The Leopard Project

Annual Report 2015

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Executive Summary:

The year 2015 was another busy year for the Wilderness & Wildlife Conservation Trust (WWCT). We conducted two large field research projects and initiated a third that is both longer-term and more directly conservation oriented. We continued with our education and awareness programs with multiple presentations and the wide distribution of our printed materials. We were also heavily involved both in organizing and participating in an important international symposium on South Asian wild cats held in Sri Lanka. We had two students link up with our projects during the year, one local and one international, and hosted several volunteers and an intern from an Australian institution. Finally we garnered some additional funding which should help to make 2016 an equally busy year.

The first field project was a leopard occupancy survey in Ritigala Strict Natural Reserve, an isolated rock outcrop in the north-central dry zone. We were disappointed that no photo captures of leopards were obtained during the 3-month Ritigala study, but were even more concerned by the lack of any sign of their presence within the Reserve. Although this is insufficient evidence to rule out leopard presence in Ritigala, it does suggest that use of the Reserve is low at best. The reasons for this are uncertain, as remote cameras did detect widespread, varied and abundant prey. Poaching and poisoning are possibilities that need to be investigated.

The second major project was a leopard abundance survey in the iconic Wilpattu National Park in Sri Lanka's northwestern dry zone. Here we had very high photo capture success with 49 different individuals detected during the 3-month camera survey. Density was estimated to be 16.2 leopards/100 km^2. Prey and resource use analysis are ongoing. Although no fishing cats were photo-captured, numerous rusty-spotted cats were. This is a good sign for this little-known felid.

We launched the human-leopard co-existence initiative, a conservation oriented project aimed at reducing leopard conflict in the Central Highlands. This emerged as a response to the repeated incidents reported from this area. Initial investigations by WWCT and an MSc student from Edinburgh identified priority locations and the project proposal was delivered, receiving very positive initial responses from the estate sector stakeholders as well as Department of Wildlife Conservation officials.

Additional funding has now been secured for the population genetics study proposed in last year's budget and this research will be a central component of 2016. The necessary analysis equipment is currently being purchased.

As usual, WWCT engaged in continuous education and awareness programs throughout the year including several presentations in the Central Highlands, a talk at St. Thomas' College, Mount Lavinia and a training program in Yala. WWCT was also heavily involved in organizing, running and presenting at the 1st Wild Cats of South Asia Past and Present Symposium held in Mount Lavinia in November and will continue to be involved in the follow up wild cats of Sri Lanka working group that is to be established as a result of the symposium.

Finally, we were fortunate to once again have a number of interested individuals come and join us this past year as students, volunteers and interns. The continued interest in our work from both local and international quarters is heartening.

Update of Leopard Project activities - January to December 2015

I. Research

A. Occupancy and Abundance Surveys

Following on from the initial reconnaissance and mapping trips to Ritigala, Wilpattu and Peak Wilderness (Fig. 1) carried out in 2014, the Wilderness & Wildlife Conservation Trust's (WWCT) Leopard Project conducted closed population abundance occupancy and abundance surveys at two of these sites – Ritigala and Wilpattu - in 2015. Utilizing the same camera trap mark-recapture framework as the 2012 project in Horton Plains National Park (HPNP), this work signifies the continuation of our ambitious project to estimate leopard distribution and abundance across a variety of representative habitat types throughout the island. The goal of this work is to better understand regional patterns as well as allow for a more comprehensive understanding of leopard numbers in Sri Lanka. This past year marks a dedicated effort to investigate dry zone populations both in small forest fragments (Ritigala) and large, contiguous protected areas (Wilpattu). This type of baseline data is essential for relevant conservation planning at the national level and is considered a priority by the DWC.

