

🐾 The Leopard Project 🐾

Annual Report 2011



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The Wilderness & Wildlife Conservation Trust

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Executive Summary:

In 2011 the Wilderness & Wildlife Conservation Trust's (WWCT) Leopard Project was again active conducting primary research on Sri Lanka's endangered leopard subspecies (*Panthera pardus kotiya*) as well as undertaking a variety of education and awareness-raising initiatives. These initiatives were aimed both at increasing understanding specifically of leopard ecology and behaviour as well as more generally about issues pertaining to leopard conservation in the country.

On the research front, we continued with the monitoring work from the past few years. In addition to our continual monitoring of leopard distribution, human-leopard interactions and leopard deaths throughout the country we also conducted regular leopard sign indexes in the Dunumadallawa forest reserve and increased our catalogue of leopard identification photographs from Yala National Park's Block I. These we are compiling as part of a long-term population monitoring project. We undertook field visits to assess the viability of conducting a camera-trapping study in Sinharaja forest reserve and Horton Plains National Park. A proposal to carry out the study in Horton Plains has just been approved by the Department of Wildlife Conservation (DWC) and work has begun.

Questionnaire surveys of villagers in Sri Lanka's re-settling Northern provinces continued with three regions specifically targeted – Mannar in the northwest, the Wanniyala Oluwa area north of Vavuniya in the north central and Padaviya in the northeast. The aim of these surveys is to document the baseline mammalian biodiversity in these poorly understood regions which have been largely inaccessible for almost 3 decades due to the recently concluded civil conflict. Results so far are mostly positive, indicating that wildlife populations are presently robust in the region even while forested areas are losing their large trees. The impact of the re-settlement process on wilderness areas and wildlife populations can only be monitored with some kind of baseline such as this.

On the education and awareness side, WWCT was involved in a wide variety of programs from televised interviews, radio broadcasts, school and community talks and University lectures. We also had our leopard awareness pamphlets translated into Sinhalese and Tamil for much wider distribution within the country.

Bridging research and education, in October 2011, two students from Sabaragamuwa University of Sri Lanka (SUSL) started work with us as part of their final year undergraduate projects. They are the 4th and 5th such students that we have had joining the project in the past 3 years. One is investigating the biodiversity of patch forests in the hill country, comparing the isolated Dunumadallawa forest reserve with the Duckwari estate forest near the extensive Knuckles Conservation Area. The other student is determining the presence/absence and relative abundance of Sri Lanka's four cat species in two hill country locations, Duckwari and Horton Plains National Park.

