# The Leopard Project

# Annual Report 2020


February 2021

The Wilderness & Wildlife Conservation Trust
130 Reid Avenue, Colombo 04, Sri Lanka
Website: www.wwct.org
Email: info@wwct.org

## Executive Summary

It is no surprise that 2020 has been a strange year with activities around the globe seriously curtailed – to say the least – by the coronavirus pandemic. The Wilderness & Wildlife Conservation Trust (WWCT) has also been impacted by the current situation, mostly through travel restrictions which reduced the frequency of our field site visits, but also through an increased difficulty in procuring equipment which has to be shipped in from out of country. Thankfully a lot of our current work relies on the use of remote cameras, which is possibly the best type of equipment to be using when one is unable to regularly access field sites. As such, we were able, at the very least, to continue to monitor our varied research areas in 2020. Much of the following report focusses on the remote camera monitoring in the Central Highlands, Gal Oya NP, Yala Buffer zone and Sigiriya patch forest properties.

Due to the lockdowns and travel restrictions, an increasing emphasis was placed on digital communication, from schools to workplaces to international conferences. WWCT responded to this change by joining social media with the launch of our Instagram page. This allowed us to put out educational and awareness messages which we were unable to do in person due to the pandemic, and to respond to specific incidents rapidly. We are thankful for our younger generation of volunteers and supporters who keep the account ticking over!

This year was not just challenging for people in Sri Lanka, but also for leopards, as we had the highest number of leopard deaths recorded in 2020 than any year in the past 2 decades. In total, 14 leopards killed in 2020 were recorded, with most caught in wire snares set for other species. We provide an overview of this situation in this report. In response to the increase in leopard deaths – and particularly the death in May of a rare black leopard on a tea estate near Peak Wilderness – there was a surge in media interest in human-leopard interactions and ways to mitigate negative repercussions. As such, WWCT partook in many media interviews, briefings and opinions, as well as wrote our own newspaper articles. We were also involved in a news documentary on snaring in the Central Highlands which was collaboratively conceived and produced by one of Sri Lanka's largest media companies. WWCT collaboratively designed and created an anti-snaring pamphlet that was rapidly and widely distributed in the Central Highlands, especially amongst the tea estate companies for whom this is a direct issue. A collaborative awareness message was also devised together with the Department of Wildlife Conservation (DWC) and a public interest group - which was placed, free of charge, in Sri Lanka's most widely circulating English, Sinhala and Tamil newspapers.

Despite all of the many challenges, for WWCT 2020 will be remembered with a great deal of pride as the Peak Ridge Corridor was finally brought into being with a Memorandum of Understanding (MoU) signed by 5 of the 6 main stakeholders. The sixth, although fully supportive on the ground, will only formalize its support in 2021. This is a very exciting initiative as it marks a ground-breaking, collaborative effort by a number of ostensibly competing tea companies, brought together by a leisure company, to join together for the greater good of leopard and wider biodiversity conservation in the Central Highlands. Now that the broad-brush agreement has been made, the finer details of the agreement will continue to be refined and implemented in 2021. Replicating this initiative is something that WWCT plans to pursue. Key to this is re-forestation of sections of the Ridge which WWCT has already started in 2020 on the Dunkeld estate.

