

# 🐾 The Leopard Project 🐾

## Annual Report 2010



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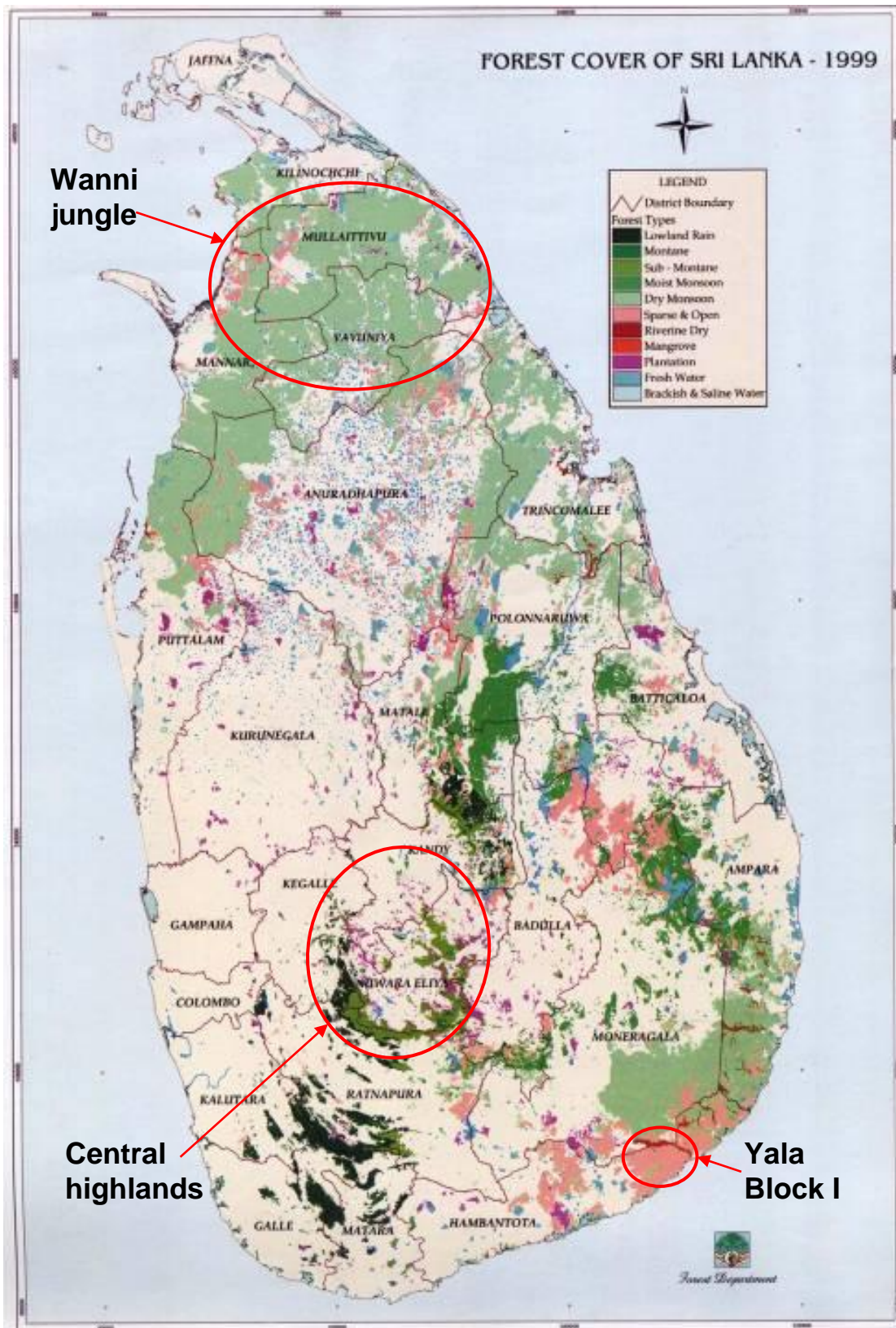
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## Executive Summary:

In 2010 the Wilderness & Wildlife Conservation Trust's Leopard Project expanded beyond a strictly research-based approach to leopard conservation, designing and implementing a more broadly-based program focused on educating and fostering awareness about the issues facing the Sri Lankan leopard (*Panthera pardus kotiya*). A geographical expansion was also undertaken (Fig 1), whereby we initiated two projects in the lowland dry zone of the country to complement the ongoing work in the central hills. The first of these, a volunteer-based monitoring initiative called "Spotting the Spots", was launched in Yala National Park's Block I, one of the island's best leopard viewing areas and where the Leopard Project carried out a detailed leopard study in 2001-2. The second initiative enters uncharted territory with initial surveys, both ecological and social, conducted in the north of the country, in an area that has been off limits for almost three decades during the civil war. The war ended in May 2009 and slowly the area is opening up with de-mining efforts making resettlement increasingly possible. This area harbours the largest contiguous forest on the island, the Wannijungle, once famed for its abundant wildlife but now an unknown quantity after so many years of conflict and uncertainty.

