



CONSERVATION PROJECT FOR ELEPHANTS AND OTHER WILDLIFE IN KAENG KRACHAN NATIONAL PARK





THAI ELEPHANT STATUS

MARCH 2014



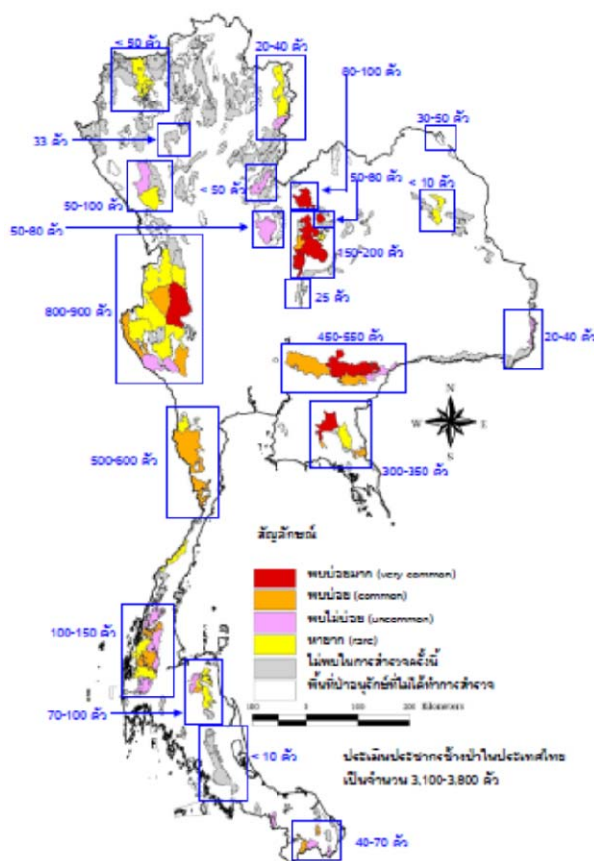
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THAI ELEPHANT STATUS: OVERVIEWS

Number of Elephant 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 inhabit in 68 protected areas (PAs) of Thailand, including 30 Wildlife Sanctuaries (WS) and 38 National Parks (NP).



↑ Rough distribution of wild elephant from a survey in Thailand. PAs that elephants frequently observed are represented in red color and PAs that elephant was absent are represented by grey color.

PROBLEMS AND THREATS OF WILD ELEPHANT IN THAILAND:

DNP identified 2 main problems (threats) which are (a) Human-Elephant Conflict and (b) Direct poaching of wild elephant.

DNP'S SOLUTIONS FOR HEC EMERGENCY ACTIONS:

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

MID-TERM PLAN

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

LONG-TERM PLAN

- Land use re-planning
- Improve human attitude in HEC areas to be more acceptable with elephant presence
- Conduct wild elephant movement study
- Wildlife corridor
- Translocation some problematic elephant
- 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. in captivity
- 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.



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↑ 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.



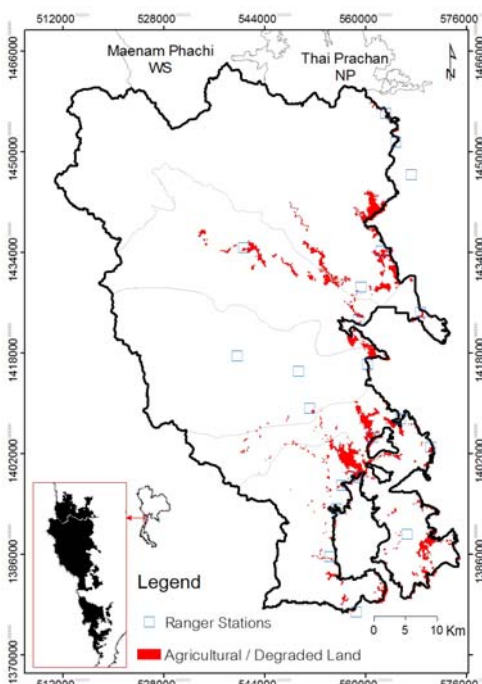
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KAENG KRACHAN NATIONAL PARK (KKNP): ITS FASCINATION & WILDLIFE CONSERVATION ACTIVITIES

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 km² 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 and Thai Prachan National Park in the north and Kuiburi National Park in the south. All forest patches in this whole landscape together is named **Kaeng Krachan Forest Complex (KKFC)**. It is highly important landscape for conservation, concerned as a biodiversity hotspot and listed as ASEAN Heritage site in 2005.

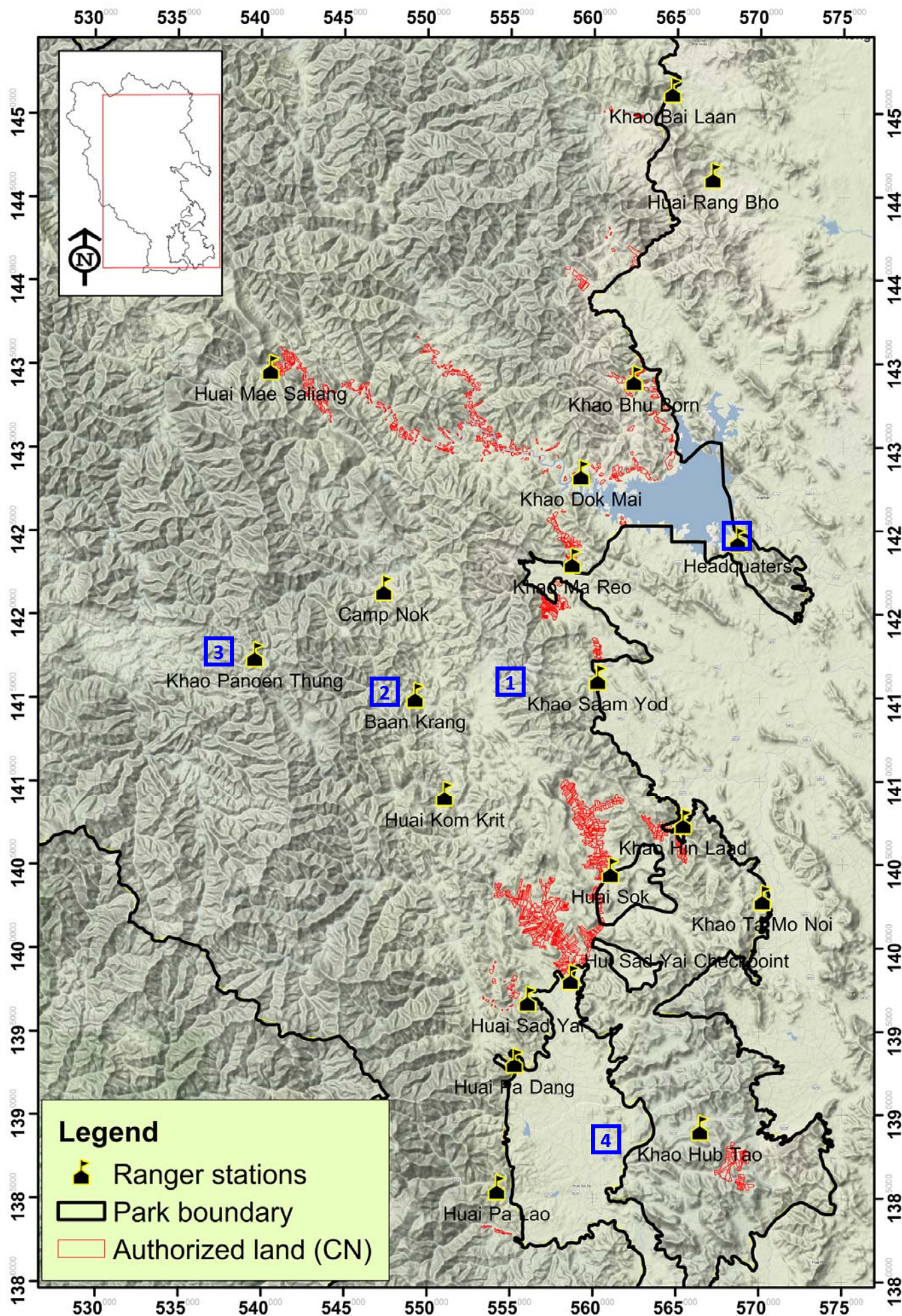
*KKFC is
Biodiversity
hotspot, highly
important
landscape for
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Heritage site in
2005.*