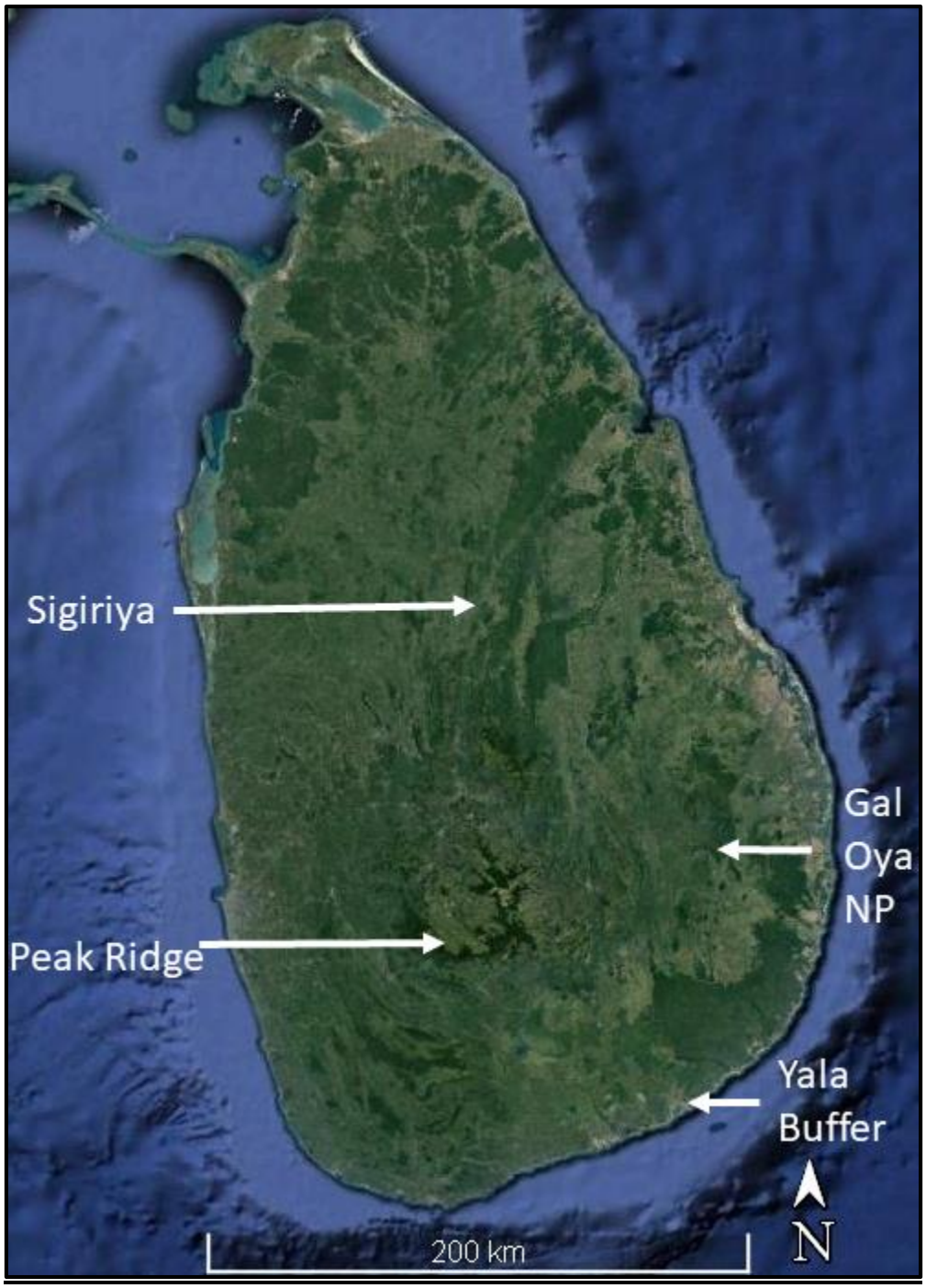



Figure 1: Map of Sri Lanka showing the main study areas where WWCT conducted field research in 2020. Sigiriya and Gal Oya NP are in the dry zone, the Yala Buffer area is in the arid zone, and the Peak Ridge area is in the wet zone.

## Update of WWCT Activities - January to December 2020

I. Research
- A. Island-wide Status
- B. Peak Ridge Corridor
- C. Gal Oya National Park
- D. Yala Buffer Zone
- E. Patch Forest Project
  - i. Sigiriya
- F. Human-leopard co-existence
  - i. Central Highlands

II. Education and Awareness
- A. Events
- B. Presentations/training sessions
- C. Awareness materials
- D. Social Media
- E. Staff/Students/Interns/Volunteers
- F. Media
- G. Publications

III. Acknowledgements

---

## I. Research

### A. Island-wide Status

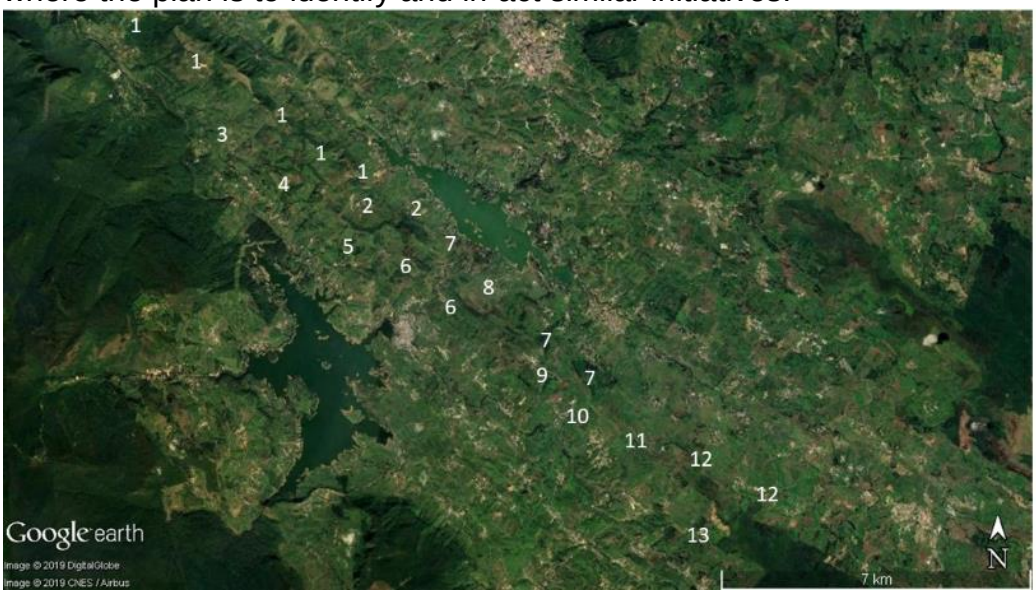
In 2020 the status of the Sri Lankan leopard (*Panthera pardus kotiya*), the endemic sub-species that is Sri Lanka's apex predator, was down-listed in Threatened status from Endangered (EN) to Vulnerable (VU) based on the assessment by WWCT's PIs. This was a very challenging assessment as it was largely based on a wealth of new information which has been hard won – mostly by WWCT - since the previous assessment in 2008. As such this does not represent an authentic improvement in the status of the species but a category change based on an improved ability to judge the status. Confusingly however, the crux of the status change is that there is only a minor reduction (-7%) in the estimated population size of *P.p. kotiya* from 834 mature individuals (range: 700 – 950) in 2008 to 776 (range: 529 – 1132) in 2020, which is below the reduction threshold (20%) required to qualify as EN. This is good news for the leopard in Sri Lanka as it suggests that the population has remained fairly stable in the past decade, a notion supported by the fact that the known range of the leopard in Sri Lanka has actually increased slightly since 2008 with no known sub-populations being extirpated.