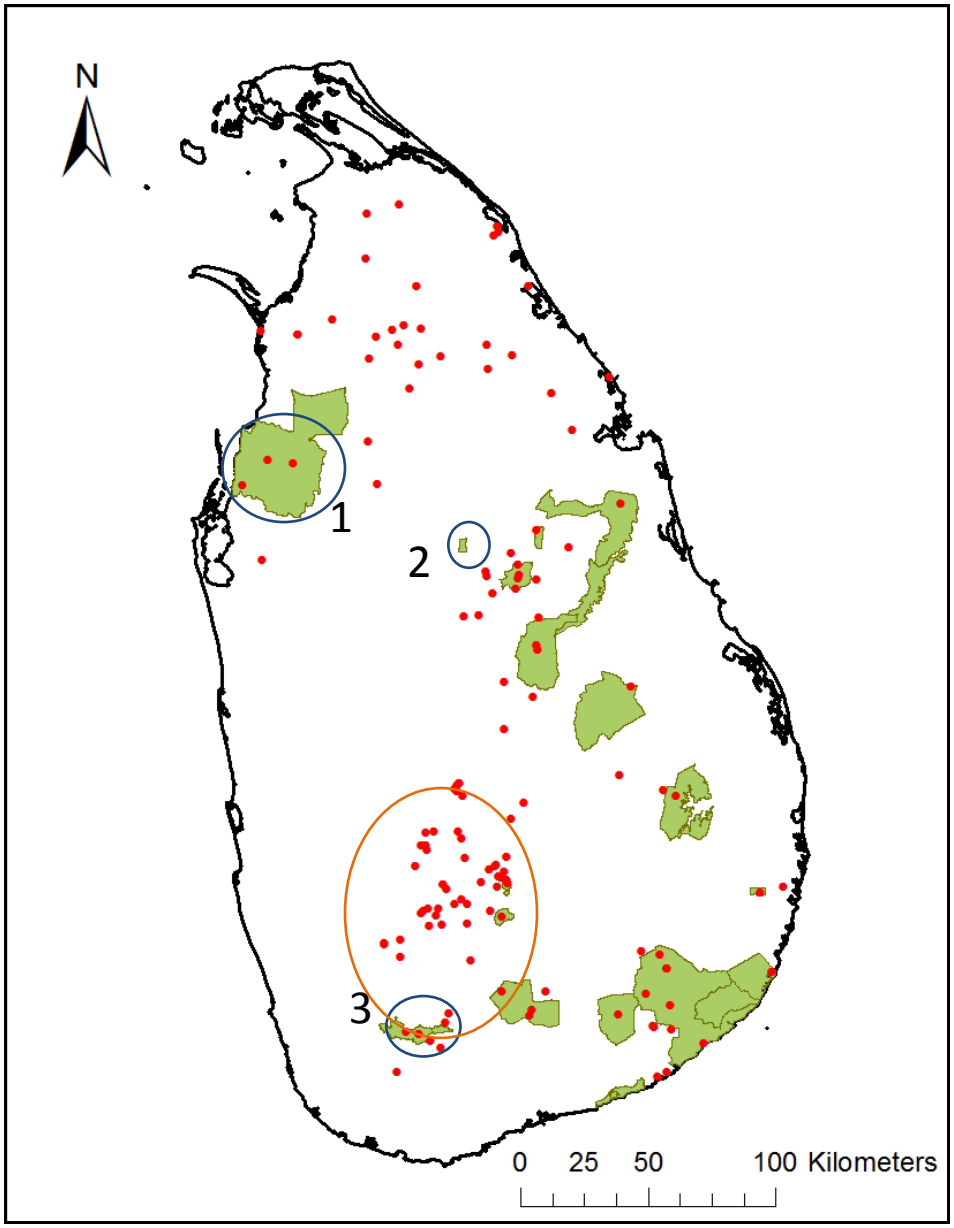


Fig. 1 Map of Sri Lanka showing the locations with blue circles of the 3 selected PAs for leopard occupancy and abundance surveys: 1 = Wilpattu National Park (conducted July – Oct 2015), 2 = Ritigala Strict Natural Reserve (conducted Feb – April 2015), and 3 = Peak Wilderness Sanctuary (planned for 2016). Also shown with orange circle are the central highlands where the leopard-human co-existence Initiative is being implemented.

i. Ritigala Strict Natural Reserve

Ritigala SNRs location in the dry zone, as well as its potential importance as a terminal forest bordering the vast agricultural lands south of Anuradhapura, makes it a priority location for an occupancy survey, and WWCT in accordance with the Department of Wildlife Conservation (DWC) identified it as such.

Following from initial site visits in September, October and November 2014 and due to the heavy rainfall that arrives in Ritigala SNR during the North-east monsoon, it was decided, in collaboration with DWC officers at the site, to commence camera trapping operations in February 2015. Eight stations were identified for use in order to fully cover the SNR and cameras were set up in the first week of February 2015 (Fig. 2).

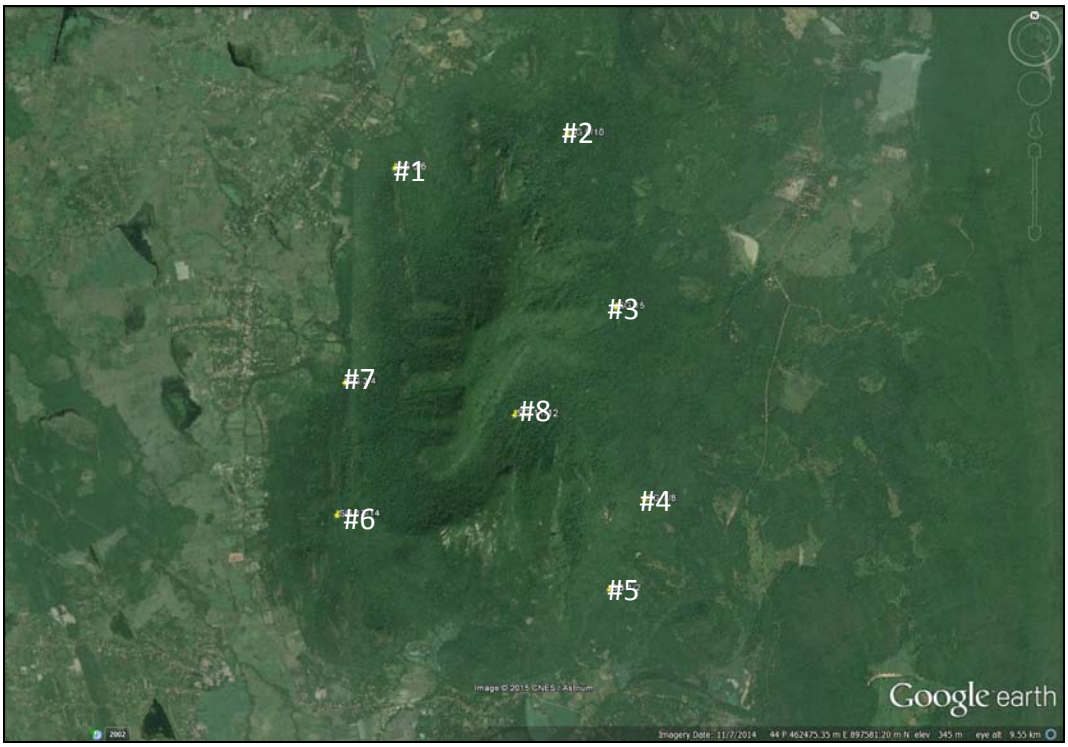


Fig. 2: Google map image of Ritigala SNR (central dark green patch) with remote camera locations indicated (#1-8). Note that the SNR is surrounded on its entire eastern border with agricultural land, whereas in the west there remain narrow connections to larger forest extents (indicated by dark green on the right side of the image).

