of patrol in 1-km<sup>2</sup> grid is presenting in darker red color. Patrol intensity was relatively higher in northeast and south and moderate at the center.

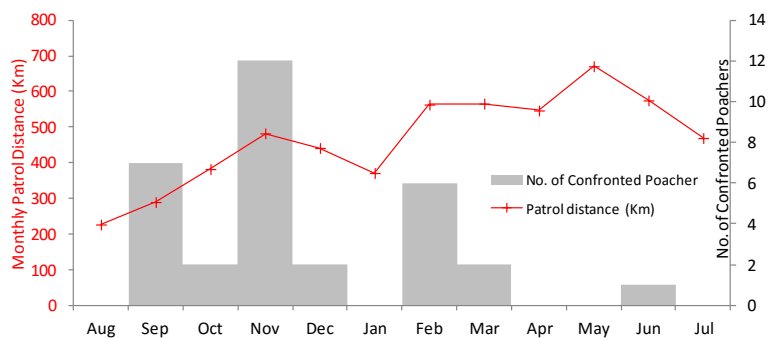


← **Map of poaching intensity** as evident from, e.g., wildlife carcass, cartridges or bullet shell, camp with meat drying rack. From this data, it was found relatively higher in the northeast and in the south which are in darker red color.

→ **Map of logging intensity:** illegal logging found relatively higher in the southern part of KKNP.



← **Land clearing map** showing higher intensity of land clearance in the northeastern and southern parts of KKNP.



↑ **Patrol Statistics:** the left axis represents monthly patrol distance (red line) while the right axis represents the number of poachers confronted by patrol teams (grey bar).



## Threats to Wildlife and Their Habitats

Threats to wildlife and their habitats are generally categorized and presented as hunting/poaching, logging, land clearance and non-timber forest products collection (NTFPs). During August 2012 to July 2013, a total number of 44 people were confronted and 24 of them were successfully arrested and cases were drawn. Ten out of these cases were about wildlife poaching. Though the explanation for association between increasing patrol distance and lower number of confronted poachers was not clear, it could be reasonably explained by poaching season and poachers who are aware of KKNP actions after several arrestments around the end of 2012.

*A total number of 44 people were confronted and 24 of them were successfully arrested and cases were drawn. Ten out of these cases were about wildlife poaching.*



↑ Wildlife poaching found distributing over KKNP in various patterns by both local hunters and people from town. Elephant poaching has been reported in the area and two member of the gang were arrested in February 2012 (top-left).



↑ Illegal logging is usually found concentrating in the southern part of the park which is well accessible because of the road cutting through villages into the park area. The highest value timber is Makhamong *Azelia xylocarpa* (Kurz) Craib.



↑ Land encroachment and NTFPs collection are found to be seasonal, following the cropping cycle, fruiting season for wild seed collection or harvesting season for mushrooms and bamboo shoots.



## Building Rangers' Capacity: Physical Strengthening, Skill Sharpening and Leadership Improvement through Quality Training

*Quality training requires about seven days to cover several key activities including theories, laws and field practices.*

As one of key qualifications for SMART Patrol System, WCS helps KKNP organize quality training every year. We set specific aims for each training to best fit the situation on ground. For example, we arrange a full training for rangers who are new to patrol system and a refresher training for old rangers. Quality training requires about a week to cover several major activities such as physical strengthening and testing, map and GPS reading, data collection using standardized forms, forestry and relevant laws, patrol formation, frisking, gun fire and maintenance.



↑ Physical strengthening and testing



↑ Map reading



↑ GPS reading and recording



↑ Rules of safety and patrol formation



↑ Gun firing tactics



↑ Frisking



↑ Shooting practice



↑ Weapon maintenance



↑ Quality training with morale motivation





# SAVING WILDLIFE IN KAENG KRACHAN 3 FOREST COMPLEX

MARCH 2014



©WCS/DNP

## CAMERA-TRAPPED WILDLIFE

Example of wildlife photos from 31 species captured by camera trapping in 2003 - 2004



©WCS/DNP

Leopard  
(*Panthera pardus*)



©WCS/DNP

Dhole  
(*Cuon alpinus*)



©WCS/DNP

Malayan Sunbear  
(*Helarctos malayanus*)



©WCS/DNP

Banteng  
(*Bos javanicus*)



©WCS/DNP

Asian Elephant  
(*Elephas maximus*)

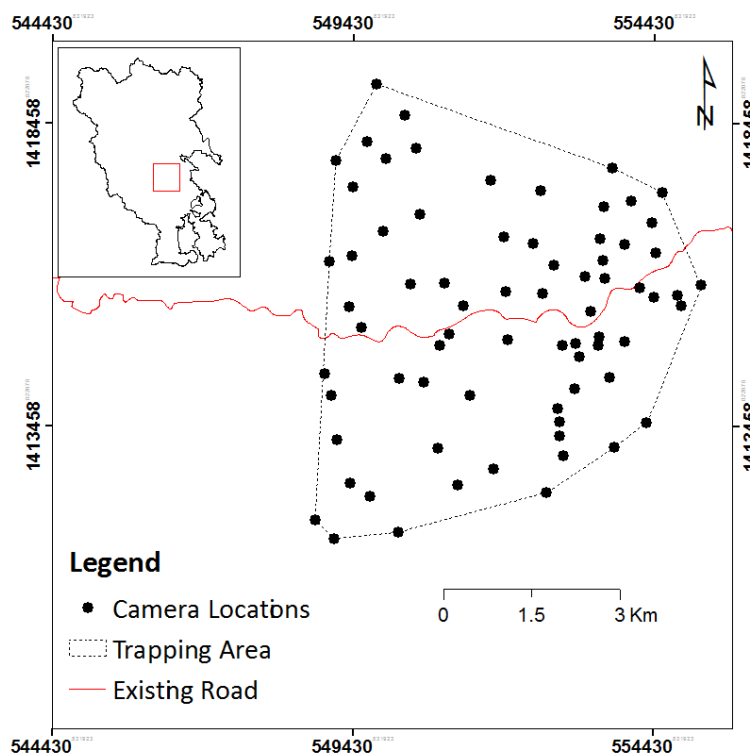
## WILDLIFE MONITORING PROJECTS: CAMERA TRAPPING, CROCODILE AND PATCH OCCUPANCY SURVEYS

### Large Mammal Survey in Home of Tigers

From 4,493 trap-nights, a total number of 31 mammal species were confirmed including of 4 individual tigers.