As assessors, we did argue that indirect evidence points towards an increasing risk to leopards in Sri Lanka with both levels of deforestation and direct persecution increasing in the past 10 years. Earlier research by WWCT has shown that habitat suitability for

leopards in Sri Lanka is closely linked to the amount and continuity of forest cover, so the increasing loss of that cover suggests a decline in habitat quality for the sub-species. Unfortunately, forest cover decline has accelerated even more in the past 12 months with almost daily reports of incursions of clearing land in Forest Reserves, State Forests, Sanctuaries and even National Parks. Furthermore, the number of leopards killed in 2020 in Sri Lanka rivals the highest single years in the two decades (2010 and 2016; see section I F.). Together these daunting signals mean that the leopard population in Sri Lanka needs to continue to be carefully monitored, despite the apparent improvement in status, and this has been agreed with the IUCN and written into the 2020 status update. The full assessment can be read here:
https://www.iucnredlist.org/species/15959/50660847.

B. Peak Ridge Corridor

There was very promising progress in 2020 regarding the conservation status of the Peak Ridge Corridor (Fig. 2). Of the 6 Regional Plantation Companies (RPCs) and private estates that are stakeholders on the ridge, 5 have signed the Memorandum of Understanding (MoU) to formalize the status of the ridge into a Conservation Area. Those companies are Bogawanthalawa PLC, Horana PLC, Madulsima PLC, MJF Plantations (Dilmah) and Kelanya-Braema private estate. Maskeliya PLC, which has 3 estates backing the ridge, has yet to sign the MoU despite being in general agreement about its goals. This has been a very long process but one that we hope will pay immense future dividends by ensuring that this important ridgeline corridor remains intact, and in fact improved, for the future. The realization of this initiative has been greatly assisted by Resplendent Ceylon who has taken a lead role in bringing together these partners. An official launch of the Peak Ridge Corridor, inclusive of all present signatories', had to be postponed for early 2021. This is a historic event as it is the first time a group of different companies have come together to make a joint declaration of this nature and we hope it provides an effective blueprint going forward. WWCT is now looking at adjacent ridges where the plan is to identify and in-act similar initiatives.




1. Osborne Estate (Bogawanthalawa)
2. Dunkeld Estate (MJF)
3. Hapugastenne Estate (Maskeliya)
4. Moussekelle Estate (Maskeliya)
5. Kelani-Braema Estate (Pvt)
6. Glentilt Estate (Maskeliya)
7. Norwood Estate (Bogawanthalawa)
8. Rockwood Estate (Bogawanthalawa)
9. Stockholm Estate (Horana)
10. Mahanilu Estate (Horana)
11. Venture Estate (Madulsima)
12. Kew Estate (Madulsima)
13. Alcot Estate (Horana)

Figure 2: The tea estates and their parent companies that run along the Peak Ridge Corridor.

*Leopard Activity*

Unfortunately – possibly due to the influx of new people to the tea estate landscape in 2020 due to Covid-19 (see below section I F.) - we lost 4 remote camera units to theft, plus one that was destroyed by a fire set by estate workers clearing underbrush, which subsequently got out of control. Despite these setbacks – and the associated challenges of visiting field sites and maintaining cameras during lockdown - we managed to run 13 remote camera locations for a total of 2556 remote camera days and collected 247 leopard images of 16 leopards (5 adult males, 6 adult females and 5 cubs).

Most of these individuals are well known to us now, including “Arnold” who has been in the Kew and Norwood estate area since August 2016; “Ozzie” who we have had since October 2016, mostly around Osborne estate; “OC” who has been in the Dunkeld/Kelanya-Braema/Osborne estate area since November 2016 when she was with a young male cub (“Oliver”), the first of 4 litters that we have tracked to date (Fig. 3)!


Figure 3: Upper left – “Arnold”, an adult male whose range includes parts of the Norwood, Kew and Venture estates and has been resident here since WWCT started this project in August 2016. Upper right – “Ozzie”, an adult male whose range includes the Osborne estate portion of the ridge and was first detected here in October 2016. Lower left – “OC”, an adult female who resides in the Dunkeld/Kelanya-Braema/Osborne estate sections of the Ridge and has had 3 litters of cubs since we first detected her (when she was already with a male cub) in November 2016. Lower right: OC’s most recent cub, born in the end of 2019.

More recent additions on the landscape who are now also “regulars” include two individuals who first appeared on the ridge in January 2019: “Whitley”, who is now an established presence in the Norwood/Dunkeld/Kelanya-Braema area, and “Nina” who has been residing in the Norwood and Kew estates since, and after bringing up a male cub, “Nino”, had a litter of 3 more in March or April 2020 (Fig. 4). It is quite likely that “Arnold” is the father of these cubs, as he and “Nina” were photographed together on several occasions in the end of 2019 (Fig. 5) and the gestation period for leopards is ~90 days.


Figure 4: Upper left – “Whitley” is an adult male who arrived on the scene in January 2019 and has since established himself as a resident using the Dunkeld/Kelanya-Braema/Glentilt/Norwood section of the Ridge. Upper right – “Nina” also was first detected, at Norwood estate, in January 2019 and has also now established herself, using the section of Ridge that runs from Norwood through Venture to Kew estate. Lower left: “Nino” is from Nina’s previous litter, a male who was last seen in July 2020 at around the same time as Nina’s most recent litter was being nursed. We assume he has dispersed as young male leopards do. Lower right: Nina’s latest litter of 3 cubs.

Figure 5: “Arnold” and “Nina” together in December 2019. In March or April 2020 Nina had a litter of 3 cubs.