Given that Ritigala is a Strict Natural Reserve and therefore does not have roads, jeep tracks or established walking trails which are features typically utilized by leopards, deciding on locations with a high probability of leopard use was challenging, especially since repeated visits had provided no signs of leopard presence. Further complicating the project was the fact that walking trails that were accessible were typically on the borders of the Reserve and were used by surrounding villagers to illegally enter the Reserve. A concern from this perspective was that remote camera equipment would be

stolen if set up directly on these trails. As a result cameras were set up along prominent animal trails, typically in areas where other habitat features (e.g. streams, rocky areas) force animals to utilize them. Cameras were then checked on a regular basis by WWCT personnel, accompanied by armed DWC officers. Most cameras were operational for ~8 ½ weeks although one station remained for 12 weeks and one only ran for ~4 ½ weeks due to technical constraints (Table 1). This time period is suitable for closed population surveys.

Table 1: Remote camera duration in Ritigala Strict Natural Reserve

Trap	Start	End	Days	Nights
#1	Feb 02/15	Apr 05/15	63	62
#2	Feb 02/15	Apr 05/15	63	62
#3	Mar 07/15	Apr 06/15	31	30
#4	Feb 03/15	Apr 06/15	63	62
#5	Feb 03/15	Apr 06/15	63	62
#6	Feb 03/15	Apr 29/15	85	85
#7	Feb 03/15	Apr 06/15	63	62
#8	Feb 03/15	Apr 06/15	63	62
TOTAL			**494**	**487**

A total of 19 mammal species were detected including numerous potential leopard prey species (Table 2). Photo-captured carnivore species included fishing cat, golden jackal and golden palm civet. The most abundant species as documented by remote camera traps was the toque macaque both in terms of the total number of animals photo-captured (165) and the number of occasions (days and nights) when individuals were photo-captured (61) (Fig. 3). Humans and then elephants were the next most commonly photo-captured species although they were observed on far fewer occasions (Fig. 3). All toque macaques were photo-captured during the day as were both grey langurs and purple-faced langurs (Fig. 4). In contrast, porcupines, golden palm civets, Indian civets and the single fishing cat were all documented only at night (Fig. 4). All members of Order Artiodactyla were photo-captured during both periods with red muntjak more frequent during diurnal periods and white-spotted chevrotain more often observed nocturnally (Fig. 4).

Table 2: List of mammal species photo-captured in Ritigala SNR listed by Order, Family and Species.

Order	**Family**	**Species**	**Common name**
Artiodactyla	Cervidae	*Axis axis*	Spotted deer
		Rusa unicolor	Sambhur
		Muntiacus muntjak	Red muntjak
	Tragulidae	*Moschiola meminna*	White-spotted chevrotain
	Suidae	*Sus scrofa*	Wild boar
Carnivora	Canidae	*Canis aureus*	Golden jackal
		Canis familiaris	Domestic dog
	Felidae	*Prionailurus viverrinus*	Fishing cat
	Viverridae	*Herpestes smiithi*	Ruddy mongoose
		Viverricula indica	Indian civet
		Paradoxursus zeylonensis	Golden palm civet
Pholidota	Manidae	*Manis crassicaudata*	Thick-tailed pangolin
Primates	Cercopithecidae	*Macaca sinica*	Toque macaque
		Semnopithecus priam	Grey langur
		Semnopithecus vetulus	Purple-faced langur
	Lorisidae	*Loris lydekkerianus*	Grey slender loris
Proboscidea	Elephantidae	*Elephas maximus*	Elephant
Rodentia	Hystericidae	*Hystrix indica*	Indian crested porcupine
	Muridae	*Rattus rattus*	Black rat

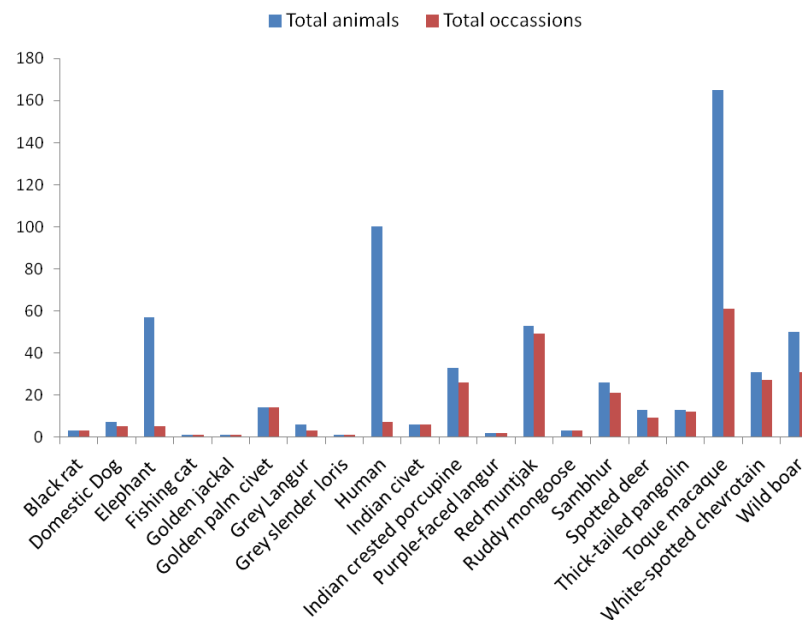


Fig. 3: Total number of individual animals photo-captured, as well as the number of occasions (N = 981) when photos were obtained, by species, during remote camera survey in Ritigala SNR.