In 2001, WCS started a project to survey distribution and status of key mammal species in KKNP. A total number of 24 camera traps were set through all 72 locations in 3-month trapping cycles. From 4,493 trap-nights during February 2003 and February 2004, presence of 31 mammal species from 16 families were confirmed, including 14 carnivorous mammals from 5 families. Remarkably, 11 photographs of four individual tigers were identified.

→ Camera locations of trapping area during 2003 and 2004, showing details of vegetation types within KKNP and the access road.



### Legend

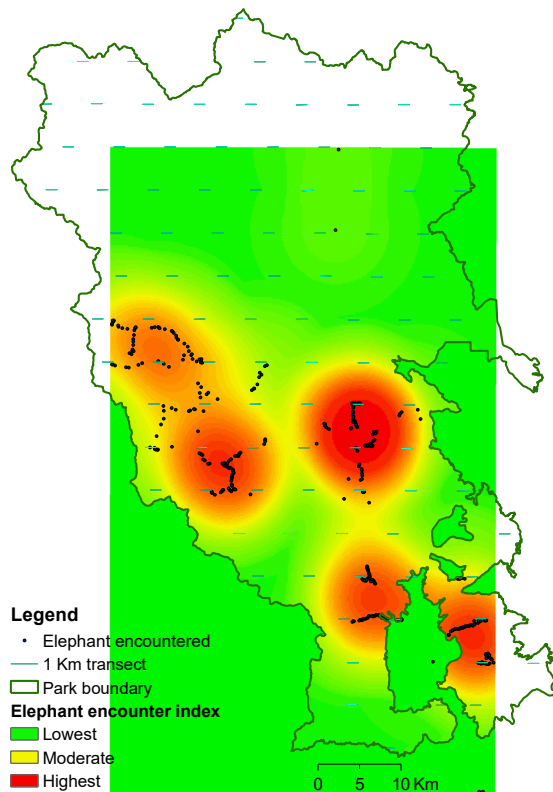
- Camera Locations
- Trapping Area
- Existing Road



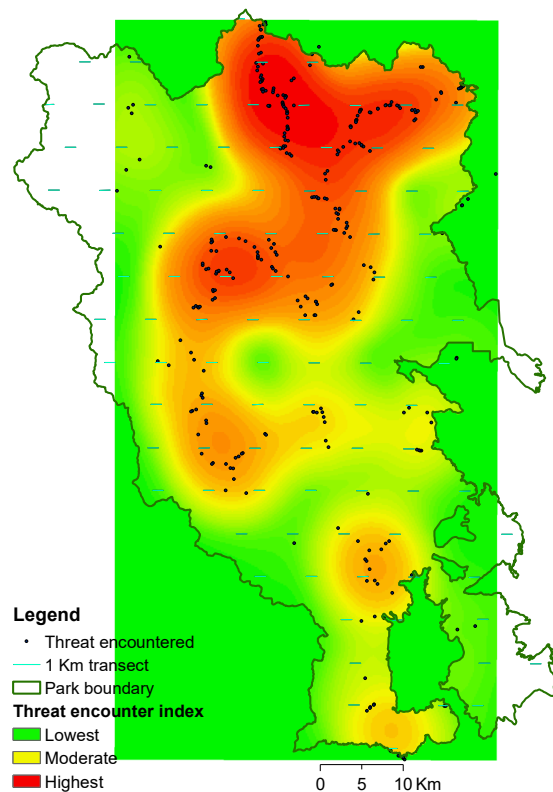
Elephants were confined to ca. 33% of KKNP and completely absent from the northern areas. Dung piles were found at 5.04 piles/km. The highest encounter rate (0.9 sign/km) of illegal human activities was showed in the northeast region.

## Elephant and Threat Distributions from Transect Surveys

WCS placed recce-survey transects (RSTs) systematically throughout KKNP in order to assess: (a) elephants and threats to wildlife and (b) dung-pile encounter rate. Each of 100 RSTs was 1 km long with a 5 km inter-transect interval. The results showed that elephants were confined to ca. 33% in the park area and were entirely absent in the northern parts. Discarding those afford in the north, elephant dung piles were found with the encounter rate of 5.04 piles/km. From January - June 2006, illegal human activities were shown highest in the northeast region by 0.9 sign/km.



↑ Elephant distribution survey is based on signs encountered along RSTs from January - June 2006. Elephant was absent in the northern part.

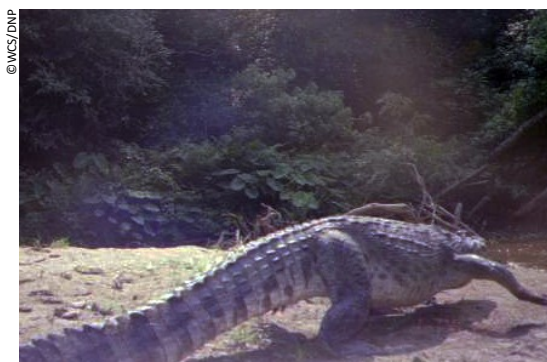


↑ Intensity of illegal human activities found along RSTs from January - June, 2006. The northeastern area is densely highlighted due to the highest threat intensity (red color).

10 detections of Siamese Crocodile signs were recorded, resulting in overall detection rate of < 0.30/km.

## Determine Conservation Status of Endangered Reptile: Siamese Crocodile (*Crocodylus siamensis*)

KKNP is one of few protected areas in Thailand where Siamese Crocodile can be found and nest. We investigated the conservation status of Siamese Crocodile in KKNP from July 2009 through August 2011 using a combination of nocturnal spotlight counts, track and sign surveys, and interviews with villagers. We recorded 10 detections of their signs (tracks and scat) along Petchburi River. Overall, the detection rate was low at < 0.30/km.



← An adult Siamese Crocodile at Petchburi River captured by a camera trap in 2001.