What becomes of the cubs that are born in this landscape is a question that is taking on increasing prominence for us. From the animals that we have been closely monitoring for the past 4+ years, we have seen three adult females having 7 litters of a total of 12 cubs (Table 1). It is probable that there were more cubs than this as leopards typically have 2-3 cubs in a litter, but from the remote camera captures that we were able to get, we have seen 3 litters of a single cub, 3 litters of 2 cubs and a single litter with 3 cubs. Of these 12, 4 were still < 12 months old at the end of 2020. Of the remaining 8, we were able to track 4 individuals to an age roughly commensurate with dispersal (~1.5 – 2 years). This equates to 50% of cubs reaching dispersal age, assuming cubs that were no longer detected had died, which is approximately similar to what WWCT determined for Yala National Park, Block I (~40 - 50%). Needless to say, more accurate information about the survival of these cubs (as well as about the actual litter sizes at birth) would be extremely useful for improving our understanding of the status of leopards in this unprotected landscape.

| Litter # | Cubs | # | Sex | Name | First Seen | Estimated age | Last Seen | Estimate age | Duration (days) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | OC's 2016 (Oliver) | 1 | Male | Oliver | 2016-11-16 | 4 - 6 months | 2017-12-04 | 17 - 19 months | 383 | Possibly dispersed? |
| 2 | OC's 2017 cubs | 2 | UN | NA | 2017-10-12 | 4 - 6 months | 2018-01-15 | 7 - 9 months | 95 | |
| | | | UN | NA | 2017-10-12 | 4 - 6 months | 2017-11-19 | 5 - 7 months | 38 | |
| 3 | Kelanya Cubs | 2 | UN | NA | 2018-02-06 | 4 - 6 months | 2018-02-06 | 4 - 6 months | NA | Only seen once |
| 4 | OC's 2018 cubs | 2 | Male | Oswald | 2018-12-06 | 4 - 6 months | 2019-11-14 | 15 - 17 months | 343 | Possibly dispersed? |
| | | | Female | Odile | 2019-02-03 | 6 - 8 months | 2019-12-03 | 16 - 18 months | 303 | Possibly dispersed? |
| 5 | Nina's 2019 (Nino) | 1 | Male | Nino | 2019-08-22 | 4 - 6 months | 2020-07-24 | 15 - 17 months | 337 | Possibly dispersed? |
| 6 | OC's 2019 cubs | 1 | UN | NA | 2020-06-20 | 4 - 6 months | 2020-09-06 | 6 - 8 months | 78 | Possibly still around |
| 7 | Nina's 2020 cubs | 3 | UN | NA | 2020-09-14 | 4 - 6 months | 2021-01-07 | 8 - 10 months | 115 | Still in area. One may have died. |

Table 1: List of the 7 litters of leopard cubs that WWCT has detected and monitored on the Peak Ridge Corridor since 2016.

*Other wild Cat monitoring*

As usual, other small cats were also monitored along the Peak Ridge Corridor, with fishing cats (*Prionailurus viverrinus*) detected on 9 occasions and rusty-spotted cats (*Prionailurus rubiginosus*) on 96 (Fig. 6). This trend, whereby the diminutive rusty-spotted cat is detected far more frequently than its larger cousin, has been consistent over the years of this work, and is also typical of most areas in the country, suggesting a substantial island-wide rusty-spotted cat population.

Figure 6: Left - A Fishing cat (*Prionailurus viverrinus*) photo-captured on Osborne estate in February 2020. Right – a Rusty-spotted cat (*Prionailurus rubiginosus*) photo-captured on Glentilt estate in October 2020.

*Habitat Restoration*

The re-forestation of the Peak Ridge was initiated in 2020, with the assistance of the Dunkeld estate school's Forest Guardians, on a 7-hectare section at the top of Dunkeld estate (Fig. 7). The initial planting was of a shade providing hardy timber species common in this estate landscape. We hope that these trees will prosper and provide the needed micro habitat to support the native species that we are currently propagating inside the Dunkeld Conservation Station nursery, and thereafter planting on the ridge (Fig. 8). Interspersing such shade trees with native species will ensure long-term establishment of the planted area.

Figure 7: Left: loading "toona" saplings for planting; Centre: WWCT staff and Forest Guardians preparing the ground; Right: an 'elephant ears' native species sapling planted at the site.

Figure 8: The DCS nursery nestled in the hills on Dunkeld estate, below the Peak Ridge Corridor.

These native species are difficult to source, as the Sri Lanka Forest Department primarily stocks timber species, and most other re-forestation nursery's hold lowland dry zone species. We therefore collect wild cuttings and propagate from seed. Unfortunately, due to Covid-19 restrictions, we were unable to plant as many trees as we had hoped, and so far, ~200 trees have gone into the ground, with several hundred more in various stages of growth in the nursery.

C. Gal Oya National Park

*Leopards*

In Gal Oya NP an additional 904 camera trap 24-hour periods were recorded in 2020, from January through mid-June, all in the Nilgala area (Fig. 9). We recorded 50 leopard observations over this period which included 4 previously unrecorded individuals. This gave us a total for Gal Oya NP of 4846 24-hr camera periods and 229 leopard observations, and gives an overall relative abundance index (RAI) of 4.7 leopard observations/100 remote camera 24-hr periods. This varies by area/habitat with both Mullegama and Nilgala – the more undisturbed, forest sections – with RAIs ~ 7.0, compared to Namal Oya which had RAI ~ 1 in the Sanctuary partially utilized by cattle herders, and ~3.5 in the National Park section (Fig.10).