← Inset presenting KKFC associate to Thailand map and big KKNP map showing management sectors, ranger station And agricultural or degraded land inside the park.

WCS ACTIVITIES IN KKNP:

- **2001-2002:** Studying distribution and population of some large carnivores and other mammals using camera-trapping.
- **2004-2006:** Conducted an elephant distribution and threats survey, started addressing Human-elephant Conflict (HEC) in Pa La-U site, 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 Siamese Crocodile, one of KKNP Living Landscape Species, a long c.a. 30 km of Petchburi River.
- **2011-2012:** Examined existing elephant trail networks in Pa La-U area generating rough idea of their movements associated to crop damage incident.
- **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-trapping.
- **2013-Present:** Patch Occupancy Survey in WEFCON has been extended to KKFC, field survey in KKNP has recently done in March 2014.



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

INFORMATION AT STOP POINTS

1 Natural and Artificial Saltlick at 10-11th km



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

2 Baan Krang Camp at 15th km



↑ Another wildlife rich area, high possibility to see some of them especially in the morning at fruiting tree. This camp is famous because its good accessibility and good nature. A couple kilometers from the camp, the people like to stop at stream for bird and butterfly watching. Wildlife that commonly seen are such as Dusky Langur, White-handed Gibbon and Hornbills. Sighting on carnivore like Leopard and Dhole are only occasional.

3 Phanoen Thung Viewpoint at 30th km



↑ Though accessibility here is quite limited because of steep slope and road condition, it is a very tourist attractive 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 South of KKNP, Pa La-U HEC Site



← This site is very well known from its Human-elephant Conflict (HEC) history. WCS keep monitoring HEC, assessing crop damage situation and promoting standardized mitigation technique. On the road before entering to village, you may have some chance to see wild Elephant and Stump-tailed Macaque.



SAVING WILDLIFE IN KAENG KRACHAN 2 FOREST COMPLEX

MARCH 2014



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SMART PATROL QUALIFICATIONS:

- ☐ Adequate numbers 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 including: adequate numbers of patrol staff trained in enforcement techniques, supported by strong intelligent-networks and equipped with the necessary infrastructure, equipment and resources needed for patrolling, standardized Law Enforcement Monitoring (LEM) protocols implemented 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. The qualifications for Smart patrol system are shown on the right.

Implementing SMART Patrol in KKNP

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



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

Managers and conservation scientists tried 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 meeting.

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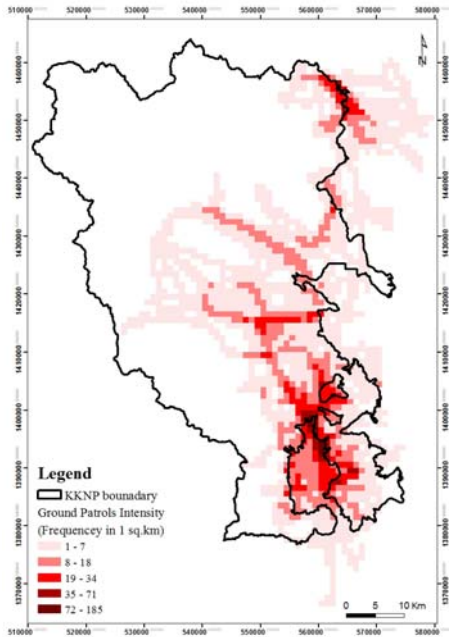


Patrol effort especially monthly patrol distance was gradually increased from c.a.300 to 550 km per month. Much of the effort was on the northeast and in the south of the park.

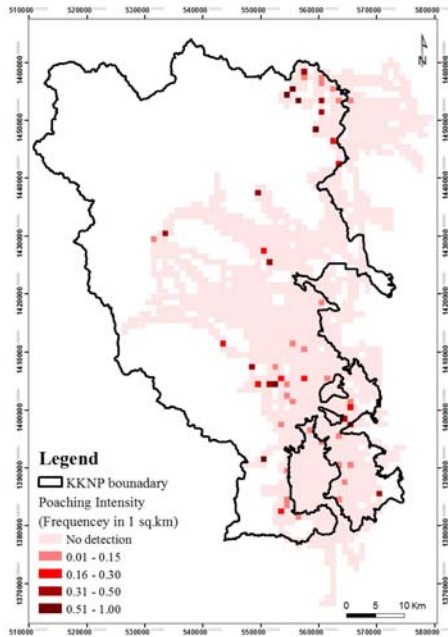
Monitoring Patrol Effectiveness

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).