In the central hills we continued our camera trap surveys and leopard sign indexes in the Dunumadallawa forest reserve, a small but important forest patch which borders the town of Kandy. This forest reserve was also targeted as the initial site for an ambitious forest rehabilitation project. The goal of this project is to remove a 44 hectare *Pinus* plantation that encompasses the upper slopes of this important watershed and re-plant native species with the twin goals of improving water retention on the upper slopes and increasing the available forest habitat for the wide array of species that live here. We are working on this project in conjunction with the Kandy Municipal Council, Waterworks Department, Forest Department and a local NGO. The Leopard Project has subsequently supplemented and expanded the small forest nursery on site and carried out biodiversity surveys (bird, butterfly, amphibian and mammal) in the forest reserve in order to fulfill the Environmental Impact Assessment criteria. These surveys will provide the ecological baseline for the whole project. Also in the central hills we conducted a recce trip in May to determine leopard presence in Horton Plains National Park as we hope to undertake a camera trapping survey in this area. The signs were encouraging and we are hopeful of getting permits to carry out a camera trap survey here in the coming year.



2010.

Update of Leopard Project activities - January to December 2010

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### **I. Research**

Direct research continues to be the main avenue by which the Leopard Project attempts to undertake leopard conservation in Sri Lanka, believing that it is only by understanding important aspects of leopard distribution, ecology and behaviour that effective management and conservation plans can be designed and implemented.

#### A. Central Hills

##### *i. Dunumadalawa/Hantane*

We are continuing to monitor the Dunumadalawa forest reserve on a monthly basis, recording both leopard and prey sightings and signs. We have also been continuing with the camera trap surveys, conducting a 90 trap night trapping schedule from October through December. Unfortunately unusually heavy rains caused some equipment damage, limiting the data coming in. No leopards were captured during this period and minimal signs were found. It is hoped that by increasing the duration of these surveys we will be able to pick up on seasonal trends of habitat use that may help us to understand how leopards are using this, and other small forest patches.

##### *ii. Horton Plains National Park*

This 3160 hectare National Park is the country's highest ranging from 1800 m to 2389 m above sea level. It holds the island's 2<sup>nd</sup> and 3<sup>rd</sup> highest peaks and forms the upper watershed of three major rivers, the Mahaweli, Kelani and Walawe. The plateau which holds the plains for which the park is named sits at 2100 m, the highest tableland on the island. Large herds of sambhur deer (*Cervus unicolor*) congregate on these patana grasslands and form the basis of the leopard diet in this area (75.8%; N=29; Ranawara

et al 1998). Our previous work in a bordering forest/tea mosaic (Agra-Bopath) also found these large deer to be the most important component of leopard diet (54.2%; N=24) (Kittle et al. in prep). Because Horton Plains NP represents the most cohesive protected section of highland forest, has a sizeable prey base and borders the larger Peak Wilderness Sanctuary (22 379 hectares) we hypothesize that it may be a source forest for the central highlands, producing the animals that then move into other less pristine forest patches.

Despite being the only National Park in the central highlands, there has never been a systematic survey of leopards in Horton Plains, and the current park warden is interested in the Leopard Project doing just that. To investigate the possibility of conducting a camera trapping survey in Horton Plains, the WWCT conducted an observational recce in May 2010. Well aware that leopards inhabit this forest we were nevertheless surprised to find 35 leopard signs in the Park in three days of investigation. These included 18 separate pugmarks, 7 scats, 9 scrapes and a carcass. The trail network is also extensive enough to make conducting a camera trap survey reasonable; we are preparing to submit a proposal to DWC for permits to undertake such a survey in 2011.