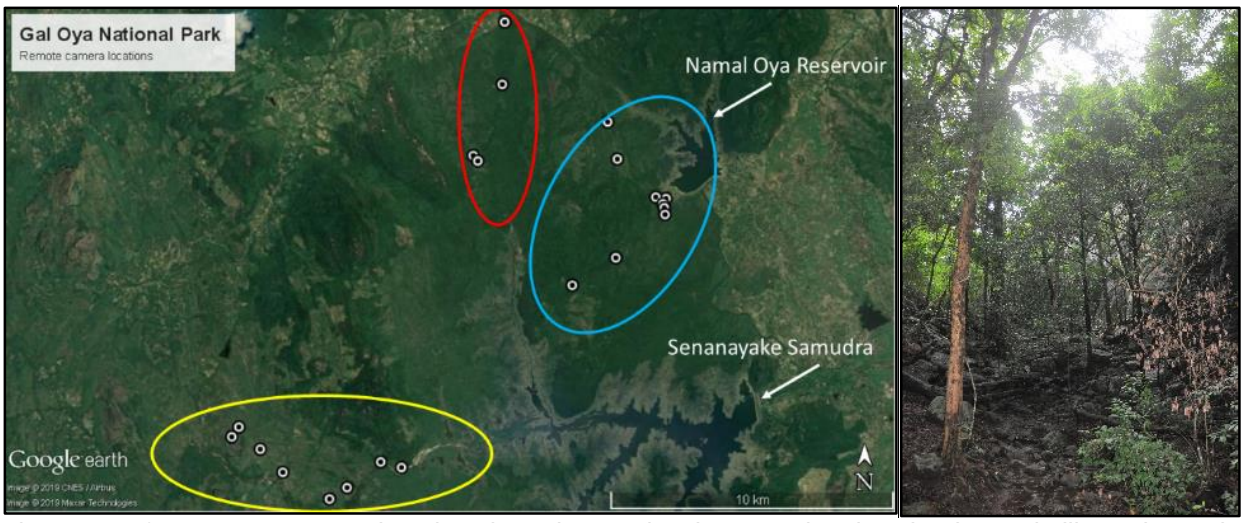
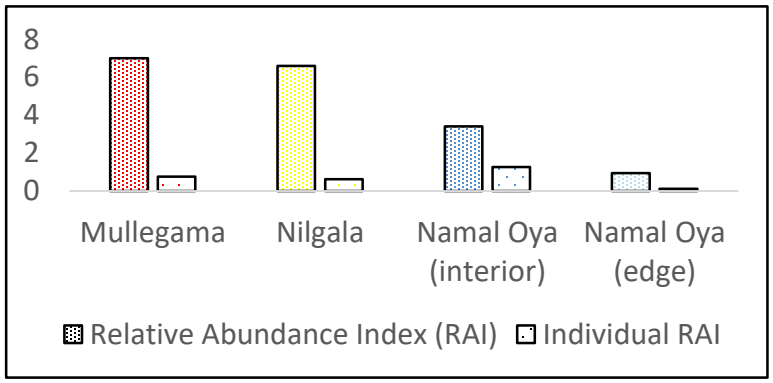



Figure 9: Left - Remote camera locations in and around Gal Oya National Park. The Red ellipse shows the Mullegama area of dense, lowland, dry zone monsoonal forest; the Blue ellipse shows the Namal Oya area which includes both heavily grazed, open terrain around the Namal Oya reservoir, and tropical dry zone monsoonal forest as one moves southwest towards the Senanayake Samudra; the Yellow ellipse shows the Nilgala area of more open dry zone forest, paralleling the Gal Oya, the river that was dammed to form the massive Senanayake Samudra reservoir. Right – an example of some of the forest in the Nilgala area.

Fig. 10: The Relative Abundance Index (RAI; # of leopard observations/100 24-hr periods of observation) of the different sections of Gal Oya NP. As can be seen, the two more similar forested core areas (Mullegama and Nilgala) were very similar in terms of the number of leopard observations as well as the number of different individuals, whereas the Namal Oya area differed, with far less frequent observations, especially in the peripheral Sanctuary.




In total we recorded 23 different individuals (not including one unidentified animal) across the 3 Gal Oya study areas, with an adult sex ratio of 1♂:1.4♀ (Table 2).

| | Individuals | | | | Total |
|---|---|---|---|---|---|
| **Location** | **Adult F** | **Adult M** | **Sub F** | **Sub M** | **Individuals** |
| Mullegama | 4 | 3 | 2 | 1 | 10 |
| Nilgala | 4 | 4 | 2 | 1 | 11 |
| Namal Oya (interior) | 2 | 1 | 0 | 0 | 3 |
| Namal Oya (edge) | 1 | 1 | 0 | 0 | 2 |
| **Total** | **10** | **7** | **4** | **2** | **23** |

Table 2: The number of individuals by age and sex class detected in each of the study areas over the duration of the study. The "Total" column is not a sum of the location numbers as we had a couple of individuals that utilized both the Mullegama and Namal Oya areas.

Observed activity patterns were broadly similar across the three study areas, with increased nocturnal activity but a low level of diurnal activity (Fig. 11). Again, the two more similar areas – Mullegama and Nilgala – had relatively little deviation between activity patterns.

Nilgala does show a slightly lower amount of diurnal activity than Mullegama, which might be explained by the fact that Nilgala is visited by safari jeeps, whereas Mullegama is not. Unlike well-visited PAs such as Yala and Wilpattu NPs where leopard populations are well habituated to human presence, in Gal Oya, few visitors enter the NP so leopards here remain wary of vehicles. The Namal Oya area sees a slightly higher level of daytime activity but also a sharp spike just before dawn. This somewhat puzzling pattern is explained when looking more closely at the Namal Oya observations. When dividing the Namal Oya area into its two component parts (interior and edge), it is apparent that all of the daytime activity is in the interior which is not frequented by people, whereas the edge zone, where fishermen, cattle herders, wood collectors etc. are present during the day, sees an absence of daytime activity and is responsible for the pre-dawn (and to a lesser extent post-dusk) spike (Fig. 12).