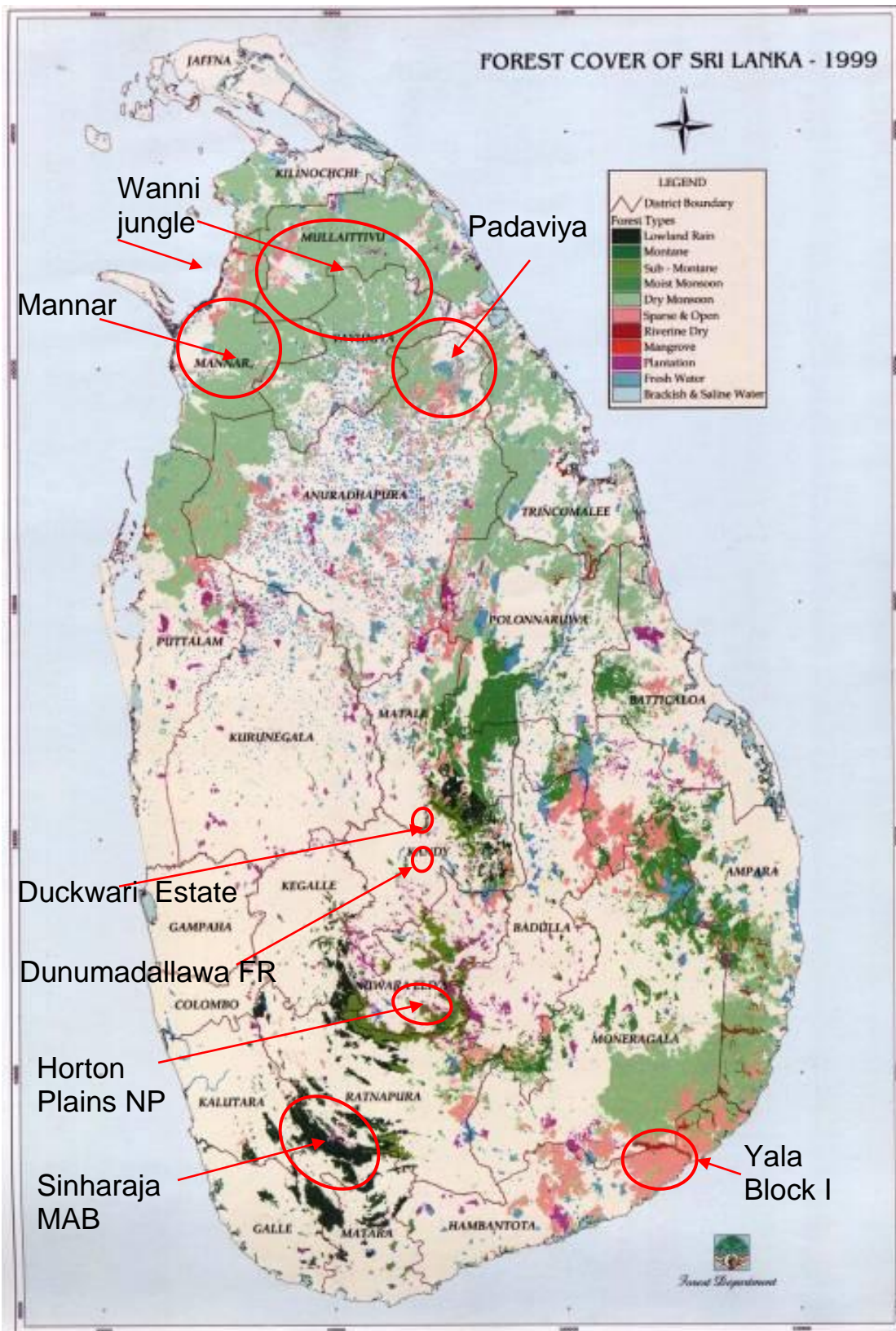


Fig. 1: Forest cover map of Sri Lanka showing areas where the Leopard Project was actively conducting research in 2011.

Update of Leopard Project activities - January to December 2011

I. Research

A. Central Hills

- i. Dunumadalawa/Hantane*
- ii. Horton Plains National Park*
- iii. Duckwari Estate*

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I. Research

A. Central Hills

i. Dunumadalawa/Hantane

Trail index monitoring surveys for both leopards and their prey were continued in the mid-country wet zone Dunumadallawa Forest Reserve in the Central Province's Kandy District. These surveys were undertaken in January, February, April, July and August. Little new leopard evidence was documented during these visits, but enough to verify the continued utilization of the forest. This was confirmed when leopards were observed on at least 2 occasions by Forest Reserve personnel.

In November, quadrat surveys were conducted to document tree diversity in the FR. Seven 20m x 20m quadrats were surveyed throughout the reserve and all trees within these 400 m² plots were identified and measured (dbh and height). Understory species were also documented. One of the plots fell within a *Pinus* monoculture and was excluded from further analysis. Results from the remaining 6 plots showed moderate diversity with 33 tree species represented, however over half (52.5%) were of a single species, Ceylon Ironwood (*Mesua ferrea*). This species was dominant in 4 of the 6 plots where it represented 56.1 – 93.6% of total trees. These plots were comprised of 5 to 10

species. Ironwood was absent entirely in the remaining 2 plots which exhibited a much more heterogeneous and diverse community. In these two plots there were 13 and 14 species represented with the most abundant individual species comprising 17.8 and 20.5% of the total respectively.

Overall, the forest at Dunumadallawa can be characterized as a maturing secondary forest. Tree diversity included a number of typically cultivated species such as jak (*Artocarpus heterophyllus*), breadfruit (*Artocarpus nobilis*), mango (*Mangifera sp.*) and tea (*Camellia sinensis*). Cinnamon (*Cinnamomum verum*) and kithul (*Caryota urens*) were also represented. Tree size was small on average with 84.7% of all trees <20cm dbh (Table 1). The plot with the lowest tree density (7.75/100m²) also had the largest average dbh (16.2cm) whereas the plot with the highest tree density (18/100m²) had the smallest average dbh (10.8cm). However the correlation was not significant ($r = -.49499$). This information is useful in that it allows a better understanding of the types of forests in which leopards are residing. Specifically this data underscores the fact that even regenerating, secondary forests with a less than ideal mix of tree species are harbouring leopards and their prey. As this estate was an active tea estate until early 1900s, it also exhibits the potential of recovering viable forest land from the extensive plantation industry.