## B. Yala Block I

In 2001-02 the Leopard Project conducted an intensive 20-month study of the leopards that inhabit Ruhuna (Yala) National Park's 14,100 hectare Block I. The leopards in this park are thought to be some of the most visible in the world and our previous work helped to determine that the population density (15.1/100km<sup>2</sup>) was one of the highest ever recorded (Kittle and Watson 2002). The high prey base – Axis or spotted deer (*Axis axis*) form the majority of the available and utilized prey – and protected status of this park allow for these high numbers and relatively small home range sizes (Kittle and Watson 2002).

Key to the protection of this park is tourism (it is the most visited of the 50 protected areas in the country) as the presence of visitors ensures that poachers (of trees and wildlife) are not allowed to act with impunity. Taking this a step further, the Leopard Project recognized both that leopards in this park are remarkably visible and that there is a strong core of regular local visitors with an overarching interest in photography. As leopards are a favourite photographic subject we decided to see if we could effectively monitor the population (with our previous study used as a baseline) by using a regular group of trained volunteers photographs. This method is not new. It has been, and is still being, used with success in Tanzania where the rapid decline of the Ngorongoro Crater lion (*Panthera leo*) population during the canine distemper outbreak in the early 90s was reconstructed using tourist photographs (Packer et al 1991) and tourist photos remain a central component of the ongoing cheetah (*Acinonyx jubatus*) research in neighbouring Serengeti National Park (Sarah Durant, pers obs).

### C. Wannu

According to extensive hunting records and numerous written accounts, the dry monsoonal jungles of the north, known as the Wannu, were considered the best place for wildlife on the island during the British colonial period. However, almost three decades of civil war has had unknown impacts on the region. The fighting in and around the Wannu jungles ensured no development occurred here which might have actually had a positive impact on wildlife populations, however poaching, unregulated timber extraction, incidental killing from mines, a lack of law enforcement and hunting by army and LTTE might all have conspired to negatively impact the region's wildlife. To try and determine these impacts and understand the current status of the Wannu we have initiated social and ecological surveys there.

The war ended almost two years ago and while de-mining is ongoing, the area is slowly opening up for resettlement. Already potential conflicts have arisen between wildlife and settlers. Human-elephant interaction is considered a larger problem but there are also issues of human-leopard conflict arising, with 3 leopards being caught in traps and killed (Fig 2). These are not new issues in the area, as there has always been people and wildlife co-existing here, however the return of people after a long absence and the probability of altered wildlife movement and behaviour patterns during this absence means that achieving a balance will take some time. In the area between Vavuniya and Mallavi most habitations were abandoned during the war. Many cattle were left behind and became feral. It is probable that these then became prey for the leopards that have always roamed the suddenly uninhabited forests. Post-war, people are returning to their old homesteads (Fig 3) and feral cattle are being rounded up and distributed among villagers and new cattle brought into the area. Leopards are continuing to prey on these animals but given the changed human context, this form of predation is now visible and can elicit resistance from villagers.



Fig 2. Trapped and killed leopard in Malavi and Unit 1, Kalmadu, Vavuniya District.

During discussions with villagers in a two day visit in September we were able to document several separate incidents of leopards killing cattle (almost exclusively calves) in the previous 6 months. According to interviewed farmers, all of whom were contacted because they reported leopard incidents, 11 calves, 1 cow and some goats were killed by leopards during this time. Collectively these farmers reported owning 123 cattle. In order to determine the frequency, and thus impact, of this domestic livestock predation we hope to obtain Department of Defense (DoD) clearance if required, to collect scat in the Wannu forests and conduct large mammal presence/absence surveys.



Fig. 3 A typical homestead near Mallavi, Vavuniya District

We have so far conducted structured interviews with 17 randomly selected farmers situated between Vavuniya and Mallavi in order to try and ascertain the extent of the problem. We hope this to be a first step towards a viable solution and a more general understanding of the overall situation. These interviews have begun to highlight some interesting results. For example farmers indicate that there has been an overall increase in wildlife abundance in the past 10 years. This increase is despite the consensus observation that there has been a widespread decline in the abundance of large trees in these forests. Of note also is the fact that 94% of these farmers considered leopards to be present in the area (Table 1), with most interviewees indicating that they were common.