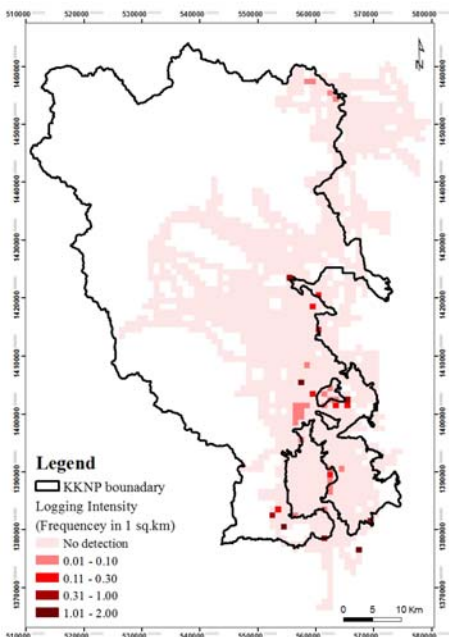
→ Patrol coverage and intensity map showing patrol effort covered about 50% of the park area. The higher frequency of patrol conducted in 1-km² grid is presenting in darker red color. Patrol intensity was relatively higher in northeast and south and moderately at the center.



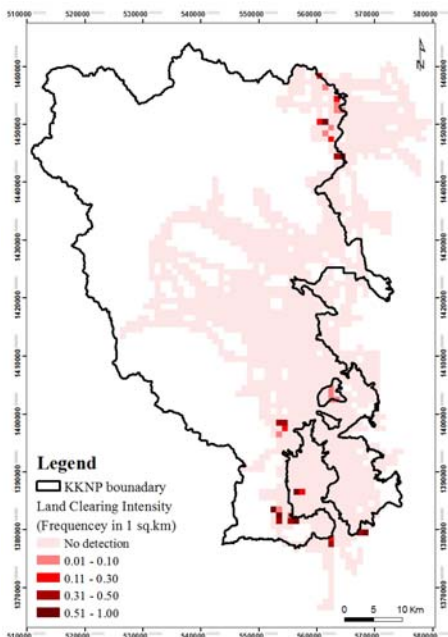
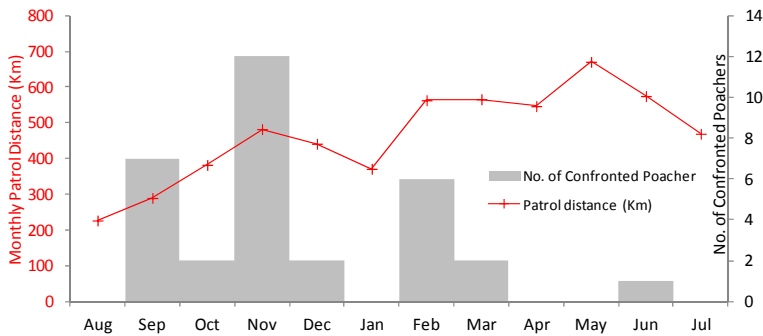
← Poaching intensity map, Evidences such as wildlife carcass, cartridges or bullet shell, camp with meat drying rack are identified to wildlife poaching. For this data, it was found relatively higher in northeast and in the south which are showing in darker red color.



→ Logging intensity map, illegal logging found relatively higher the southern part of KKNP.



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



↑ Patrol statistic, the left axis presenting monthly patrol distance (red line) whereas the right axis presenting number of poacher confronted by patrol team (grey bar).

Threats to wildlife and their habitats

Threats to wildlife and their habitats are generally categorized and present as hunting/poaching, logging, land clearance and collecting non-timber forest products (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 explanation for association between increasing in patrol distance and lower number of confronted poachers was not so clear, it is reasonably explained by poaching season and poacher may aware of KKNP action after several arrests 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 distributed all over KKNP in various pattern 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 concentrate in southern part of the park where accessibility is good because of existing road cut through villages into park area. The highest value timber is Makhamong *Azelia Xylocarpa* (Kurz) Craib.



↑ Land encroachment and NTFPs collection found to be some seasonal, following their cropping circles, fruiting season for wild seed collection or harvesting season for mushroom and bamboo shoot collection.

Building Rangers' Capacity: Physical Strengthening, Skill Sharpening and Improving their Leadership through Quality Training.

Quality training needs 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 set a full training for new rangers who are new to patrol system and set refresh training for old rangers. Quality training needs about a week to cover several key activities such as physical strengthening and testing, map and GPS reading, data collection using standardized forms, forestry and relevant laws, patrol forming, frisk searching, gun fire and maintenance.



↑ Physical strengthening and testing



↑ Map reading



↑ GPS reading and recording



↑ Rules of safety and patrol forming



↑ Gun firing tactics



↑ Frisk searching



↑ Shooting practices



↑ Weapon maintenance



↑ Quality training with morale motivation



SAVING WILDLIFE IN KAENG KRACHAN 3 FOREST COMPLEX

MARCH 2014



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CAMERA-TRAPPED WILDLIFE

Examples wildlife photos from all 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

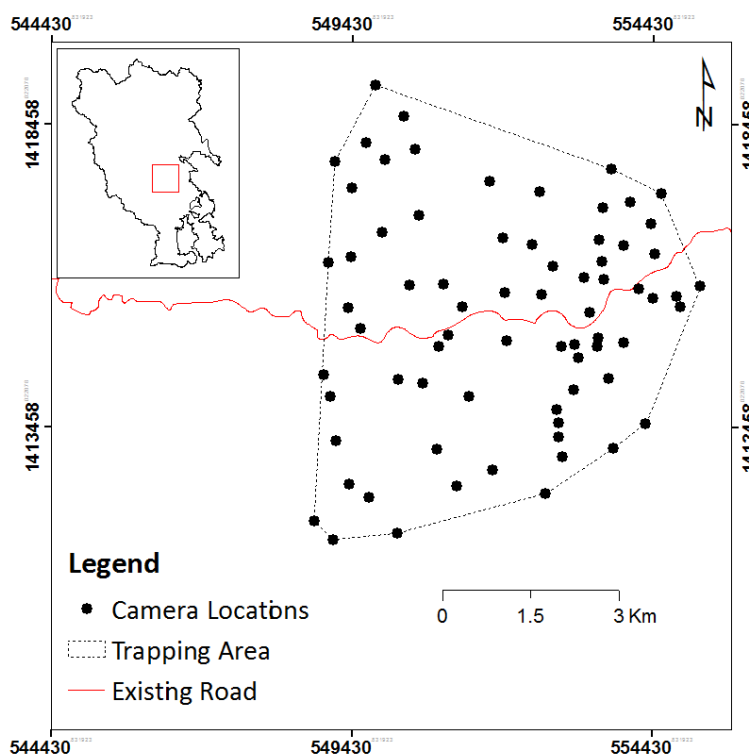
Asian Elephant
(*Elephas maximus*)