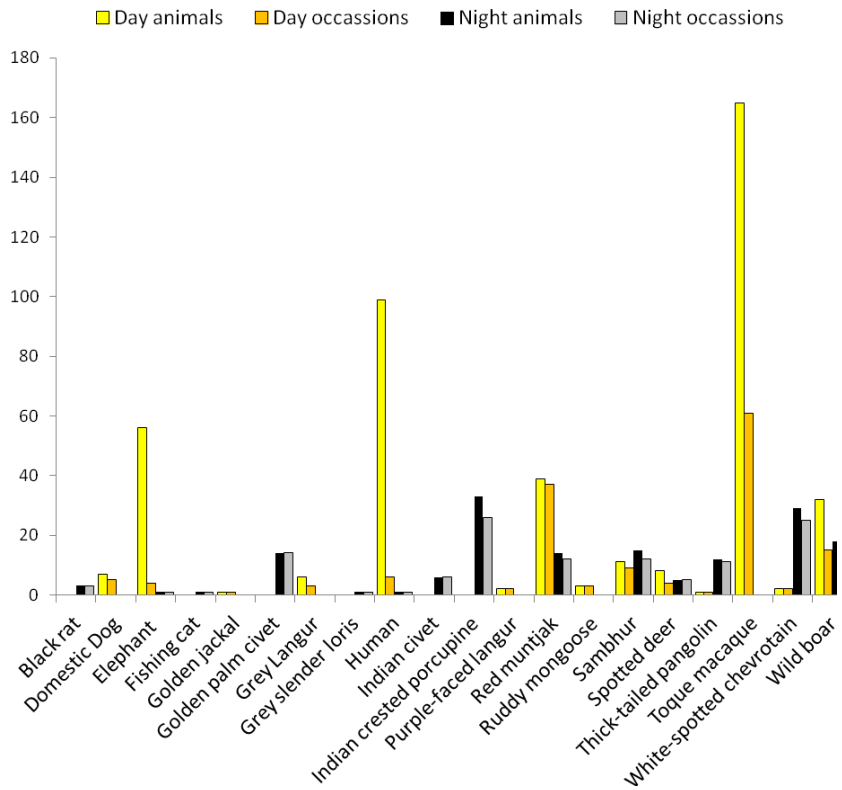


Fig. 4: Number of individual animals photo-captured, as well as the number of occasions (N = 981) when photos were obtained, by species and occasion (day = 6am – 6pm; night = 6pm – 6am).

Wild boar and porcupine were the most widespread species detected during the survey (Fig. 5). Toque macaque, red muntjak and sambhur were also widely distributed, whereas there were 6 species that were detected only at a single remote camera location including elephants (Fig. 5).

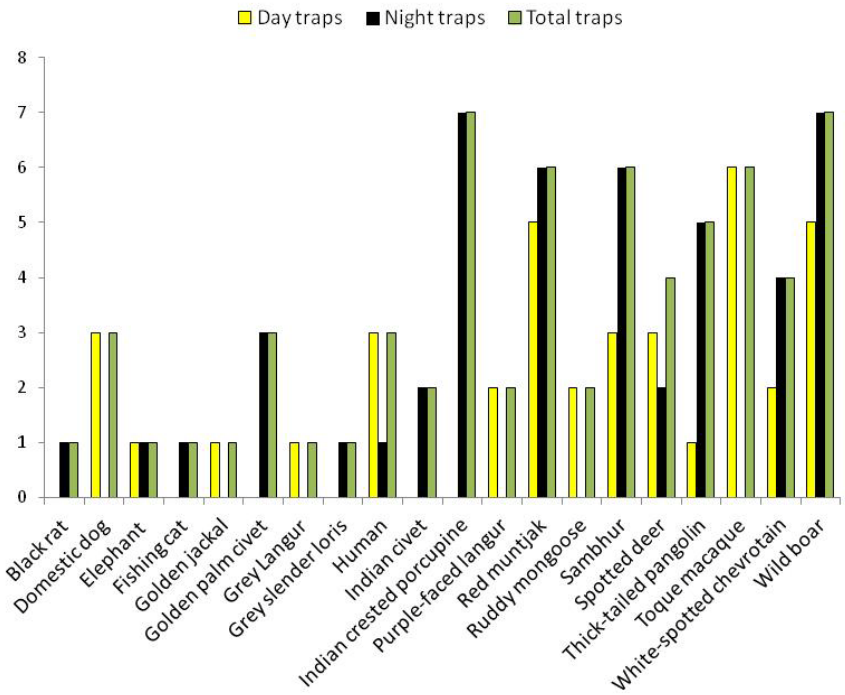


Fig. 5: Number of remote camera locations (N = 8) where individuals of each species were detected in Ritigala SNR. Daytime (6am – 6pm), Nocturnal (6pm – 6am) and Total occasions are shown.

Relative Abundance

A measure of relative abundance of species using this camera trap methodology is possible. The number of trapping occasions (days and nights) required per photo-capture of each species gives an indication that the most abundant species in the reserve is the endemic toque macaque (macaques photo-captured every 16.1 total trapping occasions)(Fig. 6). This assumes that the monkey troop is the unit of measure and not the individual monkey, which makes sense from the perspective of a hunting leopard. The next most abundant potential prey species is the red muntjak (20 trapping periods/photo capture) followed by wild boar (31.6), white-spotted chevrotain (36.3) and sambhur (37.7).