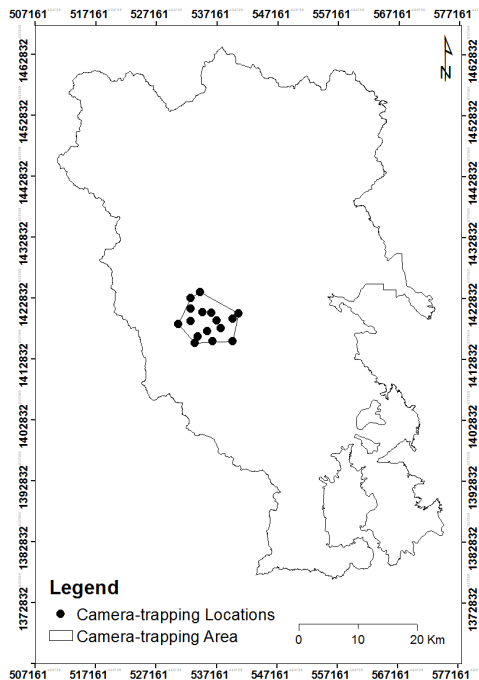
## Tiger Presence Confirmed by Camera Trapping

Under collaboration with Khao Nang Rum Wildlife Research Station, WCS and KKNP carried two camera trapping seasons. The first season was conducted for 72 days, from November 2011 to January 2012. Camera-traps were set at 47 locations covering an effective area of 583 km<sup>2</sup> in the wildlife core habitat. From a total of 1,098 trap-nights, 30 mammal species of 15 families were successfully captured. No photo of tiger was captured despite some tracks.

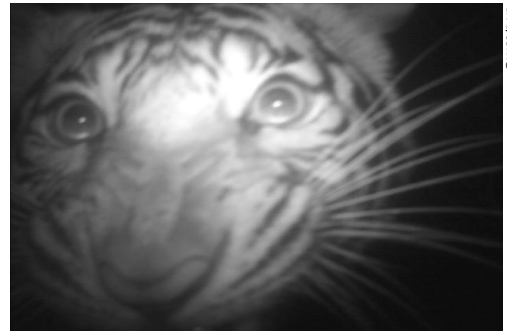
To confirm the current status of tigers, trapping period for the second season was extended to 110 days from January to May 2013. All of 16 cameras were left operating for about 105-110 days in the field where tiger tracks and signs were found in the previous session. By 1,611 trap-nights, we finally captured five events of tiger visits at three locations. However, all photos was identified as one female tiger. The longest distance between captured locations was about 12 km apart.

*From a total of 1,098 trap-nights in the first trapping season, we captured 30 mammal species from 15 families but no tiger's been captured.*

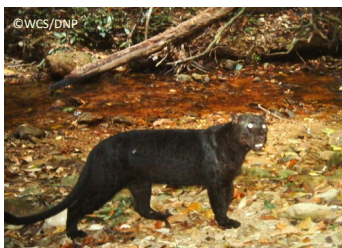
*With 1,611 trap-nights in the second trapping season, five photos of one female tiger were captured from three locations.*



↑ Camera trap locations in the second trapping season (January - May, 2013), the spots where tiger photos were captured are indicated in red circles.



↑ Photos of a female tiger captured in the second trapping season.



Leopard / Black Panther  
(*Panthera pardus*)



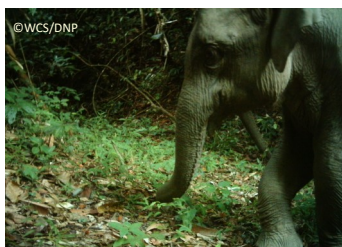
Leopard  
(*Panthera pardus*)



Asian Golden Cat  
(*Catopuma temminckii*)



Leopard Cat  
(*Prionailurus bengalensis*)



Asian Elephant  
(*Elephas maximus*)



Gaur  
(*Bos frontalis*)



Asian Tapir  
(*Tapirus indicus*)



Malayan Sunbear  
(*Helarctos malayanus*)

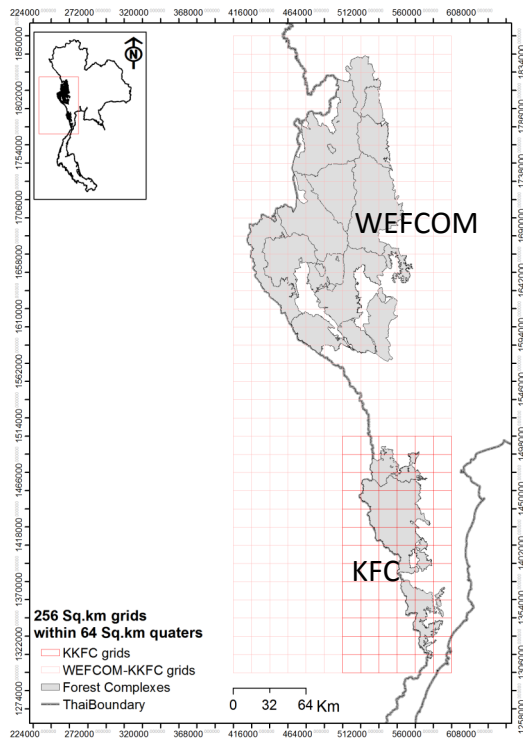
↑ Some other wildlife photos captured during the first and second camera-trapping sessions.



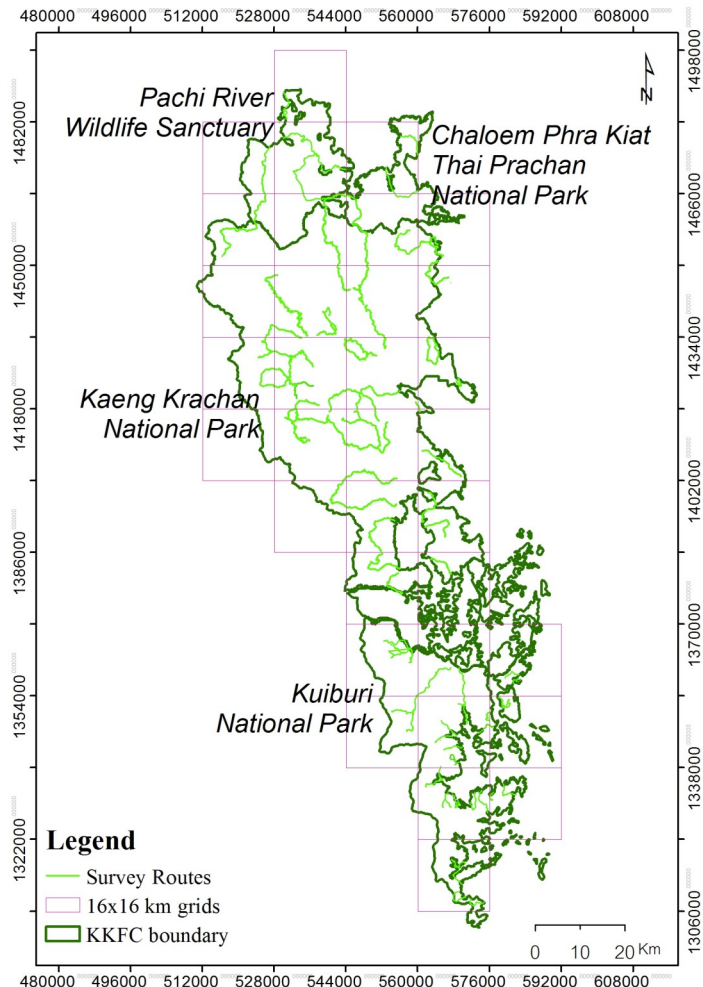
## Extending Patch Occupancy Survey (POS) for Tigers and Elephants along Tenasserim Range