Table 1: The average dbh of trees in 6 20x20m quadrats in the Dunumadallawa forest reserve, Kandy District.

dbh (cm)	#	%
0 - 9.9	175	59.3
10 - 19.9	75	25.4
20.0 - 29.9	20	6.8
30.0 - 39.9	12	4.1
40.0 - 49.9	3	1
50.0 - 59.9	2	0.7
60.0 - 69.9	3	1
70.0 - 79.9	3	1
80.0 - 89.9	1	0.3
90.0 - 99.9	1	0.3
	295	100.0

ii. Horton Plains National Park

We visited the Sinharaja Man and Biosphere Reserve in June to gauge the viability of conducting a camera trapping survey there. While it will certainly be worthwhile in time, given the difficulty in detecting sign in the heavy rainforest leaf litter, we decided to shift focus to Horton Plains National Park (Fig. 2). A recce trip in 2010 had been extremely rich in leopard signs and this trip was to more specifically scout out a suitable trail network for the proposed camera trapping study. During two days of mapping we detected 31 leopard signs cementing our decision to work within this park.

Our proposal to conduct a camera trapping abundance study here to complement the ongoing prey abundance and leopard sign index surveys conducted by Sabaragamuwa University of Sri Lanka students (Fig. 2), was approved at the beginning of January 2012. The index and prey transect data carried out by the students is still to be completed and analyzed. In addition to the abundant signs of leopard presence, the advantage of working in Horton Plains is that the very dense, dwarf forest that characterizes the zone essentially forces leopards onto the existing trail network. This should result in a higher probability of camera trap capture success.



Fig. 2: Horton Plains National Park (HPNP) entrance (left) and Dharshika Pathirathna (right, with compass) and Thushani Senevirathna, two final year undergraduate students in the Department of Natural Resource Management at Sabaragamuwa University of Sri Lanka, conducting leopard prey transects in HPNP in November 2011.

iii. *Duckwari Estate*

The Duckwari Estate is a tea plantation and property of Finlay's Company (Fig. 3). It is an active tea estate which also encompasses cardamom plantation lands in the understory of its small, intact forest patches. In close proximity to the 17,500 ha Knuckles Conservation Area, this forest patch represents an excellent opportunity to investigate both general biodiversity and leopard presence and compare with the Dunumadallawa forest reserve, which is a far more isolated forest patch. In addition to adding valuable data to our ongoing leopard distribution work, we are documenting the prey species available to leopards and hoping to locate enough scat samples to investigate feeding ecology.

The biodiversity surveys (plants, birds, amphibians, mammals) are to be compared to the Dunumadallawa site as well as to the Knuckles Conservation Area, in an effort to better understand the importance of such estate-land patch forests. Furthermore, we are interested in investigating these patch forests as they relate to the theory of island

biogeography (McArthur and Wilson 1967) and to seek a relationship between the proximity to a large, intact reserve and biodiversity.



Fig. 3: Reservoir at Duckwari Estate (left) and highland forest patch where it meets the extensive tea plantation (right).

B. Yala Block I

The Spotting the Spots initiative which was implemented at the end of 2010 was continued throughout 2011 with a selection of dedicated volunteers providing photographs of leopards within Yala Block I complete with Leopard Project data sheets detailing GPS location, activity, time etc. So far data sheets from 42 sightings have been catalogued while another 289 photographs have been collected. Preliminary sorting into age/sex classes has been undertaken and we plan to train one of the many volunteers that have contacted us to carry out the individual identification process so essential for population level monitoring.

C. Wanni

Field visits to the northern Anuradhapura, Mannar, Vavuniya and Mullaitivu Districts were made in January, May, July, August, October and December to conduct presence/absence surveys (Fig 4). During these trips Leopard Project personnel traveled extensively throughout the region, checking for signs of leopards as well as interviewing villagers about the wilderness areas and wildlife in the area. The goal of these surveys is to establish a baseline about what species are present/absent (Table 2), which are common/uncommon in this area (Table 3), as well as the state of the forest and where possible, how it has changed during the past decade.



Fig. 4: House belonging to a typical interviewee in Padaviya area (left) and cattle pen on the coast at Silawathura, Mannar.

Table 2: List of species present mentioned by interviewees (N=67) in Mannar, Vavuniya and Padaviya areas 2010-11.