WILDLIFE MONITORING PROJECTS: CAMERA TRAPPING, CROCODILE SURVEY AND PATCH OCCUPANCY

Large Mammal Survey in a Home of Tiger

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

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

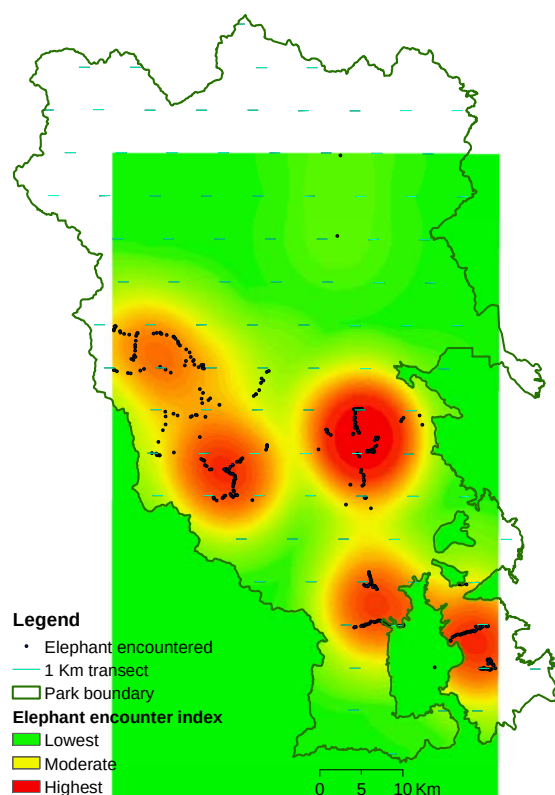


→ The location of trapping area during 2003 and 2004, showing details of vegetation types within the Park and the access road. The inset shows the location of KKNP in Thailand.

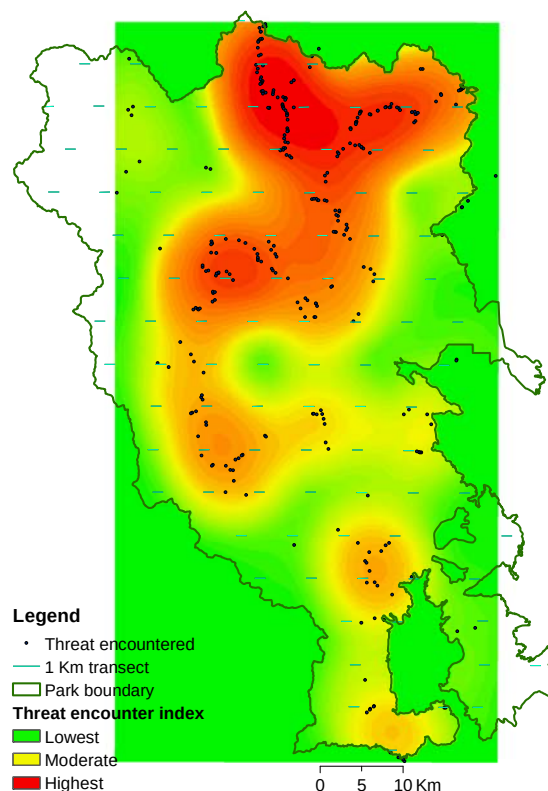
Elephants were confined to ca. 33% of KKNP and completely absent from the northern areas. Dung piles were found at 5.04 piles/km. The highest encounter rates (0.9 sign/km) of illegal human activities was showed in the northeast region.

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% of the park area and were entirely absent in northern areas. Discarding those afford in north, elephant dung piles were found with encounter rate of 5.04 piles/km. From January to June 2006, illegal human activities was showed highest in the northeast region, 0.9 sign/km.



↑ Elephant distribution based on signs encountered along RSTs from January—June 2006. Elephant was absence in the north part.



↑ Intensity of illegal human activity found along RSTs from January—June 2006. Areas in northeast were seriously highlighted for the highest threat intensity (red color).

We recorded 10 detections of their signs which made overall detection rates of < 0.30/km.

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

KKNP is one of few protected areas in Thailand that 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 village interviews. We recorded 10 detections of their signs (tracks and scat) along the Petchburi River, overall detection rates was low (< 0.30/km).



← An adult Siamese Crocodile in Petchburi River captured during camera-trapping in 2001.

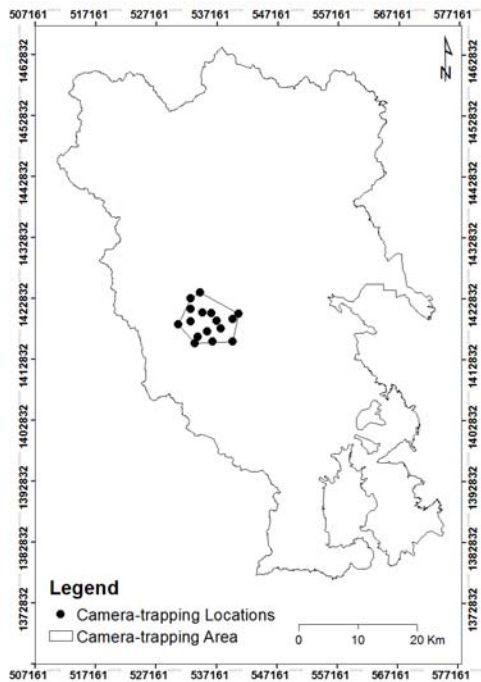
Confirm Tiger Presence by Camera Trapping

Under collaboration with Khao Nang Rum Wildlife Research Station, WCS and KKNP carried two camera trapping seasons. The first season was conducted in 72 days, from November 2011 to January 2012. Camera-traps were set at 47 locations covering an effective area of 583 km² in the wildlife core habitat. From a total of 1,098 trap-nights, we successfully captured 30 mammal species of 15 families. None of tiger photo was captured but some tracks.

To confirm current status of tiger, trapping period for the second season was extended to 110 days from January to May 2013. Each of 16 cameras were left operated in field about 105-110 days over the area where tiger tracks and sign found in last 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 first trapping season, we captured 30 mammal species from 15 families but no tiger.

By 1,611 trap-nights in second trapping season, five photos of one female tiger was captured from three locations.