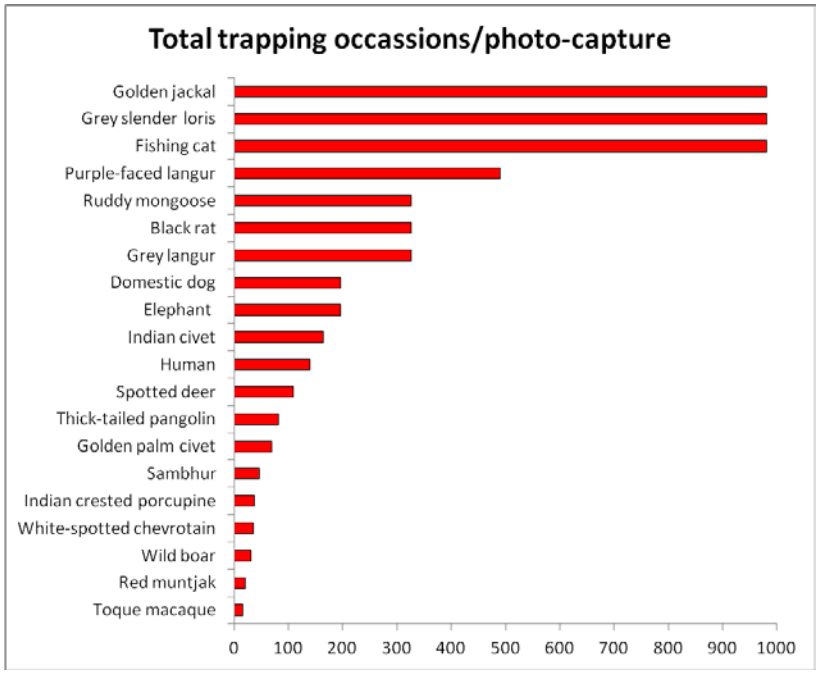


Fig. 6: Relative abundance of mammals photo-captued in Ritigala SNR as measured by the total number of trapping occasions (days and nights) per photo-capture of a given species.

The absence of leopard photo-captures during the survey does not necessarily mean that leopards are absent from Ritigala SNR as the lack of detected presence is not the same as absence. However the lack of photo evidence combined with an absence of any sign (i.e. pugmarks, scat, scrapes and other spoor) during this survey as well as during the recent baseline biodiversity surveys (DWC 2008) is not encouraging.

Two factors indicate that leopard presence in Ritigala is still likely. First, it is clear that there is an adequate prey base in Ritigala SNR and secondly, leopards are remarkably adaptable and able to survive in habitat much more compromised than that found in Ritigala SNR. Ritigala SNR is home to 4 species of deer including spotted deer, which are within the range of preferred prey sizes for leopards and sambhur which leopards predominantly consume in other parts of the country and our previous work suggests that they prefer in Yala. Furthermore, in the Hantane area near Kandy, leopards reside in much smaller, more fragmented forests where prey is less available. Here they have been detected feeding on porcupine predominantly, another species widely available in Ritigala SNR (Figs. 3 - 6).

The sloth bear (*Melursus ursinus*) is much more likely than the leopard to avoid highly disturbed forests but bear sign was detected in the higher slopes of the reserve indicating continued presence. Bears were also commonly detected during earlier

baseline biodiversity surveys (DWC 2008). Therefore it is unlikely that Ritigala SNR, despite fairly heavy human pressure on its boundaries, is more than moderately disturbed overall and certainly not to the extent that would dissuade leopards. These factors make the absence of detection more puzzling.

The small size of Ritigala SNR (~15 km²) means that even if leopards are present it is unlikely that there are more than 1 adult female and 1 adult male based on range size in Sri Lanka. It is possible that the current survey's inability to penetrate the higher reaches of the SNR limited its ability to detect leopards, but given typical leopard ecology and behaviour, this is unlikely. This is quite possibly the reason that no sloth bears were photo-captured, given the more reclusive nature of these omnivores, but leopards typically utilize the entirety of forest patches including areas in close proximity to human activity. The single leopard sighting near Ritigala SNR in the past 2 years was on the approach road to the DWC office to the east of the reserve boundaries in close proximity to both chena cultivation and cattle grazing areas.

One story that was repeated from several independent sources (e.g. DWC officers, villagers) which may have bearing on the current status of leopards in Ritigala SNR is that in the recent past (~10 – 20 years ago) there was conflict in the area between cattle herders and leopards. This account indicates that farmers whose cattle were killed by leopards retaliated by poisoning the carcasses which resulted in the death of many leopards. Indications were that a dozen or so leopards were killed in this way and that since this time there has been no leopard and no conflict. Given typical leopard ecology, this seems unlikely as transient animals would continue to access the reserve from the forest connections to the east (i.e. Minneriya, Kaudula, Giritale, Hurulu) unless persecution was continuous. Again, this does not appear to be a satisfactory explanation for the lack of leopard presence detected in Ritigala SNR.

Other species

Although it was not the intention of this survey to document biodiversity within Ritigala SNR, the utility of remote cameras nevertheless allows some insight about species richness in addition to prey availability. Given that small mammal species including bats are vastly under-represented in camera trap data, obtaining photo-captures of 19 mammal species (not including humans) indicates a substantial mammalian diversity within Ritigala SNR. Most of these species have previously been documented within the reserve although both the grey langur and pangolin which were detected during the present survey were not detected in the most recent previous baseline biodiversity survey (DWC 2008). The current survey found pangolins regularly present at 5 of 8 stations (Fig. 7).

Both rusty-spotted cat (*Prionailurus rubiginosus*) and jungle cat (*Felis chaus*) have previously been detected within the reserve (IUCN 1990, DWC 1997) but have not been detected recently (DWC 2008) including in this survey. Fishing cat was similarly documented previously (IUCN 1990) but was not recorded again until the present survey (Fig. 8).

Fig. 7: Pangolin (*Manis crassicaudata*) photo-captured at Ritigala SNR on Feb 17, 2015.

Fig. 8: Fishing cat (*Prionailurus viverrinus*) photo-captured in Ritigala SNR, March 18, 2015.