*Twenty-one of 16x16 km grids were laid over KKNP. We equally located 15 km-transects in each four 8x8 sub-grids to make a total of 60 km walk in the grid that contains 100% of tiger habitat. We have just finished our field session this month.*

Previously, an extensive POS has been done in Thailand's Western Forest Complex (WEFCOM), covering >10 protected area in the northern Tenasserim Range of Kaeng Krachan Forest Complex (KFC). Khao Nang Ram Wildlife Research Station, KKNP and WCS conducted another survey in KKNP from November 2013 - June 2014 using similar standard protocol. A total of 34 grids (16x16 km), where a total length of 978.5 km was located, had been laid over KKFC. The detection for tiger was extremely low, found only in 3 grid cells where elephant found distributing through the half-south of KKNP and all over Kuiburi National Park. We are currently in the process of analyzing occupancy data for elephants and other wildlife for the whole complex.



↑ Locations of WEFCOM in association with KFC where the survey plan covers.



↑ Example of survey routes in each survey grid.



↑ Surveyors noting information on presence of key wildlife and evidence of illegal human activities in every 100 m segment.

**SUPPORTED BY**



**zoo!**  
ZÜRICH

صندوق محمد بن زايد  
للمحافظة على الكائنات الحية  
The Mohamed bin Zayed Species Conservation Fund





# SAVING WILDLIFE IN KAENG KRACHAN 4 FOREST COMPLEX

MARCH 2014



©KKNP NIGHT RESPONSE TEAM

## LAND USE SURROUNDING KKNP AND COMMONLY RAIDED CROPS

- The enclave of an area is approximately 110 km<sup>2</sup> in size, holding about 12,000 people in total. This site is widely known as *Pa La-U*.
- Commonly found crops in the area are such as banana, pineapple, rubber tree, cassava, durian and jackfruit.
- Potential causes of crop raiding are such as
  - Elephant native routes
  - Fallback or alternative water source
  - Habitat, food decline or/and degradation
  - Crop palatability and nutritive value

## HUMAN-ELEPHANT CONFLICT (HEC) AND CROP DAMAGE MONITORING

### HEC Assessment and Monitoring

*HEC has been known to area since 1997. WCS start assessing and monitoring HEC since 2005.*

HEC has long been addressed in some areas adjacent to KKNP border through crop damage incidents and one elephant killed in 1997. Under collaboration with KKNP, Sub-district Administrative Offices and community members, WCS initiated HEC assessment and monitoring since 2005. HEC has been reported in 6 sub-districts but, for quantitative analysis, we only focus on 2 sub-districts where HEC is intense.

*Total damage cost is estimated at US\$531,000, or around \$9,500 per year per site.*

### Frequency and Cost of Damage

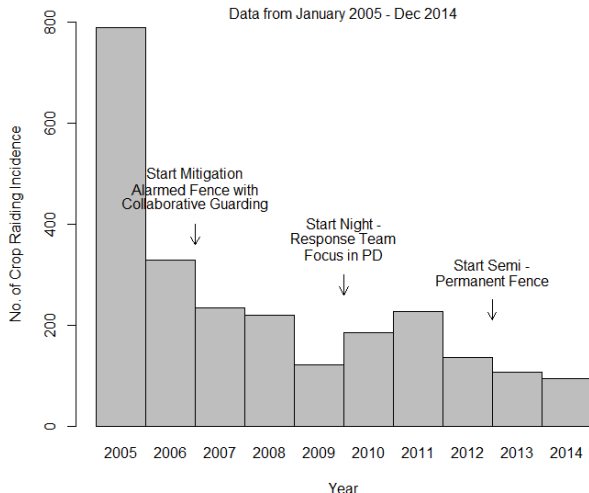
Until June, 2015, a total of 2,601 HEC incidents have been recorded from all sites where 355 farmers are affected. More than 55 crop species are destroyed and eaten by elephants. Total damage cost is estimated at US\$531,000 or averagely US\$9,500 per year per site.

### SUPPORTED BY



Crop Damage Incidence in Each Year

Data from January 2005 - Dec 2014



↑ Number of crop raiding incidence by years. It tends to decline from 2005 to 2008 and stabilizes at around 100 incidents in each of later years.



← A farmer looking at her banana field raided by a herd of elephants in Pa Deng Sub-district.



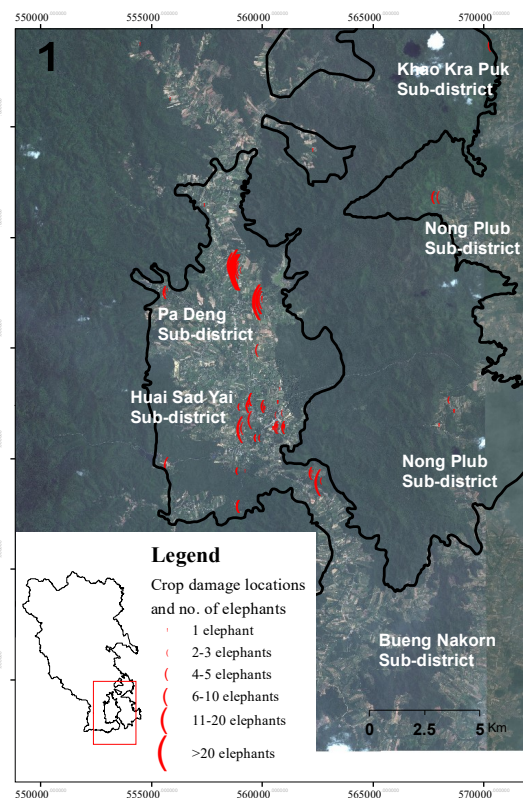
← An electrocuted elephant in Pa Deng by a farmer who set the killing wire directly hooked to 220V house electricity. He was arrested in June, 2013.