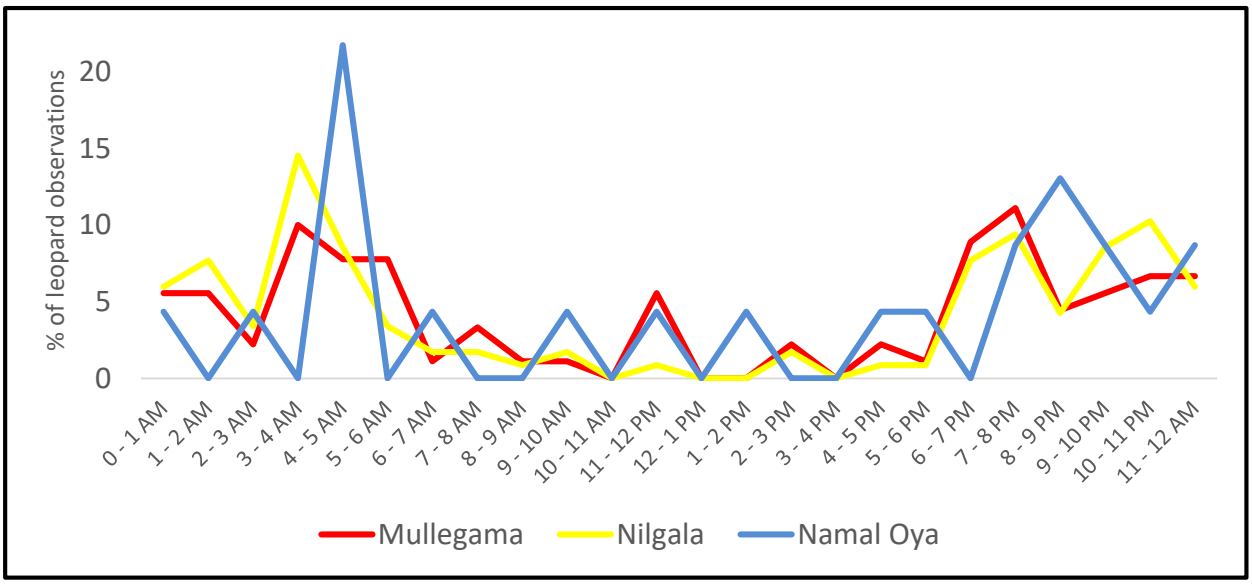



Figure 11: A) the 24-hour activity patterns of leopards in the three study areas of Gal Oya NP (Mullegama, Nilgala and Namal Oya) based on photo-capture times.

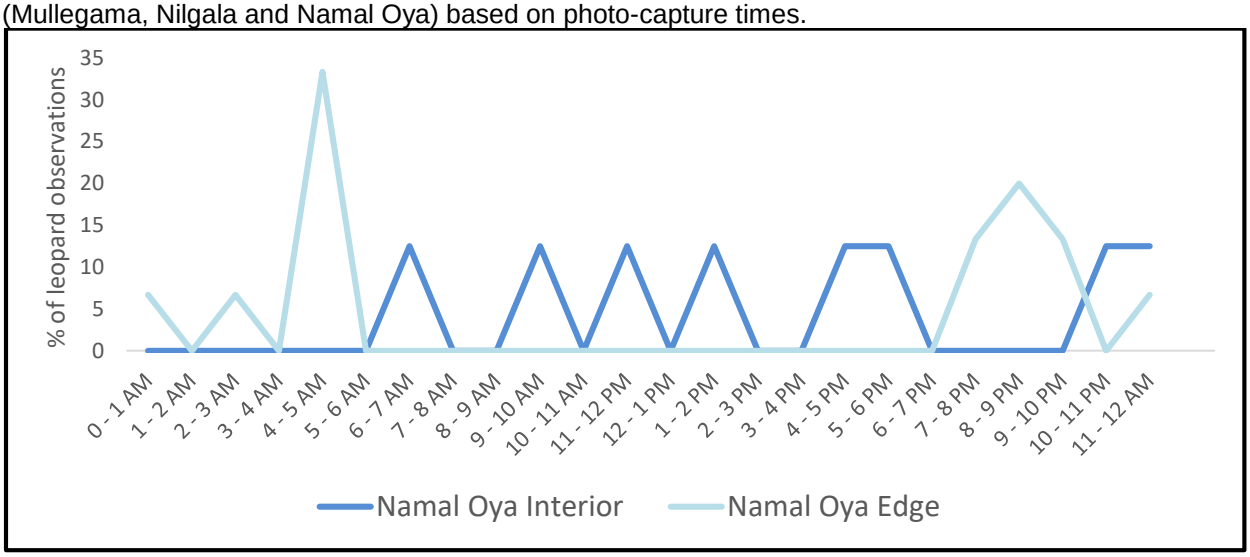



Figure 12: The activity patterns of leopards in the interior and edge of the Namal Oya study area, showing that the area without humans (interior) sees more frequent diurnal activity whereas the area with a high human presence (edge) shows NO daytime activity and instead pre-dawn and post-dusk spikes.

This unusual pattern of daytime inactivity is strikingly similar to what we see in the unprotected Central Highlands (Fig. 13, “Peak Area”) which also has a high human footprint. It appears that in places where daytime human activity is heavy (and not in the form of jeep safaris) leopards actively reduce their diurnal activity, probably to avoid encounters. In general, however, the Gal Oya NP leopard activity patterns are similar to those of another lowland dry zone PA, Wilpattu NP, albeit with a higher proportion of activity in the early hours of pre-dawn (Fig.13).