Table 1: List of common mammal species (by Order and Family) reported to be present in the Wannu area between Vavuniya and Mallavi, by farmers (N=17) interviewed in September and December 2010. 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	Bovidae	<i>Bubalus bubalis/arnae</i>	Water buffalo	VU‡	35.3	
		Cervidae	<i>Axis axis</i>		Axis (spotted) deer	94.1*
			<i>Cervus unicolor</i>		Sambhar	52.9*
			<i>Muntiacus muntjak</i>		Barking deer	47.1*
	Suidae	<i>Sus scrofa</i>	Wild boar		47.1	

Carnivora	Tragulidae	<i>Moschiola meminna</i>	Mouse deer	E	35.3
	Canidae	<i>Canis aureus</i>	Jackal		17.6
	Felidae	<i>Felis chaus</i>	Jungle cat	VU	11.8*
		<i>Panthera pardus kotiya</i>	Leopard	E, EN/VU <sup>†</sup>	94.1*
		<i>Prionailurus rubiginosus</i>	Rusty-spotted cat	EN	64.7*
		<i>Prionailurus viverrinus</i>	Fishing cat	VU	29.4*
	Herpestidae	<i>Herpestes smithii</i>	Grey mongoose		23.5
	Ursidae	<i>Melursus ursinus</i>	Sloth bear	EN	82.4*
	Viverridae	<i>Paradoxurus hermaphoditus</i>	Palm (toddy) cat		5.9
	Lagomorpha	Leporidae	<i>Lepus nigricollis</i>	Black-naped hare	
Pholidota	Manidae	<i>Manis crassicaudata</i>	Pangolin		58.8
Primates	Cercopithecidae	<i>Macaca sinica</i>	Toque macaque	E	82.4*
		<i>Semnopithecus entellus</i>	Grey langur		82.4*
		<i>Trachypithecus vetulus</i>	Purple-faced langur	E, VU	5.9*
		<i>Loris lydekkerianus</i>	Grey slender loris		17.6*
Proboscidea	Elephantidae	<i>Elephas maximus</i>	Asian elephant	VU	93.8*
Rodentia	Hystriidae	<i>Hystrix indica</i>	Porcupine		70.6
	Sciuridae	<i>Funambulus palmarum</i>	Palm squirrel		17.6

\* = species about which surveys specifically inquired about presence. Other species were mentioned independently by interviewees when asked about general wildlife, therefore the percentages do not represent true presence/absence but instead provide a coarse species list. ‡ = *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. † = *Panthera pardus kotiya* is listed as vulnerable in 2007 Sri Lanka Red List and as endangered in the 2009 Global IUCN Red List.

Perhaps of greater interest from the perspective of ecological resilience, 82.4% of respondents indicated the presence of sloth bears (*Melursus ursinus*) in the surrounding forests. Bears are much less tolerant of human interference and forest degradation than leopards, which are adaptable enough to live in and around heavily impacted areas, and are thus a better indicator of ecosystem health.

We are interested to monitor how the return of villagers to these areas will affect wildlife populations. Most villagers rely on forest areas to graze their cattle and procure fuel wood, and are thus cognizant of the importance of intact forest. Evidence of this form of stewardship comes from the fact that most villagers interviewed expressed sadness in the loss of large trees in their areas. Furthermore many still believe in living in co-existence with wildlife and it is commonly accepted that if a few cattle are missing when their herds return from freely grazing in the forest, this is the price that must be paid for use of that forest. In large part this co-existence is what allows for humans and wildlife to live so close together in such high numbers in Sri Lanka and we believe it must be fostered as a philosophy that is key to the continued existence of leopards in the area. Of course the ecological balance is dependent upon the number of returnees and importantly the scale of development programs that might be initiated here.



## II. Reforestation

A central component of the WWCT mandate is to ensure that viable forest patches remain intact and that connections and corridors be preserved or created where necessary to ensure the movement of wildlife between these patches. The key to this is sensible land use planning, so we are looking at ways in which existing land use practices be altered in order to improve ecosystem functioning and provide higher quality habitat for wildlife. One area that WWCT has identified to target is pine (*Pinus caribaea*) plantations. These monocultures dominate many of the high ridges throughout the central highlands, introduced in 1978 in watershed reforestation projects (due to their speed of growth) but planted since 1964 to produce chipboard, pulp, paper and fuel. Public concern regarding the negative impacts of these plantations ensured that the practice was stopped, albeit with thousands of hectares already planted. Apart from being alien species with very low ecological value compared to indigenous tropical forest, these pine plantations have a negative impact on natural vegetation regeneration and soil biodiversity (Nissanka et al 2005). Additionally water retention is compromised, resulting in increased erosion, heightened flood risk and increased drought effects during dry periods (Hofstede et al 2002).