Perhaps most notable from the current survey is the relatively common and widespread documentation of the endemic golden palm civet, a species that has not previously been reported in Ritigala SNR. It appears from the colouration of the body (dark brown) and the tail (pale, whitish) that this would be classified as the Sri Lanka

brown palm civet (*Paradoxursus montanus*) under the new, but not yet accepted, taxonomic classification (Fig. 9).

Fig. 9: Golden palm civet (*Paradoxurus zeylonensis*) photo-captured at Ritigala SNR on March 10, 2015. Under the new classification this would be the Sri Lankan brown civet (*Paradoxurus montanus*).

ii. Wilpattu National Park

Wilpattu is regarded as one of the premier locations in the country to view leopards and before the civil conflict that erupted on the island in 1983, this was considered the absolute top location. The Smithsonian Institution conducted biodiversity surveys of Wilpattu, including some preliminary work on leopard range size and activity times, in the late 1960s, but since that time there has been no formal, scientific leopard research conducted here. As the largest protected area in the country, Wilpattu might be a very important reserve for threatened wildlife so a population survey was highly warranted.

Exceptionally heavy rains in the dry zone in 2014 and 2015 resulted in very high water levels within Wilpattu far into the dry season (Fig. 10). With park access critical, WWCT commenced remote camera in mid-July in order to avoid the worst of the flooding and ensure that the project was finished by the onset of the north-west monsoon in mid-October.

Fig. 10: Flooded conditions in Wilpattu National Park in June 2015.

A total of 36 remote camera stations were set up across the central portion of Wilpattu covering an area > 500 km^2 (Fig. 11). These were divided into 4 rounds each using 9 locations for ~3 weeks each. This design allowed the project to optimize the trade-off between photographic re-captures and area coverage. We also conducted 3 prey transects every month which ranged in length from 20 – 23 kms and traversed the heart of the study area.

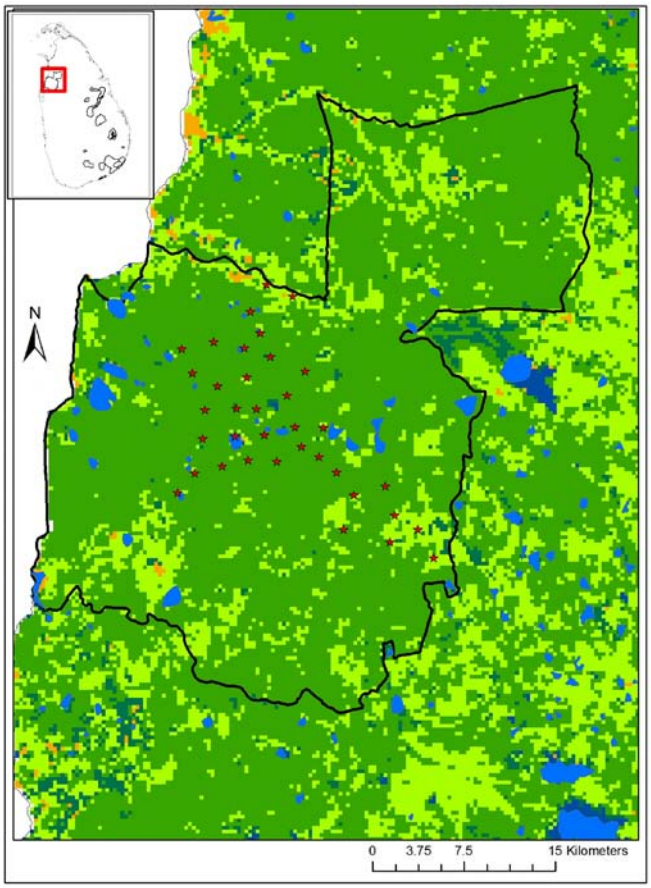


Fig. 11: Wilpattu National Park (black border) showing camera trap locations (red stars).

Over the course of the 836 trap days (each 24hr from midnight to midnight) there were a total of 49 individual leopards photo-captured during 151 separate occasions (Fig. 12). Using spatially explicit capture-recapture analysis we estimated a population density within the study area of 16.2 leopards/100 km^2 or 8.2 adult leopards/100 km^2. This suggests a density slightly lower than in Yala National Park, Block I and slightly higher than in Horton Plains National Park.

Fig. 12: Adult male leopard photo-captured in Wilpattu National Park, September 28th 2015. Second camera is visible on the far left tree.

Analysis of prey distribution and abundance is ongoing with several thousand remote camera images initially being processed by students and volunteers before being analyzed by WWCT's PI (Fig. 13). This prey data, together with other input variables, will be utilized in the creation of resource selection function models with the aim to increase understanding of ecological and anthropogenic factors that influence leopard spatial dynamics.

Fig. 13: Potential leopard prey animals photo-captured at Wilpattu National Park including barking deer (left), sambar (middle) and wild boar (right).

Photo-captures of other wild cats are also of substantial importance and although no fishing or jungle cats were detected, numerous photos of Sri Lanka's smallest and least understood felid, the rusty spotted cat were obtained (Fig. 14).