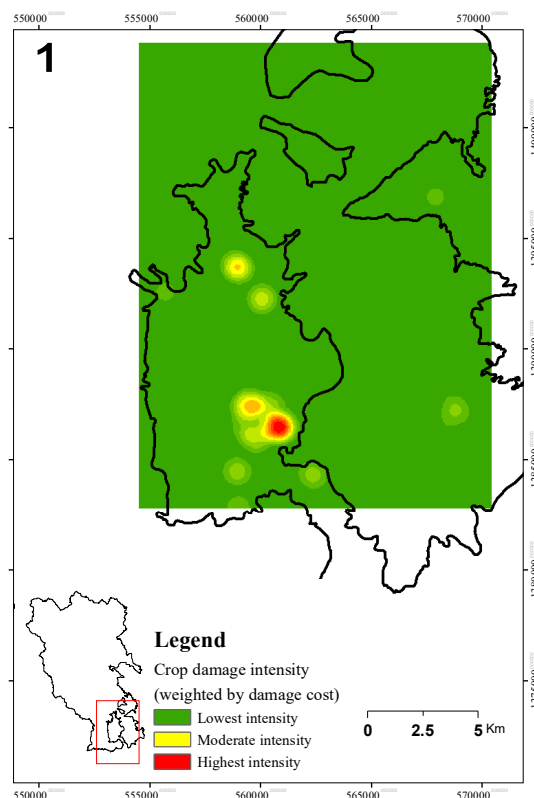
*Damage in HSY is found at highest frequency: averagely 132 incidents and \$15,014 each year.*

## Frequency and Cost of Damage (continued)

The highest damage frequency was reported in Huai Sad Yai Sub-district (HSY) followed by Pa Deng Sub-district (PD) with 132 and 106 incidents per year respectively. We're concerned that these two sites are HEC hotspots where averagely 35 farmers are involved each year. Total damage cost in HSY is ca. US\$15,014/year (US\$110/incident) whereas that of PD is US\$34,445/year (US\$672/incident).



↑ Crop damage locations (Aug 2012 - Jul 2013) in association with number of elephants. Larger groups were found more often in PD area.



↑ Crop damage intensity (Aug 2012 - Jul 2013) using kernel estimator weighted by estimated damage cost for each incident.

### RECORDS OF CROP DAMAGE FREQUENCY, NUMBER OF FARMERS AND ESTIMATED DAMAGE COST IN EACH SUB-DISTRICT (2005 - 2015)

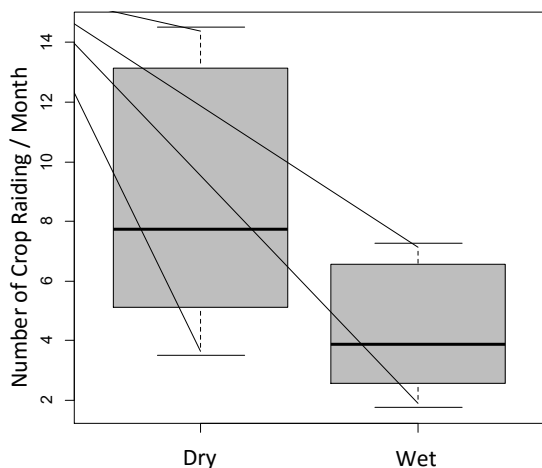
Sub-districts	Number of Incident / Year	Farmer / Year	New Farmer / Year	Total Damage Cost	Damage Cost / Year	Damage Cost / Incident / Year	Damage Cost / Farmer / Year
Bueng-Nakorn	11.1	2.3	2.3	10,985	1,087.2	110.7	309.8
Huai-Sad-Yai	131.9	23.7	23.7	179,959	15,014.4	152.0	572.7
Hui-Mae-Preang	0.1	0.1	0.1	35	3.5	3.5	3.5
Khao-Kra-Puk	0.1	0.1	0.1	5,143	514.3	514.3	514.3
Nong-Plub	21.4	6.0	6.0	35,500	2,955.2	270.3	474.0
Pa-Deng	106.3	18.5	18.5	424,697	34,445.3	672.8	1,913.3
Total	—	—	—	656,319	—	—	—
Average	45.2	8.5	8.45	173,003	322198.9	287.3	876.1

*69.3% of crop raiding incident is caused by small groups of elephants, costing about US\$102 per incident.*

## Number of Elephants and Crop Raiding

In summary, 69.3% of crop raiding incidents is caused by small groups of elephants (<3 individuals). However, cost per incident of the those damages are much less than cases made by large herds (>10 individuals). The damage cost for crops raided by small groups of elephants is estimated at US\$102/incident while the cost of raiding from large herds is at about US\$4,517/incident.





## Seasonal Patterns of Crop Raiding

We define two seasons from annual rainfall record in the area. Our long-term monitoring from 2005 to 2013 reveals that crop raiding frequency in **dry season** (December - March) is about twice higher than that of **wet season** (April - November). It is about 12 incidents per month in dry season and 6 incident per month in wet season.

*Crop raiding frequency in dry season is about twice higher than that of wet season.*

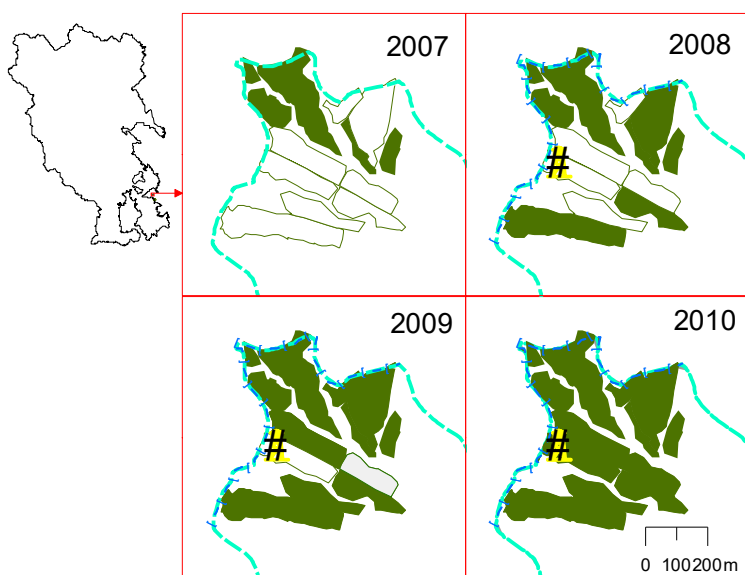
← Average frequency of crop raiding/month in different seasons