↑ Camera trap locations of the second trapping season (January - May 2013), spots where tiger photos were captured were indicating 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*)



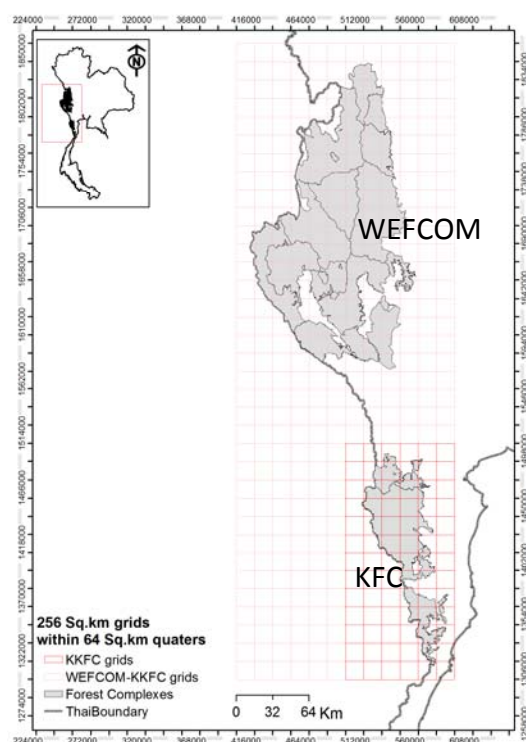
Malayan Sunbear
(*Helarctos malayanus*)

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

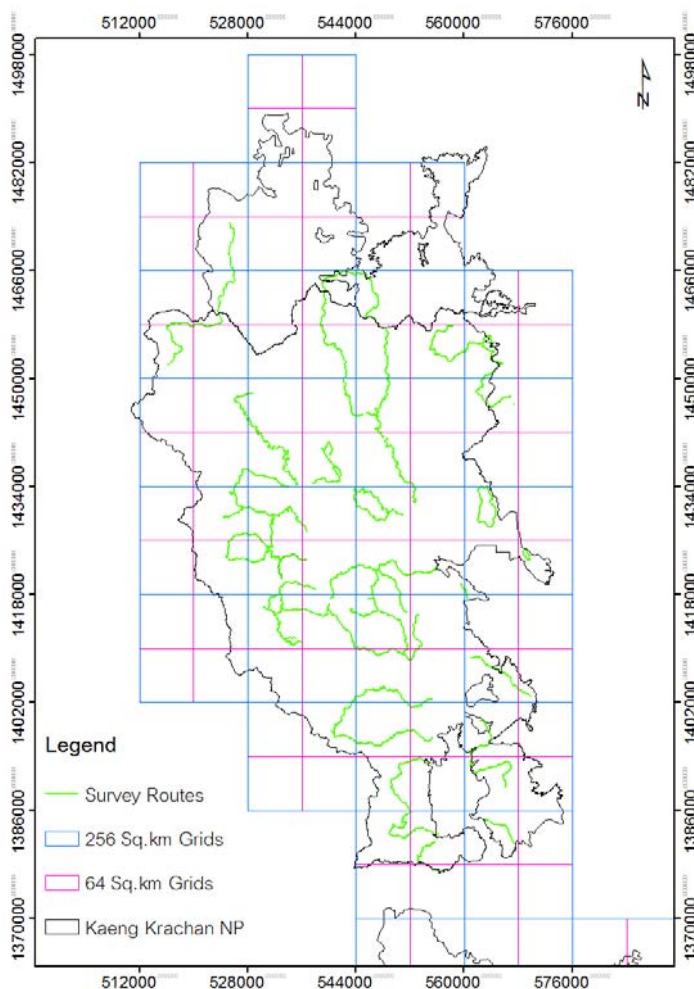
Extending Patch Occupancy Survey (POS) for Tiger and Elephant along Ténassarim Range

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.

Since previous extensive POS has been done in Thailand's Western Forest Complex (WEFCOM), covering >10 protected area in Ténassarim Range north of Kaeng Krachan Forest Complex (KFC). Khao Nang Ram Wildlife Research Station, KKNP and WCS conducted another survey in KKNP from November 2013 - March 2014, using similar standard protocol. A total of 21 (16x16 km) grids were laid over KKNP. Each grid was further divided to four 8x8 km sub-grids to systematically balance the survey effort. Therefore, for the grid that contains 100% tiger habitat, we equally located 15 km-transect walk in each of four sub-grids to make a total of 60 km walk in that grid. We have just finished our field session this month and about start data entering.



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



↑ Example of survey route in each survey grid



↑ Survey noting information on key wildlife presence and evidence of illegal human activities for every 100 m segments.

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SAVING WILDLIFE IN KAENG KRACHAN 4 FOREST COMPLEX

MARCH 2014



©KKNP NIGHT RESPONSE TEAM

LAND USE IN SURROUND KKNP AND COMMON RAIDED CROPS

□ An enclave area is approximately 110 km² in size holding about 12,000 people in total. This site is widely known as *Pa La-U* area.

□ Common crops found 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 reduction 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 assess and monitor HEC since 2005.

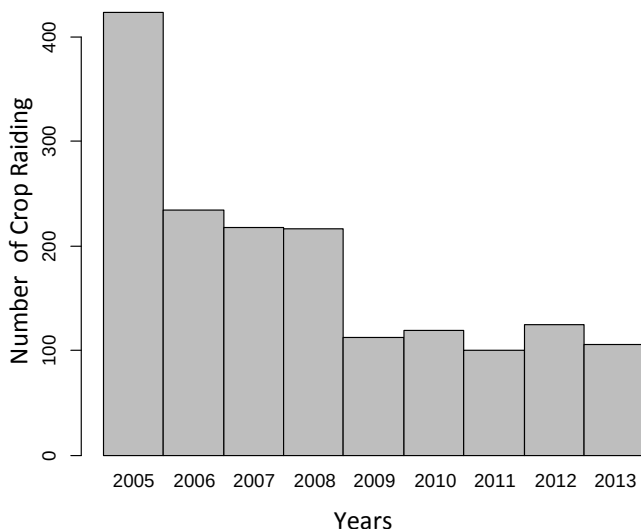
HEC has long been addressed in some areas adjacent to KKNP border through crop damage incidences and one elephant killed in 1997. Under collaboration with KKNP, Sub-district Administrative Offices and community members, WCS initiated HEC assessment and monitoring since 2005. HEC is reported in six sub-districts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

Total damage cost is estimated at \$531,000, averagely \$9,500 per year per site.