Fig. 14: Rusty spotted cat photo-captured in Wilpattu National Park on October 9th, 2015.

iii. Peak Wilderness Sanctuary

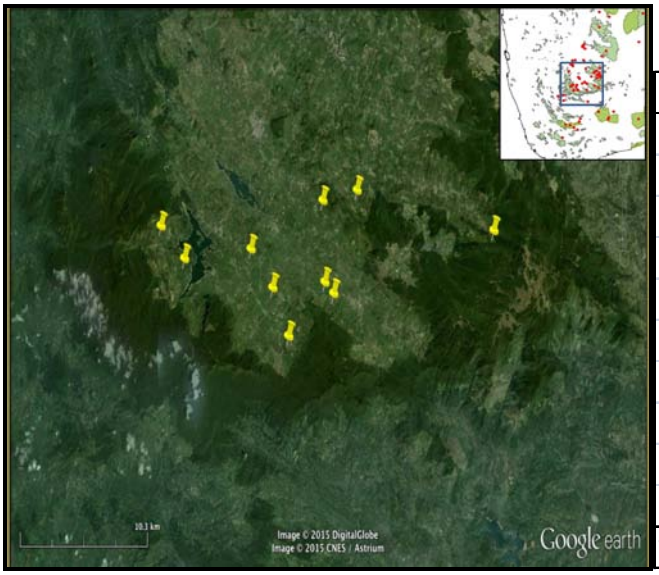
The focus of WWCT's efforts in 2015 centered on the two lowland dryzone sites (Ritigala and Wilpattu) so field visits to Peak Wilderness Sanctuary were not made during this year, other than for areas adjacent to identified estates (see B. below). This will be a priority in 2016 with initial mapping of the Ratnapura-Palabaddala trail, the Kuruwita-Erathna trail as well as the entrance trails from Murraywatta, Mookuwatta and Malimbada.

B. Human-leopard co-existence in the central highlands

This is a new initiative conceived by WWCT to address the increasing number of human-leopard incidents that are being reported from the central highlands of the island. Many of these locations border peak wilderness sanctuary and are gateways into this less traversed forest. Over 15 years of data of such human leopard incidents have been accumulated by WWCT and with the recent increase in reports of trapped leopards WWCT analyzed the data to better understand and target the areas with higher incidents. As such the human leopard coexistence initiative arose organically, as being the obvious next step to addressing the issue of trapped leopards and other human leopard related incidents.

Once the data was analyzed and mapped and the hotspots identified, WWCT staff and a dedicated student (see II. C. below) carried out surveys in select estates that had re occurring incidents and also bordered the peak wilderness sanctuary (Fig 15.). Most estates are managed and owned by larger private sector corporations and it was

felt that they should be included in the attempt to create long term solutions for reducing human leopard incidents and introducing co-existence measures. As they are the land owners in these areas and therefore primary stakeholders together with the Department of Wildlife Conservation and the Forest Department of Sri Lanka, it is they who could make lasting land use decisions that would perhaps address these issues.



Date	Estate	# surveys
18-Sep-15	Laxapana	6
18-Sep-15	Moray	5
19-Sep-15	Kew	6
19-Sep-15	Bogawantalawa	4
19-Sep-15	Ingestre	5
6-Oct-15	Brunswick	5
7-Oct-15	Gouravilla	4
7-Oct-15	Fairlawn	5
8-Oct-15	Diyagama East	5
8-Oct-15	Torrington	5
Total		**50**

Fig. 15: The Central Highlands (inset and above) which has been identified as a hotspot for human-leopard incidents. Verified leopard locations in red (inset) and surveyed estates in yellow (above and table).

Identified management companies where therefore contacted at senior management level and invited to a collaborative meeting where WWCT presented the data that resulted in the launch of such an initiative (Fig. 16). Response was positive and it is hoped that in 2016 together with our Peak Wilderness research work this Initiative will be firmly established, moving towards long term co existence solutions to address the reduction of human leopard incidents.

Fig. 16: WWCT's Anjali Watson (right) presenting ideas for the human-leopard co-existence initiative, to gathered tea estate managers and company executives at the IUCN office in Colombo in mid December.

C. Leopard genetic diversity

Additional funding for the genetic diversity study was gained in October 2015 and the necessary equipment is being ordered. In the interim scat has been collected in a number of sites including Horton Plains, Yala, Wilpattu, the Vanni and other parts of the central hills. It is necessary to determine the extent to which older scat can be amplified and reliable material obtained for DNA analysis. Collaborative work is planned with both local microbiology professors at the University of Colombo (Dr. Sampath Seneviratne) and Peradeniya University (Dr. Venura Herath) as well as international collaborators (Dr. Shomitha Mukerjee from the Salim Ali Centre, India). This will be a major component of the 2016 research program.

II. Education and Awareness

A. Presentations

Awareness presentations about leopards were again in demand in 2015 with WWCT field officer Ms. Nimalka Sanjeewani conducting several such talks, mostly in the Central Highlands (Fig. 17). The continued demand for these types of awareness programs from tea estate areas in the Central Highlands is one of the reasons that WWCT is launching the leopard-human co-existence initiative.

Fig. 17: WWCT field officer Ms. Nimalka Sanjeewani giving leopard awareness presentations at Nayapana estate on June 13, 2015 (top left and right) and at Fairlawn estate in August, 2015 (bottom left and right).

On June 6th WWCT conducted a presentation about the Cats of the World with an emphasis on the conservation of the Sri Lankan leopard to the students of the St. Thomas' College primary school Environment Club. Around 40 eager 10 – 11 year old boys participated, along with several staff members and the response was boisterous and enthusiastic (Fig. 18).

Fig. 18: WWCT's Anjali Watson (left) and Andrew Kittle (right) speaking to the Junior Environment Club of St. Thomas' College. Far right is the letter of thanks sent to WWCT after the talk, signed by the attending boys.

B. Training programs

On February 27th and 28th the WWCT team travelled to Yala National Park to undertake a training program for the staff of Leopard Safaris Pvt. Ltd., a team that operates luxury camping and excursions to Sri Lanka's national parks. As the name suggests, their primary focus is on viewing the leopard and they were keen to increase their field staff's collective understanding of leopard ecology, behaviour and spoor and sign identification in order to pass this information on to guests. WWCT personnel accompanied guests on Leopard Safari trips into the National Park and noted the information that was being presented. Back at the camp, we then gave an in-depth presentation of leopard ecology and behaviour and discussed with Leopard Safari staff ways to communicate this information. During the training we agreed to utilize the abundant images collected by Leopard Safari staff during their park visits as part of the Spotting the Spots initiative which aims to monitor the long term population trends of the Yala leopard population.