## COMMUNITY-BASED HEC MITIGATION, VIGILANCE SYSTEM, SEMI-PERMANENT FENCE AND ACTIVE NIGHT RESPONSE TEAM

### From Experiment to Standard Vigilance Scheme

Since HEC can be considered as an indirect threat to elephants, WCS has helped villagers develop an appropriate HEC mitigation scheme since 2005. The experiment has been set up to compare efficiency among four different fences; normal fence, chili fence, acetic fence and electric fence. Chili fence was found least effective whereas other fences were roughly equivalent with 60% of success. The normal fence (control) is selected over others because of its lower cost and practice. Therefore, WCS has started developing and promoting, alarm fence and vigilance team as a standard scheme from 2006 to present.

*The normal fence (control) is selected over another because of its lower cost and practice.*



### Legend

- # Watching Tower
- Recropped Fields
- Alarm Fences
- Abandone Fields
- Forest Edge

↑ With improved vigilance system in Nong Plub Sub-district, farmers who previously abandoned their lands slowly returned to crop during 2008 and 2010. The alarm fence and vigilance system are proven effective in the area that has strong community network.



↑ WCS staff and community team at alarm fence (top) and on watching tower (bottom).



*The strength of this fence is proven at a pilot site and this model is being replicated in another HEC hotspot.*



©SUPOT PANNON

*The night response team usually conduct the night patrol averagely 23 nights per month, recording 33 elephant encounters. They successfully prevent 96% of potential raiding incidents.*

↓ A member of the night response team is shooting fire-cracker by slingshot.



©KKNP NIGHT RESPONSE TEAM

## Semi-permanent Fence as Alternative Solution

The semi-permanent fence (concrete) has been built first in HSY where elephants frequently cross to crop fields, hardly stopped by vigilance team. The strength of this fence is proven at a pilot site and this model is being replicated in another HEC hotspot. A 50m semi-permanent fence has been built in PD under collaboration among community, military, KKNP and WCS in January, 2014. The fence extension in PD is progressing together with habitat improvement inside the park as a long-term solution.

← KKNP Superintendent, WCS Thailand Program Director, Hua Hin District Chief Officers, militaries and community members at pilot site of semi-permanent fence.

## Active Night Response Team: Herd Movement Monitoring and Damage Prevention

A team of 4-5 rangers, called a night response team, conduct patrol to prevent crop damage mainly in Pa Deng Sub-district since September, 2011. Each night they drive a truck to locations where elephant were spotted the previous nights. In 2013, the patrol frequency was averagely 23 nights per month. While encountering, from approximately 33 encounters per month, they count the number of elephants and observe their behaviors. If elephants attempt to move out to crop fields, the team will carefully stop them or drive them back to forest side. Firecrackers are only employed when necessary while spotlighting and shouting are mostly applied.

## Measuring Mitigation Success of the Night Team

Mitigation results of this team are classified as follows: “*Successfully guarding at the forest edge*” meaning elephant are early detected inside the forest or at the forest edge and are stopped from moving out, “*Successfully driving*” meaning elephants are detected outside the forest and are all driven back to the forest side, “*Partially success*” meaning the team can drive some elephants back to forest side but still have some left outside, and “*Failed searching*” meaning the team detect some signs of elephant (e.g. noise and fresh tracks) but cannot locate them nor cannot access to a good/safe spot for mitigation actions. Their performance are evidently effective as they successfully prevent 96% of potential crop raiding incidents.

RECORDS OF ELEPHANTS ENCOUNTERED AND RESULTS OF MITIGATION EFFORT IN 2013

Months	Guarding at Forest Side	Successfully Driving	Successfully Guarding+Driving	Partially Success Driving	Failed Searching	Total Incident	% Successfully Driving	% Successfully Guarding+Driving
January	21	15	36	0	0	36	41.7	100
February	28	11	39	0	0	39	28.2	100
March	23	10	33	1	0	34	29.4	97.1
April	0	28	28	5	0	33	84.8	84.8
May	10	25	35	0	1	36	69.4	97.2
June	27	25	52	0	0	52	48.1	100
July	13	13	26	0	6	32	40.6	81.2
August	16	10	26	1	0	27	37	96.3
September	11	9	20	1	0	21	42.9	95.2
October	6	6	12	0	0	12	50	100
November	16	12	28	0	0	28	42.9	100
December	6	34	40	0	0	40	85	100
Total	177	198	375	8	7	390	600	1151.8
Average	14.75	16.50	31.25	0.67	0.58	32.50	50.00	95.98





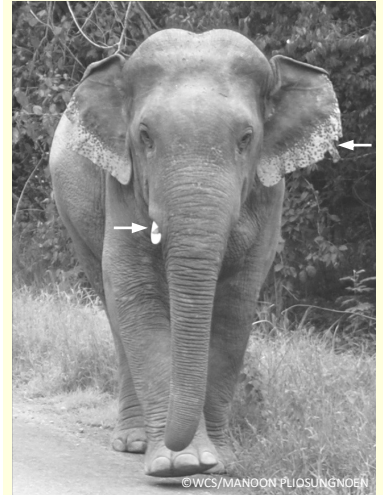
# SAVING WILDLIFE IN KAENG KRACHAN FOREST COMPLEX

MARCH 2014



© WCS/MANOON PLOSUNGNOEN

## EXAMPLE OF ELEPHANT IDENTIFICATION PHOTOS



© WCS/MANOON PLOSUNGNOEN



© WCS/MANOON PLOSUNGNOEN

↑ An elephant bull named **Ngaa Taek** which means broken tusk. He is usually found on the road in the village, rarely within the main herd.