Family	Species	Common name
Bovidae	<i>Bubalus bubalis/arnae</i> †	Water buffalo
Cervidae	<i>Axis axis</i>	Axis (spotted) deer
	<i>Cervus unicolor</i>	Sambhar
	<i>Muntiacus muntjak</i>	Barking deer
	<i>Sus scrofa</i>	Wild boar
Suidae	<i>Moschiola meminna</i>	Mouse deer
Tragulidae	<i>Canis aureus</i>	Jackal
Canidae	<i>Felis chaus</i>	Jungle cat
Felidae	<i>Panthera pardus kotiya</i>	Leopard
	<i>Prionailurus rubiginosus</i>	Rusty-spotted cat
	<i>Prionailurus viverrinus</i>	Fishing cat
	<i>Herpestes smithii</i>	Grey mongoose
Herpestidae	<i>Melursus ursinus</i>	Sloth bear
Ursidae	<i>Paradoxurus hermaphoditus</i>	Palm (toddy) cat
Viverridae	<i>Lepus nigricollis</i>	Black-naped hare
Leporidae	<i>Manis crassicaudata</i>	Pangolin
Manidae	<i>Macaca sinica</i>	Toque macaque
Cercopithecidae	<i>Semnopithecus entellus</i>	Grey langur
	<i>Trachypithecus vetulus</i>	Purple-faced langur
	<i>Loris lydekkerianus</i>	Grey slender loris
Lorisidae	<i>Elephas maximus</i>	Asian elephant
Elephantidae	<i>Hystrix indica</i>	Porcupine
Hystriidae	<i>Funambulus palmarum</i>	Palm squirrel
Sciuridae		

† = *Bubalus arnee* is the wild buffalo and its status is vulnerable whereas *Bubalus bubalis* is the domestic water buffalo and its status is common. In this area we have not yet determined which species is present.

The questionnaire also probes human-wildlife interaction to see if there are any problem areas of this sort either ongoing or on the horizon. Interviewees are selected randomly but physically spaced throughout the landscape in order to achieve wide coverage.

Table 3: List of common/charismatic mammal species (by Order and Family) and percentage of interviewees (N=67) who responded positively to their being present in the Mannar, Vavuniya and Padaviya areas in 2010-11. Status includes whether species is endemic (E) and its Red List status (2007 Sri Lanka Red List) where EN = endangered, VU = vulnerable.

Order	Family	Species	Common name	Status	% present
Artiodactyla	Cervidae	<i>Axis axis</i>	Axis (spotted) deer		95.4
		<i>Cervus unicolor</i>	Sambhar		78.1
		<i>Muntiacus muntjak</i>	Barking deer		76.6
Carnivora	Tragulidae	<i>Moschiola meminna</i>	Mouse deer	E	54.7
	Felidae	<i>Felis chaus</i>	Jungle cat	VU	56.3
		<i>Panthera pardus kotiya</i>	Leopard	E, EN/VU [†]	85.1
		<i>Prionailurus rubiginosus</i>	Rusty-spotted cat	EN	74.6
		<i>Prionailurus viverrinus</i>	Fishing cat	VU	64.1
	Ursidae	<i>Melursus ursinus</i>	Sloth bear	EN	83.6
	Cercopithecidae	<i>Macaca sinica</i>	Toque macaque	E	92.3
<i>Semnopithecus entellus</i>		Grey langur		98.4	
<i>Trachypithecus vetulus</i>		Purple-faced langur	E, VU	1.6	
Primates	Lorisidae	<i>Loris lydekkerianus</i>	Grey slender loris		64.1
	Elephantidae	<i>Elephas maximus</i>	Asian elephant	VU	98.5

[†] = *Panthera pardus kotiya* is listed as vulnerable in 2007 Sri Lanka Red List and as endangered in the 2009 Global IUCN Red List. It is the sub-species that is endemic.

There were 14 species that were asked about specifically, and an additional 9 that respondents mentioned on their own. Overall 60.9% of respondents (N=64) indicated that there has been a noticeable change to the area in the past 10 years with 61.9% (N=63) stating there was a loss of big trees. Analyzed by area one can see the impact of the conflict on the forest as the areas within the war zone (Mannar and Vavuniya) showed a higher impact than the area largely outside the war zone (Padaviya). In Mannar 76.2% (N=21) of respondents cited a change in habitat with big tree loss being cited by 70% (N=20). In the Vavuniya area of the Wannu the numbers were 68.8% (N=16) for both. In Padaviya however, only 44.4% (N=27) of respondents thought the habitat had changed in the past 10 years and 53.8% (N=26) stated that big trees had been lost during that time. The use of large trees by both the army and the LTTE for bunker construction during the war might have been responsible for this difference. Also, the illegal cutting of valuable timber might have been ongoing during the conflict as law enforcement mechanisms would have been crippled during this time.