Frequency and Cost of Damage

Until now, a total of 1,705 HEC incidences are recorded from all sites in which affected to 355 farmers. More than 55 crop species are destroyed and eaten by elephants. Total damage cost is estimated at 531,000 U.S. Dollars, averagely 9,500 U.S. Dollars per year per site.

SUPPORTED BY



↑ Number of crop raiding incidence in each year. It trends to decline from 2005 to 2008 and quite stable at around 100 incidence in each of later year.



← A farmer looking at her banana field in which raided by a group of elephant in Pa Deng Sub-district.

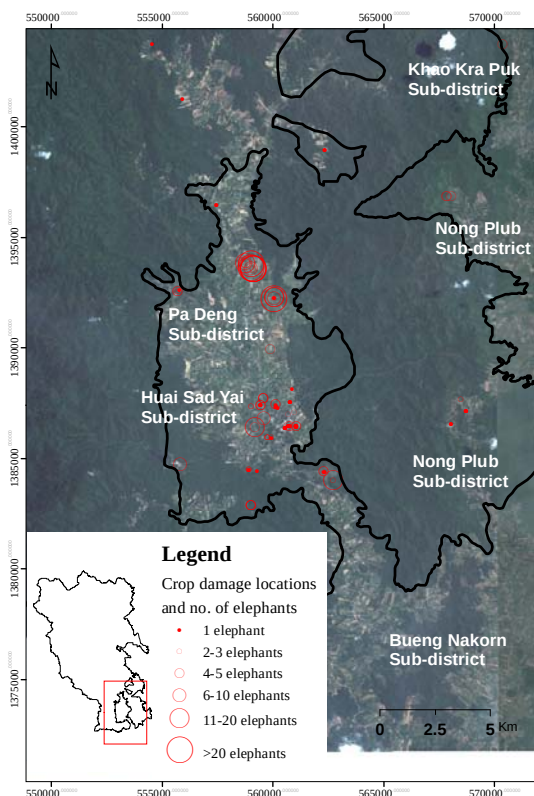


← An electrocuted elephant in Pa Deng. A farmer who set the killing wire directly hook to 220V house electricity has been arrested in June 2013.

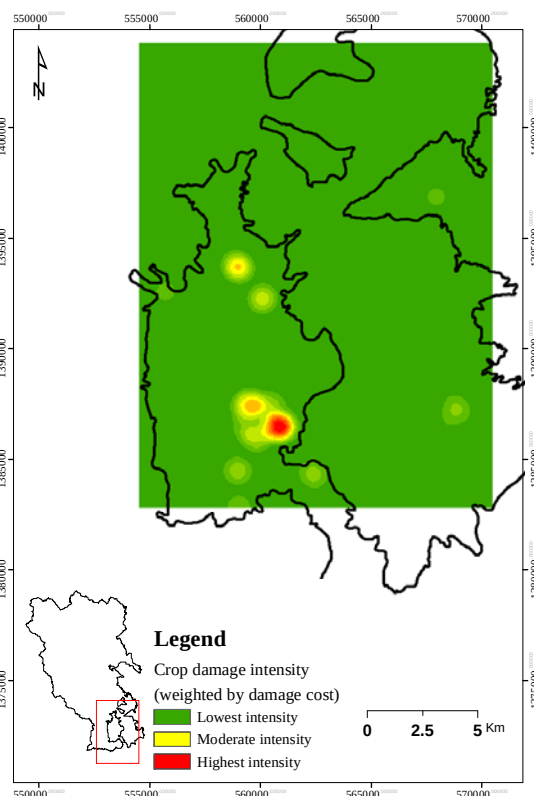
Damage in HSY is found at highest frequency, averagely 90 incidences, \$15,800 each year.

Frequency and Cost of Damage (continued)

The highest damage frequency was reported in Huai Sad Yai Sub-district (HSY) following by Pa Deng Sub-district (PD), 90 and 66 incidents per year respectively. We concern these two sites are HEC hotspots where averagely 30 farmers are included each year. Total damage cost in HSY is c.a. 15,800 U.S. Dollars/year (160 U.S. Dollars/incidence) whereas that in PD is 36,000 U.S. Dollars/year (600 U.S. Dollars/incidence).



↑ Crop damage locations (Aug 2012–Jul 2013) in association with number of elephant. Larger group was found more often in an area of PD.



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

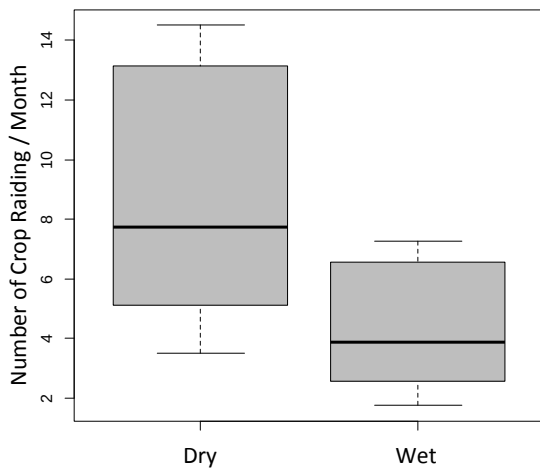
RECORDS ON CROP DAMAGE FREQUENCY, NUMBER OF FARMER AND ESTIMATED DAMAGE COST IN EACH SUB-DISTRICT (2005-2013).

Sub-districts	Number of Incidence / Year	Farmer / Year	New Farmer / Year	Total Damage Cost	Damage Cost / Year	Damage Cost / Incident / Year	Damage cost / Farmer / Year
Bueng Nakorn	13.0	3.4	0.89	10,872	1,208	122.96	334.25
Huai Sad Yai	90.6	34.7	16.67	142,461	15,829	157.96	412.52
Nong Plub	16.3	7.6	3.00	29,552	3,284	300.30	492.07
Pa Deng	66.6	29.9	15.56	324,615	36,068	609.75	1,361.22
Total	—	—	—	530,759	—	—	—
Average	46.6	18.9	9.0	126,875.0	14,097.2	297.7	650.0

65% of crop raiding incidence is made by small group of elephant which cost about \$63 per incidence.

Number of Elephant and Crop Raiding

In summary, 65% of crop raiding incidence is made by small group of elephant (<3 individuals). However, cost per incidence of the those damages are much less the cases made by large herd (>10 individuals). Cost for crop raided by small group of elephant is estimated at 63 U.S. Dollars/incidence whereas cost of raiding from large herd is about 6,650 U.S. Dollars/incidence.