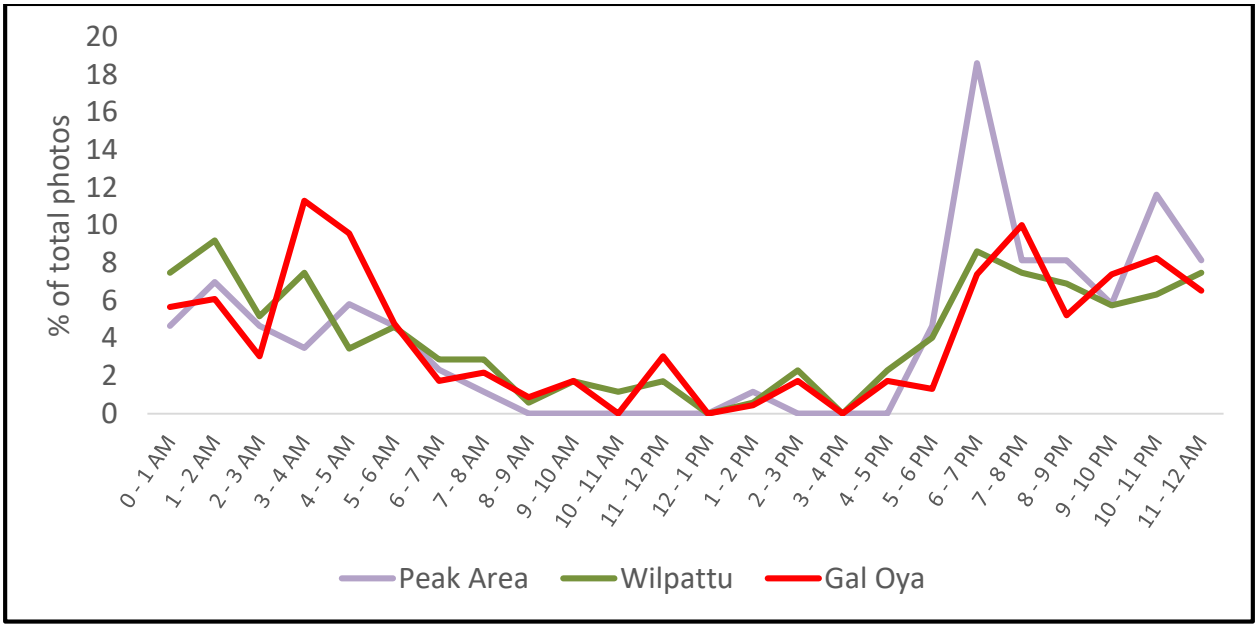



Figure 13: Activity times, based on leopard photo-capture times, for Gal Oya NP compared to Wilpattu NP and the unprotected tea estate landscapes in the Peak Wilderness Area. Gal Oya NP shows a very similar pattern to Wilpattu NP, another lowland dry zone PA. Leopards in both PAs exhibit higher levels of diurnal activity than that observed in the human-dominated Peak Area landscape.

Continuing the comparison between Gal Oya NP, Wilpattu NP and the unprotected tea estate landscape of the Central Highlands near Peak Wilderness, it is clearly apparent that Wilpattu NP has the highest frequency of leopard detections which reflects its higher leopard population (Fig. 14). What is interesting however, is that the RAI in the unprotected Peak Area is considerably higher than that in Gal Oya NP, suggesting a higher abundance of leopards in the Peak Area. On the surface, this is surprising, as Gal Oya is a National Park with vast expanses of intact monsoonal evergreen forest and savanna-type habitat whereas the Peak Area is characterized by a mosaic of heavily cultivated tea land, small forest patches, plantation forests of *Eucalyptus* and *Pinus*, grasslands/scrub areas of released/removed tea and village areas. Typically leopard density scales closely to available prey biomass which suggests that the Peak Area, despite its heavily fragmented structure may have a greater availability of prey than Gal Oya NP. Alternately, leopards in the two locations may be utilizing the landscape differently, with Peak Area leopards perhaps more likely to use the tea roads where our cameras are located given that off-road movement is compromised by the structure of the tea cultivation.

In the relatively open lowland forest of Gal Oya NP, leopards might be more easily able to move along game trails and thus avoid some of the jeep tracks many of our cameras were located. However, were this the case, we should also possibly see lower RAI scores for Wilpattu NP which also has relatively open, tall forest, and clearly we don't. We are in the early stages of investigating potential prey availability from our remote camera data for Peak and Gal Oya to see if the prey biomass hypothesis is supported.

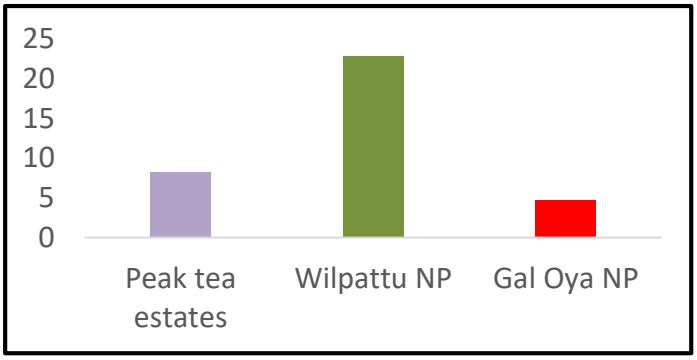



Figure 14: The Relative Abundance Index (RAI; # leopard photos/100 24-hr camera periods) of leopards in three Sri Lankan study areas: Wilpattu NP in the dry/arid northwest; the unprotected tea estate landscape of the Central Highlands near Peak Wilderness Sanctuary; and the dry/intermediate zone Gal Oya NP in the east central region. Leopard abundance was much higher in Wilpatt NP compared to the other locations. The unprotected tea landscape was also higher than Gal Oya NP.