D. Leopard death database

We continued to update our leopard database, including reports of all reported leopard deaths around the country. In 2011 at least 9 leopards were killed in Sri Lanka, snared, shot or killed in vehicle accidents (Table 4) including one within a National Park (Fig 5). How many go unreported is not known.

Table 4: Leopard deaths in Sri Lanka reported during 2011

Date	Location	Age/sex	Method	Length (in)
14 January 2011	Udawalawe	Cub	x	x
24 January 2011	Seethaeliya	Male	Snared	72+
29 April 2011	Balangoda (Udawalawe)	Male	Shot dead	~84
11 May 2011	Minneriya	Male	Vehicle	x
15 June 2011	Piduratalagala	Female	Snared	72+
17 June 2011	Minneriya/ Giritale	Male	Shot dead	x
12 July 2011	Tabbowewa	Female	x	x
22 August 2011	Vavuniya- Karaganayankulam	Male	Snared	87.5
21 October 2011	Yala National Park	Female cub	Vehicle	x



Fig. 5: Adult male leopard (left) that was killed in a snare set for wild boar in Seethaeliya in the Nuwara Eliya District, Central Province on January 23, 2011 and female cub (right) that was struck by a vehicle inside Block I of Yala National Park on October 21, 2011.

On a more positive note, we were also involved together with the DWC in the rescue of an young adult male leopard that had become stuck in a well in Werulugolla, Nawalapitiya in the southern hills on February 13 (Fig. 6). We were asked to choose a suitable release location for this animal and were glad to be involved with the DWC in this rescue/release.



Fig. 6: Young adult male leopard in the new well at Nawalapitiya in the southern hills (left). He was removed from the well and re-located to a nearby forest reserve (right).

E. Fishing cat distribution

WWCT has long been collecting data about the other 3 felid species extant on the island, the fishing cat (*Prionailurus viverrina*), the jungle cat (*Felis chaus*) and the rusty-spotted cat (*Prionailurus rubiginosus*) during the course of leopard work. The largest and most visible of the three “other” cats is the fishing cat and we have managed to compile a fairly large distribution database for this species based on observations, signs and detailed interviews (including photos). We shared this information with the Fishing Cat Working Group an affiliated member of the IUCN’s Cat Specialist Group. Of particular interest is the data from Sri Lanka’s Northern provinces which had no previous records (eg Philips 1935; Miththapala 2006). This data has been gained from the aforementioned Northern surveys.

II. Education and Awareness

A. University lecture series

In November our University lecture series was launched with the first being given at Moratuwa University.. This presentation was given to over 150 mostly first-year science and engineering students as a general introduction to leopards, the Sri Lankan leopard and the conservation issues that surround these endangered species here. This was followed in December with a similar presentation at the Sabaragamuwa University of Sri Lanka’s annual Natural Resources (NR) Night (Fig 7). Another talk, this time for students at Sri Jayewardenepura University in Sri Lanka’s capital, is scheduled for mid-January 2012. We plan to continue with these awareness-raising presentations over the next several months.



Fig 7: WWCT Principal Researcher Andrew Kittle speaking at the Sabaragamuwa University of Sri Lanka's Natural Resources Night, December 28, 2011.

B. School/Group awareness presentations

In February an awareness program was given to staff at the Dunumadallawa forest reserve in Kandy. The Leopard Project has been conducting leopard research at this reserve for several years and while we have provided a number of educational posters and other materials to the reserve we had until this year not given a presentation about our activities to reserve staff. Showing the guards and administrative staff what we have been doing and highlighting the importance of the reserve for wildlife in general and the leopard in particular, is an important component of leopard conservation and appears to have had a visibly positive impact on staff morale.

On March 23, 24 and 25th the Leopard Project conducted school awareness programs at 5 schools in the Nuwara Eliya District of the Central Province. This district has seen a number of leopards being caught and killed in snares recently so it was decided to target an education campaign for school children here. The community estate schools where presentations were made were Sithaeliya, Ambewela, Haggala, Blackpool and Mipilimanna (Fig. 8). These estate areas tend to include forest patches on their uppermost slopes from where firewood is collected and in which wildlife, including leopards reside. We have previously found that leopards in these areas routinely use tea estate lands to move between forest patches. By targeting these communities in order to raise awareness about the potential importance of leopards in the ecosystem and their status as endangered species, it is hoped that we can help to alleviate to some degree the low level human-leopard conflict in these areas.