Seasonal Pattern of Crop Raiding

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

← Average frequency of crop raiding each month each season

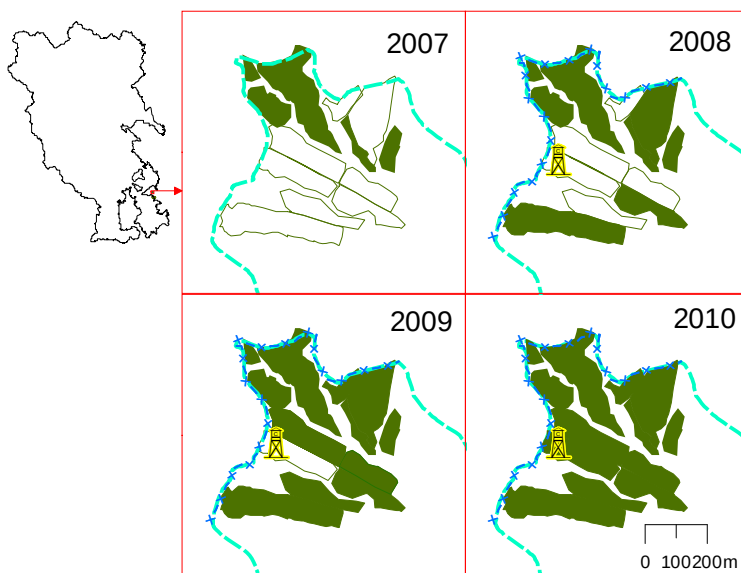
Crop raiding frequency in dry season is about twice higher than the one in wet season

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 elephant, WCS has helped villagers develop an appropriate HEC mitigation scheme since 2005. The experiment has been set up to compare the effectiveness 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, 60% of success. The normal fence (control) was selected over another because of its lower cost and practical. Therefore, WCS started develop and promote, alarm fence and vigilance team as standard scheme from 2006 to present.

The normal fence (control) was selected over another because of its lower cost and practical.



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 is 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 currently replicated in another HEC hotspot.



©SUPOT PANNONI

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

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



©KKNP NIGHT RESPONSE TEAM

Semi-permanent Fence as Alternative Solution

Semi-permanent (concrete) fence has been firstly built in HSY where elephant frequently cross to crop fields, hardly stop by vigilance team. The strength of this fence is proven at a pilot site and this model is currently 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, Monitoring Herd Movement and Stop Them before Damage

A team of 4-5 rangers, called a night response team has conducted their patrol to prevent crop damage mainly in Pa Deng Sub-district since September 2011. In each night, they drive a truck to locations where elephant were spotted previous nights. In 2013, averagely 23 nights per month. For each encounter, approximately 33 encounters per month, they count number of elephant and observe their behaviors. If elephant attempt to move out to crop field, the team will carefully stop them or drive them back to forest side, fire crackers are only employed when it is necessary, they mostly use spotlighting and shouting.

Measuring if Mitigation Success for the Night Team

Mitigation results, for this team, are classified to; *Successfully guarding at the forest edge* – elephant firstly detected inside the forest or at the forest edge and the team can stop them moving out, *Successfully driving* – elephant detected outside forest and team can drive all elephants back to the forest side, *Partially success* – team can drive some elephants back to forest side but still have some elephant left outside and *Failed searching* – team detected some signs of elephant (i.e. noise and fresh tracks) but cannot locate them nor cannot access to a good/safe spot for mitigation action. Their performance shown very effective as they successfully prevent 96% of potential crop raiding incidences.

RECORDS ON ELEPHANT ENCOUNTER AND RESULTS OF THEIR 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



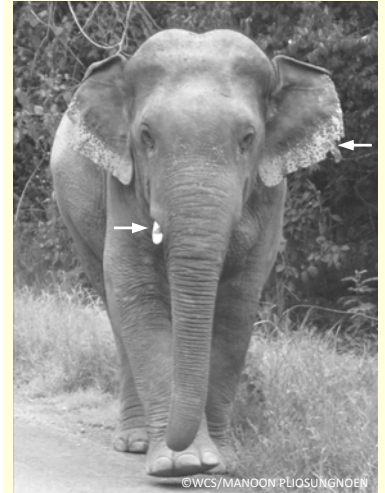
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MARCH 2014



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EXAMPLE OF ELEPHANT IDENTIFICATION PHOTO



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

POPULATION, GROUP COMPOSITION AND MOVEMENT

Elephant Counting Hints to Their Number

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

Since 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 who following herd and having good opportunity to observe them 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, we estimated for whole Pa La-U area at 150 elephants and, together with another population in KKNP core area, 200 elephants for the whole park.

Individual Identification & Re-sighting Data

We identified 8 tuskless bulls. Some of them live in the main herd, others are solitary.

Primarily focus on rouge males or tuskless bulls that commonly found near village. Identification is based on combination of traits such as presence/absence of tusk, tusk arrangement, ear loop, ear folding, tail and postures. Hence, we generate profile of each individual by using set of photos taken at front, back and both left- and right-sides to visualize all marking traits. Until now, we identified 8 tuskless bulls and 2 tuskless bulls. One tuskless bull was normally found moving with herd whereas 2 tuskless bulls and one tuskless bull have never been found with herd.

Existing Trail Utilization & Movement Pattern

Teams walked a long existing trails and noted on elephant fresh sign, assuming each group detected in different location was different group or sub-group.

Survey teams simultaneously walked a long existing trails and noted on; elephant presence and natural resource for elephant, i.e. saltlick and water hole. Elephant utilization was based only on very fresh signs of elephant, e.g. dung, foot print, marks on tree, feeding signs and calling. According to this sampling protocol, we assume each elephant group detecting in different spots was different group or sub-group.