C. Students

From August to October a Nepali MSc student from Edinburgh University in Scotland, Ms. Gynada Acharya came to Sri Lanka to work with WWCT on her dissertation project. She helped categorize the 15 years of data accumulated by WWCT on human leopard interaction and focused her work on the central highland areas, a

hotspot for human leopard interactions in the country. She conducted surveys together with WWCT staff on 10 selected tea estates bordering Peak Wilderness sanctuary to attempt to better understand the anthropogenic and land use variables that are possibly influencing such interaction in this tea estate region. Her Master's thesis will be based on this work. She also helped with the initiation work for the launch of the human-leopard co existence initiative.

The WWCT PIs are also acting as external supervisors for a local student, Mr. Samith Indika, from the Vavuniya campus of the Jaffna University as he undertakes his final year undergraduate research project. Samith is investigating the presence/absence of wild cats (leopard, fishing cat, jungle cat and rusty spotted cat) in the Vavunikulam Sanctuary in the Wanni jungles north of Vavuniya. He is conducting sign index surveys of leopards and their potential prey on trails and small roads through the sanctuary, as well as questionnaire surveys of villagers with the goal of understanding the scale and extent of human-leopard interactions in the region. Samith will finish his fieldwork in February 2016 and write up his thesis shortly after.

An intern from Deakin University in Australia, Mr. Jonathan Gnanapragasam came to WWCT for November 2015 and January 2016. Jonathan is experiencing both sides of conservation research programs as he has spent many hours staring at the computer as he sifts through thousands of remote camera images and categorizes them by species, time and date; but he is also heading up to the field north of Vavuniya to assist Samith with his data collection. As Jonathan is trilingual he has also been involved with translating text for the awareness materials being developed for the leopard-human co-existence initiative.

D. Volunteers

Mr. Riahn Pieris and Mr. Imad Sangani joined WWCT as volunteers to assist in the Wilpattu project. Both are final year high school students, Riahn at St. Thomas' College in Mount Lavinia and Imad at D.S. Senanayake College in Colombo. They ably assisted the project in clearing roads, setting up and testing remote cameras and conducting prey surveys.

Ms. Tharini Dassanayake also joined WWCT as a volunteer in the latter half of the year. A graphic design student, Tharini took over the layout and design of the "Living with wildlife" pamphlet being developed for the leopard-human co-existence initiative and will continue to use her skills to design similar material for WWCT.

E. Wild cats of South Asia symposium

On November 2nd and 3rd, the Wildlife and Nature Protection Society of Sri Lanka (WNPS) hosted the 1st Wild Cats of South Asia Past and Present Symposium at the Mount Lavinia hotel. This was an international meeting with presenters from Sweden, France, India and the UK in addition to Sri Lanka. WWCT's PI, Dr. Andrew Kittle and Project Manager, Anjali Watson, were both on the organizing committee for this

Symposium and played a key role in its programming. Dr. Kittle chaired the session on 'Big Cats of Asia' and gave a plenary talk (Fig. 19). In addition Andrew and Anjali made two well received presentations each about leopard research and conservation in Sri Lanka. The Symposium provided a good forum for researchers to present their work and for everyone involved in wild cat research in Sri Lanka if not the region, to get updated about most recent developments. One outcome of the Symposium is a planned development of a local wild cat working group to ensure that research targets are appropriate and focused and also to allow more senior researchers to mentor some of the younger batch of scientists in areas such as data analysis, report writing etc. WWCT, as an organization that has long been working in wild cat research in Sri Lanka, will be involved in organizing this working group.

Fig. 19: Left, WWCT's Andrew Kittle giving the plenary talk for the Big Cats of South Asia session of the Wild Cats of South Asia Past and Present Symposium in Mount Lavinia, November 2nd 2015. Right, WWCT's Anjali Watson giving a presentation about island-wide distribution and resource selection of the leopard during the Big Cats of South Asia session on November 2nd 2015.

F. Publications

Kittle, A.M., Watson, A.C., Kumara, P.H.C., Sandanayake, S.D.K.C., Sanjeewani, H.K.N. & T.S.P. Fernando. 2015. Leopard ecology in the central highlands of Sri Lanka. 1st Wild Cats of South Asia Symposium, Symposium paper. November 2015.

Kittle, A.M., Watson, A.C. & T.S.P. Fernando. 2015. The influence of intra-guild competition on leopard ecology and behaviour: a case study in Yala National Park, Block I, Sri Lanka. 1st Wild Cats of South Asia Symposium, Symposium paper. November 2015.

Watson, A.C., Kittle, A.M. & N. Anderson. 2015. Distribution and resource selection of an endangered carnivore across its island range – the leopard (Panthera pardus kotiya) in Sri Lanka. 1st Wild Cats of South Asia Symposium, Symposium paper. November 2015.

Watson, A.C., Kittle, A.M., Sanjeewani, H.K.N., Kumara, P.H.C., Vithanage, A. & G. Acharya. 2015. Human-leopard interaction and leopard mortality in Sri Lanka. 1st Wild Cats of South Asia Symposium, Symposium paper. November 2015.

Kittle, A.M., Watson, A.C. & T.S.P. Fernando. Accepted in August 2015. The ecology and behaviour of a protected area Sri Lankan leopard (*Panthera pardus kotiya*) population. Tropical Ecology.

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