## POPULATION, GROUP COMPOSITION AND MOVEMENT

### Elephant Count Hinting Estimated Number

Since a total count is impossible in the field, we can only estimate a rough number of elephants in KKNP. More systematic counting was in Pa La-U area where the night response team follow the herd and have good opportunity to observe closely through years. The maximum number from counting in one spot is 81 elephants, roaming in cassava field (February 2014). There were 4 infants, 9 juveniles, 16 sub-adults and 52 adults. Therefore, total number of elephants in Pa La-U area is estimated at 150 elephants. And together with another population in KKNP core area, there are 200 elephants for the whole park.

### Individual Identification & Re-sighting Data

Rogue males or tuskless commonly found near the village are primarily focused. Identification is based on combination of traits such as presence/absence of tusks, tusk position, ear loop, ear folding, tail and postures. Accordingly, we generate profiles of each individual by using sets of photos taken at front, back and both left and rightsides to visualize all marking traits. Until now, we have identified 8 tuskless and 2 tuskless bulls. One tuskless is normally found moving with the herd whereas 2 tuskless and 1 tuskless have never been found with herd.

### Existing Trail Utilization & Movement Patterns

The survey teams walk along existing trails to record elephant presence and natural resources for elephants, e.g., salt lick and water hole. Elephant trail utilization is based only on very fresh signs of elephants, e.g., dung, foot prints, marks on tree, feeding signs and calling. According to this sampling protocol, we assume each elephant group detected in different spots as a different group or a sub-group.

*The maximum number from counting in one spot is 81 and we estimated a total number of elephants at 200 in KKNP.*

*We have identified 8 tuskless and 2 tuskless bulls. Some of them live in the main herd while others are solitary.*

*Teams walk along existing trails to record elephant fresh signs, assuming each group detected in different locations as a different group or a sub-group.*

## SUPPORTED BY

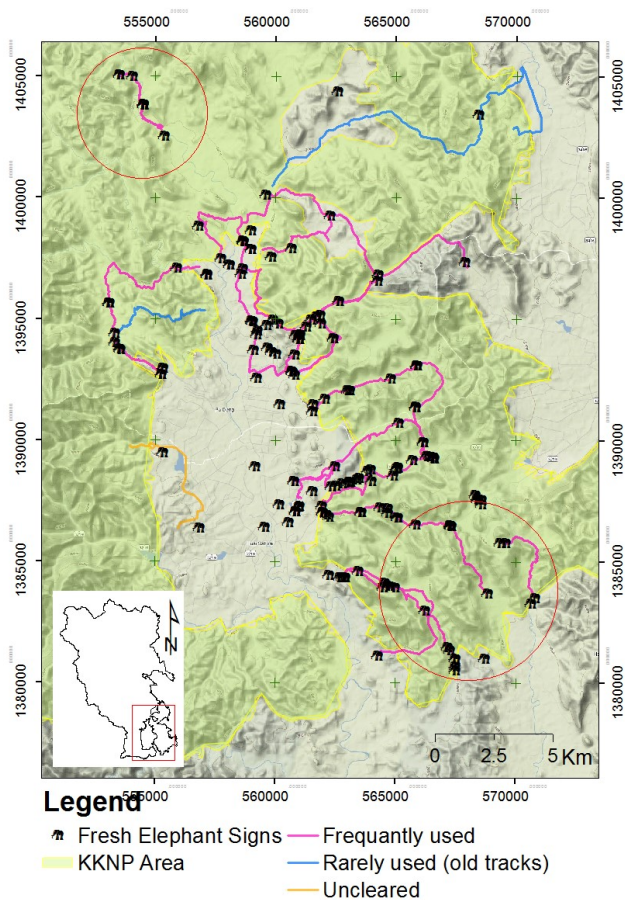


**ZOOH!**  
ZÜRICH

We confirm that the herd can move across two HEC hotspots in HSY to PD sub-districts via major trails in the eastern enclave.

## Existing Trail Utilization & Movement Pattern

Regarding to elephants’ utilization, we classify them as follows: *major trails* - widely open and found used nearly every month, *opportunistic trails* - sporadically used by smaller groups or individuals, and *ambiguous trail* - we doubt how elephant move across landscapes. Combining this result with re-sighting data, we confirm that the herd can move across two HEC hotspots in HSY to PD sub-districts via major trails in the east.



← Fresh elephant signs found during survey period, using frequency of those sing presence as an index to classify three classes of existing trails.

Two red circles indicate two elephant groups that move independently to the main herd.

## FOOD DUMPING AND WILDLIFE ON THE ROAD

### Road Sampling

We examined frequency of food dumping, quantity and quality of dropped food, types and behaviors of people and response of animals. Road monitoring was carried three times a day.

In order to understand how food dumping along the road affect elephants and other wildlife, we conducted surveys on road no. 3219 which cut through the enclave area. Regarding our preliminary survey, we scoped our survey at first for 6 km starting from the village. We examined frequency of food dumping, quantity and quality of dropped food, types and behaviors of people and response of animals. Road monitoring was carried three times a day: morning (0800-0900h), midday (1100-1200h) and evening (1600-1700h).