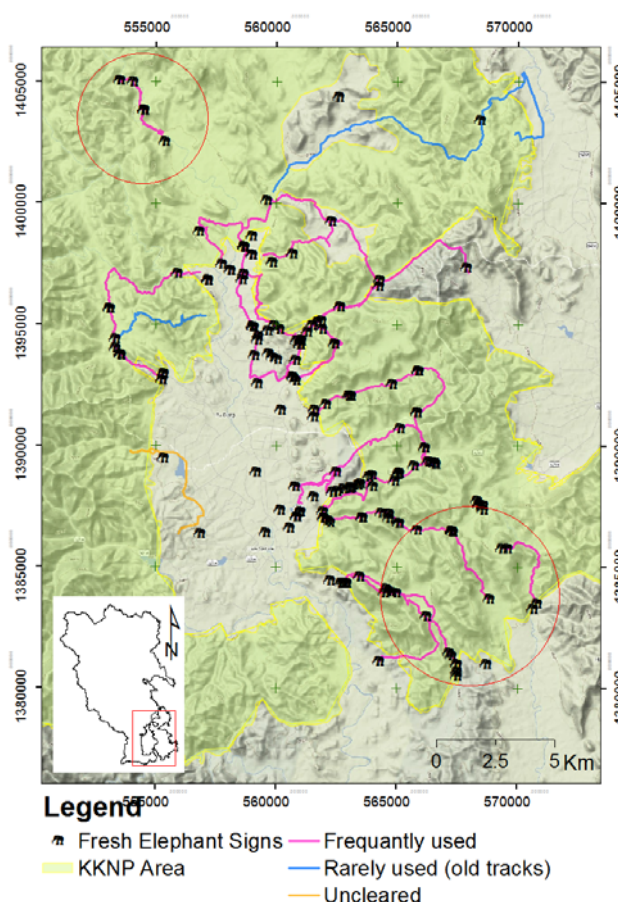
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We confirmed that herd can move across two HEC hotspots in HSY to PD Sub-district via major trails on the east side of the enclave.

Existing Trail Utilization & Movement Pattern

Regarding to its utilization, we classified them as; *major trails*—widely open and found used nearly every month, *opportunistic trails*—sporadically used by smaller group or individuals and *ambiguous trail*—we doubt how elephant move across landscapes. Combining this result with re-sighting data, we confirmed that herd can move across two HEC hotspots in HSY to PD Sub-district via major trails on the East.



← fresh elephant signs found survey period, we used frequency of those signs presence as an index to classify three classes of existing trails.

Two red circles indicating 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, type and behavior 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 to elephant and other wildlife, we conducted surveys on road no. 3219 which cutting through enclave area. Regarding to our preliminary survey, we scoped our survey at first 6 km starting from the village. We examined frequency of food dumping, quantity and quality of dropped food, type and behavior of people and response of animals. Road monitoring was carried three times a day, morning (0800-0900h), mid-day (1100-1200h) and evening (1600-1700h).

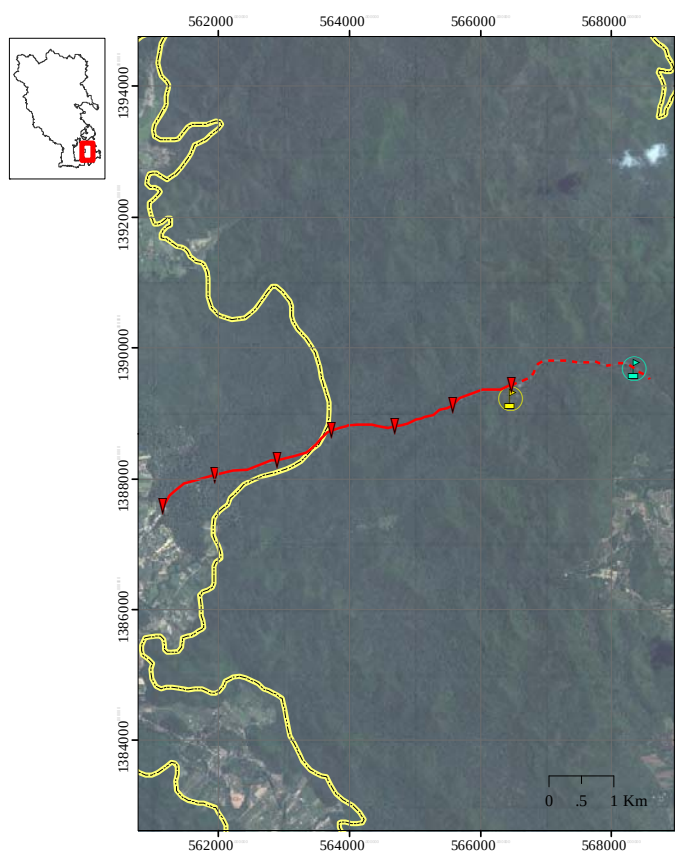
NUMBER OF FOOD DUMPING SURVEY, FREQUENCY AND RATE OF DROPPED FOOD AND ELEPHANT ENCOUNTER ALONG THE ROAD. DATA IS PRESENTED IN MEDIAN AND RANGE BETWEEN 1ST AND 3RD QUANTILES.

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 (55%) of dumped food was found in good condition, same quality as in the market. Proportion of food found in good quality in each period was increased from 33% in the morning up to 80% in the evening period. We successfully observed 16 dumping incidences, most of them were 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 morning to evening period.

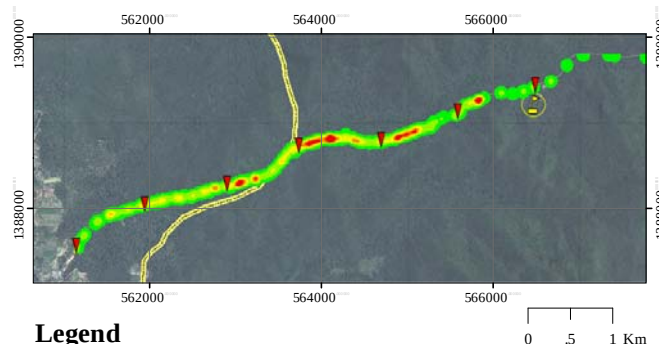
Higher encounter rate of food dumping and wildlife were found in the evening



Legend

- Ranger Station
- BPP Checkpoint
- 1-km Markers
- 6-km Road Segment
- Extended Segment
- KKNP Boundary

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



Legend

- Food dumping intensity
- Very Low
- Low
- Moderate
- High
- Very High
- 1-km Markers
- Ranger Station
- KKNP Boundary

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



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

Implication for Park Management

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

The results suggested that food dumping found most frequently between 3th and 5th km from the village. Park 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



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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 exhibition for visitors and invited four local schools to learn elephant conservation story at Elephant Conservation Information Center (ECIC). There were about 90 students visited 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 they looked very enjoy investigating wildlife track and signs along their walks.

EDUCATION – RAISING CONSERVATION AWARENESS FOR NEXT GENERATION

Initiated Conservation Network with Focal Schools

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

WCS recently started Nature Education Program to raise conservation awareness and communicate our project results to communities through outreach activities. Beside regular activities with farmer in association to 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 activity with them.



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↑ Students at Conservation Youth Camp, learning activity under forest canopy.

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