### A. Dunumadallawa

The Dunumadallawa forest reserve protects the watershed forests for the drinking water reservoir for the town of Kandy in the central hills. The Leopard Project has worked in this forest reserve for over 7 years, documenting the existence of leopards here and analyzing aspects of their abundance, feeding ecology and habitat selection (see 2009 annual report). Out of this work has come the knowledge that the 44 hectare *Pinus* plantation that tops the southern ridge of the reserve, is little used by leopards or their prey, is floristically impoverished relative to the rest of the reserve and provides no benefit to the efficiency of the catchments area. With strong support from the local Waterworks department who oversee the forest reserve and have also witnessed the negative impacts of the pine plantation, we selected this site to initiate plans to replace highland pine forests with natural forest.

This project is large and comes under the auspices of a number of different government bodies. These include the Waterworks Department which comes under the Kandy Municipal Council and the Forest Department which is responsible for plantation lands. On the ground we scaled up the on-site forest nursery from which indigenous trees will be sourced for re-planting (Fig 4), established an on site office (Fig 5) and carried out essential preliminary field work.



\ Fig 4. Seedlings (L) and putting up the fence (R) around the Forest Nursery, Dunumadallawa.



Fig 5: WWCT staff in the Dunumadallawa forest reserve Leopard Project office.

We have also conducted a number of surveys aimed at quantifying the reserve's biodiversity. These include bird, mammal, butterfly and amphibian surveys (Table 2 & Fig 6). Soil sampling in the pine plantation is also being conducted (Fig 11).



Fig 6: A frog being identified by Chanaka Kumara, Leopard Project field assistant, during amphibian surveys in Dunumadallawa.



Fig 7: collection of soil sample from the Pinus plantation at the top of the Dunumadallawa forest.

Table 2: Results of biodiversity surveys in Dunumadallawa forest reserve showing number of endemic, critically endangered (CR), endangered (EN), vulnerable (VU) and total species for 6 classes. Amphibian and plant surveys are not yet completed.

	Endemic	CR	EN	VU	Total
Birds	7	0	0	3	<b>60</b>
Butterflies	1	2	0	2	<b>70</b>
Mammals	5	1	2	4	<b>22</b>
Reptiles	3	0	0	0	<b>14</b>
Amphibians	.....	.....	.....	.....	<b>6</b>

Plants	.....	.....	.....	.....	.....
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### III. Education and Awareness

#### A. Open University education fair

WWCT's Leopard Project was invited to participate in the Open University of Sri Lanka's 60<sup>th</sup> anniversary island-wide education fair conducted from June through August 2010. We developed a stall showcasing the Sri Lankan leopard, our work to date throughout the country and highlighting the conservation issues and associated challenges still ahead. We also created an interactive power point presentation to complement the pamphlets, posters and other literature. The stall and presentation traveled to Kandy, Colombo, Jaffna and Batticaloa and reached thousands of people, both school children and the general public (Fig 8).

#### B. Villages surrounding Dunumadallawa

A key part of the re-forestation work on-going in Dunumadallawa is to increase the awareness in surrounding communities about the importance of protecting watershed forests such as this one. Many people in these communities take the forest for granted and are not fully aware of the reason for its existence or the ecological role that it plays. Neither are they cognizant of the biodiversity that exists in the forest. We have been actively engaging these communities in discussing the forest, its role in community life and its ecological importance (Fig 9). These border communities use the forest regularly, not just as the source of their water but also for fuel wood, fruit and medicinal plants and as a short cut to walk through to other areas. Linking this everyday use to the pine removal program makes the project more relevant and encourages support.



Fig 12. The Leopard Project stall at Kandy and Colombo (L) and WWCT research assistant Chanaka Kumara talking to a group of visiting school students (R).



Fig 13: WWCT staffer Nimalka Sanjeevani talks to students (L) at Udawala Vidyalaya about the importance of forest conservation; a public presentation in Kandy (R).

### C. Leopard cards

We have designed a simple information card about the Sri Lankan leopard which includes a discussion of its conservation status, sub-species designation, ecology and behaviour as well as highlighting present and future conservation issues. It includes attractive photos and a replica pugmark to be visually interesting. The idea of the card is to provide attractive educational material that can easily be picked up at presentations, exhibits etc. in order to ensure that a literal take home message is available to those interested. We envision the cards being available at WWCT events and presentations as well as at National Park visitor centres.

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