Importantly these school programs are conducted in conjunction with Department of Wildlife Conservation rangers who speak about legal issues pertaining to wildlife (trapping, poaching etc.). In addition, an education package is distributed at each

school, consisting of a leopard sticker, leopard awareness pamphlet, posters depicting the various habitat zones in the country, a WHO identification guide to snakes and snakebite and a reference book on Sri Lankan environmental law.



Fig. 8: WWCT Research Officer, Chanaka Kumara giving presentations at schools in Mipilimanna and Haggala, Central Province in March 2011.

B. Leopard awareness leaflets (translation)

Several years ago the Leopard Project had created information pamphlets aimed at increasing awareness about the Sri Lankan leopard and issues pertaining to its conservation. These have proven popular and are widely distributed at all our talks, presentations etc. However they were only in English, so in 2011 we updated the content of the pamphlets to better reflect new information and translated the text into both Sinhala and Tamil for wider distribution (Fig. 9). Since most of the school presentations that we give are in one of these National languages, the addition of these take home pamphlets is a very valuable tool for increasing the efficiency of awareness-raising attempts.

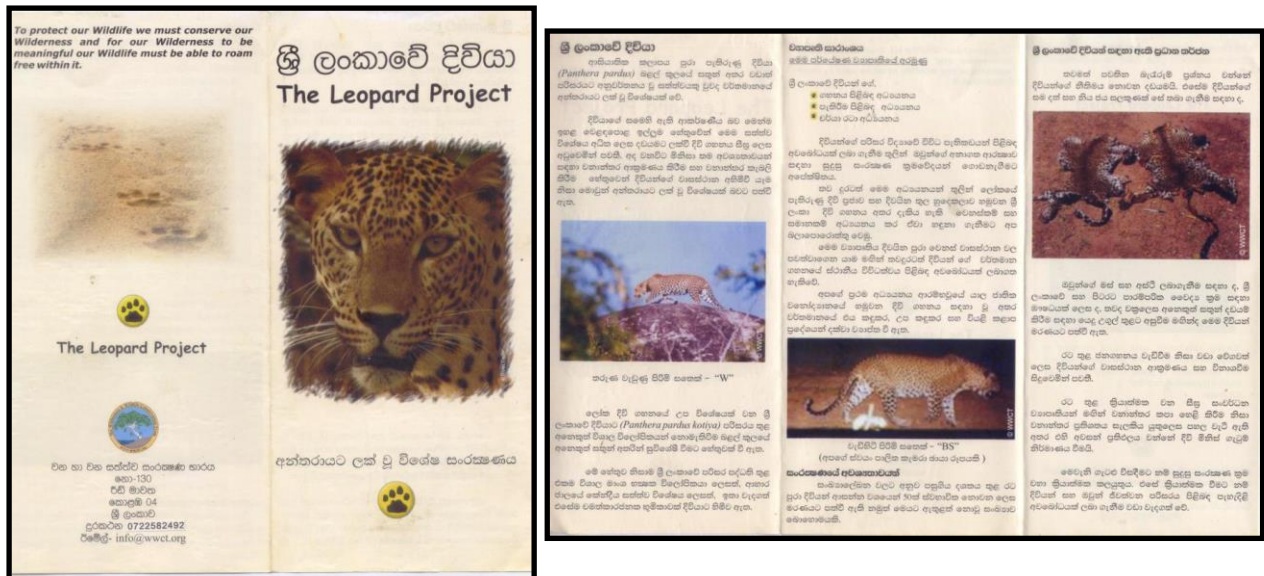


Fig. 9: Front and back covers (left) and inside information (right) of Sinhala Leopard Project pamphlet. Pamphlets were also translated into Tamil.

C. Scientific advisors for “Nightstalkers: Leopard Battleground”

An interesting feature of 2011 was the opportunity to act as scientific advisors for the Ammonite Productions film “Nightstalkers: Leopard Battleground” aired on National Geographic channel. This ground-breaking film used infra-red and thermal imaging cameras to capture some incredible footage of leopards in Yala National Park. Although not involved in the film making our role was to interpret much of what was filmed and assist in providing the scientific context to the narration. The technologies utilized for this film are exceptional, allowing for very effective observation of the animal and they provide much hope for future observational research on these elusive, mostly nocturnal cats.

IV: Acknowledgements:

All WWCT work within Sri Lanka has been following the guidelines and with the permission of the Department of Wildlife Conservation (DWC) and the Forest Department (FD). We thank them for their continued support of our work.