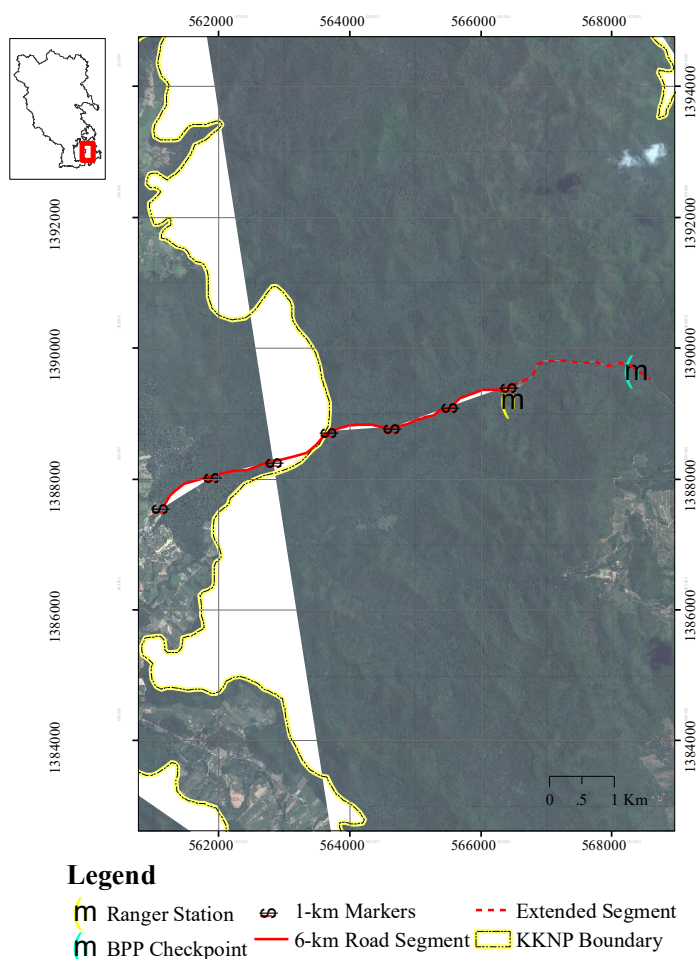
NUMBERS OF FOOD DUMPING SURVEY, FREQUENCY AND RATE OF DROPPED FOOD AND ELEPHANT ENCOUNTER ALONG THE ROAD						
DATA PRESENTED IN MEDIAN AND RANGE BETWEEN 1ST AND 3RD QUANTILES						
Period of Survey	Number of Survey	Total Dumping Frequency	Total Dumped Mass (kg)	Dumping Frequency / Survey / Month (1st Qu. - 3rd Qu.)	Dumped Mass (kg) Location / Month (1st Qu. - 3rd Qu.)	Elephant Encounter / Survey / Month (1st Qu. - 3rd Qu.)
Morning	158	76	482.9	0.40 (0.30 - 0.80)	1.20 (0.70 - 5.65)	0.00 (0.00 - 0.03)
Afternoon	146	117	743.6	0.80 (0.50 - 1.00)	2.70 (1.25 - 10.70)	0.11 (0.02 - 0.23)
Evening	143	113	527.7	1.00 (0.55 - 1.45)	4.90 (1.85 - 8.70)	0.33 (0.02 - 0.62)
Total	447	306	1754.2	—	—	—
Average	149.0	102.0	584.7	0.80 (0.40 - 1.00)	3.00 (1.00 - 9.75)	0.06 (0.00 - 0.31)



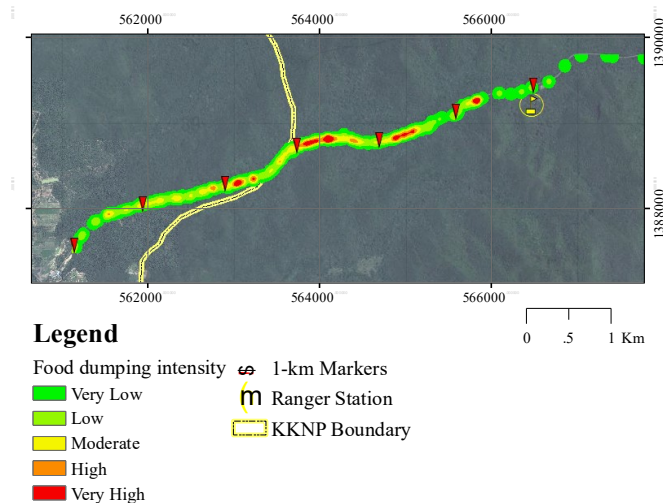
## Differences in Food Dumping and Wildlife Encounters

Encounters on dumped food were different among three sampling periods and the highest number was in the evening. Approximately half of dumped food (55%) was found in good condition, same quality as in the market. Proportion of food found in good quality in each period increased from 33% in the morning up to 80% in the evening. We successfully observed 16 dumping incidents, as most of them were that of local villagers who used truck carrying fruits and vegetables to the market. Some of tourists dropped food for animals as well but found in small proportion. Elephant encounter also increased from the morning to the evening.

*Higher encounter rate of food dumping and wildlife were found in the evening*



↑ The 6 km sampling transect of for food dumping (thick red line) and extending transect (dashed line).



↑ Relative intensity of food dumping incidents in 6 km transect.



↑ Local villagers dropping food for Stump-tailed macaques from their truck.

## Implication for Park Management

As food dumping can seriously change animal behaviors and generate many subsequent problems that would eventually affect villager's livelihood and cause difficulties in park management such as that of many in PAs. Our results revealed that food dumping was found most frequently between the 3<sup>th</sup> and the 5<sup>th</sup> km from the village or 200m from the park boundary. Park rangers may set up checkpoints to control food dumping and encourage people near the hotspot.

*The results revealed that food dumping was found most frequently between 3<sup>th</sup> and the 5<sup>th</sup> km from the village. Park rangers may set up a checkpoint to control food dumping and encourage people near the hotspot.*





# SAVING WILDLIFE IN KAENG KRACHAN 6 FOREST COMPLEX

MARCH 2014



© WCS/MANOON PLOSUNGNOEN

## ACTIVITIES WITH SCHOOL CHILDREN

□ 22 February 2013—**Huai Sad Yai Wildlife Home Cleaning Day**; we raised a campaign with HSY sub-district and schools. +120 students and villagers joined the campaign.

□ 15-22 March 2013—**Pa La-U Elephant Conservation Week**; we set an exhibition for visitors and invited four local schools to learn about elephant conservation at Elephant Conservation Information Center (ECIC). There were about 90 students visiting the center.

□ 13-15 July 2013—**Pa La-U Conservation Youth Camp**; we brought 30 students from Pa Deng Secondary School to Baan Krang Camp, in the middle of KKNP core area. A group of KKNP education staff led education games and nature walks. Many students have never been in KKNP and enjoyed investigating wildlife tracks and signs along their walks.

## EDUCATION – RAISING CONSERVATION AWARENESS FOR NEXT GENERATIONS

### Conservation Network Initiated with Local Schools

WCS recently started Nature Education Program to raise conservation awareness and communicate our project results to communities through outreach activities. Beside regular activities with farmers in association with HEC, the Nature Education Program would focus on school children and, for this beginning step, we aim to introduce our campaigns, activities to schools, building up network among schools around HEC area. Those schools are Pa Deng School, Anan School and two Border Patrol Police Schools in Huai Sad Yai and Huai Sok. As Pa Deng School is the biggest school in the area located next to HEC hotspot and the school principal has good vision on conservation, we always firstly set our activities with them.

*Nature Education Program aims to raise conservation awareness and communicate project results to local schools and students around HEC area.*



© WCS/MANOON PLOSUNGNOEN

↑ Students at Conservation Youth Camp learning under the forest canopy.

## SUPPORTED BY