*Other WildCats*

All of the small cats in Sri Lanka – the rusty-spotted cat, jungle cat (*Felis chaus*) and fishing cat – were again detected in Gal Oya NP's Nilgala region in 2020 (Fig. 15) with the diminutive rusty-spotted cat by far the most abundant (Fig. 16). The relative abundance of these cats was an order of magnitude less than that of leopards. The fishing cat was the only small cat to be detected in all study areas, albeit at relatively low abundance (Fig. 16).

Figure 15: A Rusty-spotted cat (left), Jungle cat (middle) and Fishing cat (right) photo-captured in the Nilgala region of Gal Oya NP in the first half of 2020.

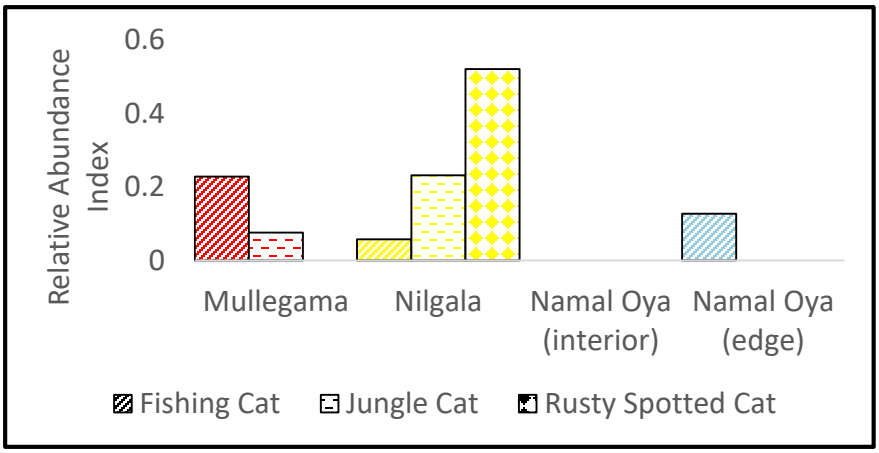
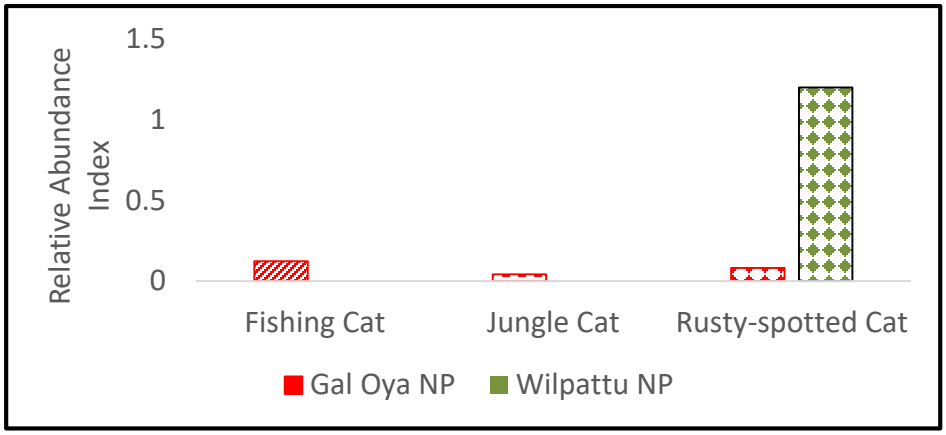



Figure 16: The Relative Abundance Index (RAI; # of individuals/100 24-hr remote camera periods) for the 3 Sri Lanka small cats (rusty spotted cat, jungle cat and fishing cat) in the different sections of Gal Oya NP. The Nilgala region was the only area where all three species were detected.

Although all three small cats were detected in Gal Oya NP, compared to only the rusty-spotted cat in Wilpattu NP, the relative abundance of the latter wild cat shows a similar pattern to that observed for the leopard, whereby Wilpattu NP exhibits a much higher RAI (Fig. 17). The observation of the jungle cat in Gal Oya NP may be due to the savannah habitat unique to this region, with patches of treed grassland amidst the forest, as this is the type of habitat seemingly preferred by the elusive jungle cat.

Figure 17: The Relative Abundance Index (RAI; # of individuals/100 24-hr remote camera periods) for the 3 Sri Lankan small cats (rusty-spotted cat, jungle cat and fishing cat) in Gal Oya NP compared to Wilpattu NP.




This tracking of small cats in the various WWCT study sites across Sri Lanka is very valuable, as none of these species are well know in terms of ecology and behaviour – globally as well as in Sri Lanka - so being able to improve our understanding of distribution and relative abundance allows for more accurate status assessments. Although WWCT has found both rusty spotted cats and fishing cats widely distributed in Sri Lanka, the jungle cat appears to be much more habitat restricted with Gal Oya NP being one of the areas in the country to encounter them.

*Sloth Bears*

Sloth bears (*Melursus ursinus*) are another important component of Sri Lanka's lowland dry zone forest ecosystem (Fig. 18) and WWCT maintains records of all observations of these shuffling omnivores across study systems as their island-wide status is not well established. In a pattern similar to that observed for leopards, bears were detected in Mullegama and Nilgala with considerably more regularity than Namal Oya, with its

increased human footprint (Fig. 19). It is important to note that the RAI for bears throughout the study area was low (< 1.5). Again, in a pattern similar to that detected for leopards and rusty-spotted cats, RAI for bears in Gal Oya overall was far lower than in Wilpattu NP, suggesting a lower habitat suitability (Fig. 20). Gal Oya is the watershed for the massive Senanayake Samudra, and is well known for its elephant (*Elephas maximus*) population (Fig. 21), however the forest has fewer fruiting trees (i.e. palu *Manilkara hexandra*) than Wilpattu NP which may underlie the relatively low bear abundance here.

Figure 18: A male sloth bear *Melursus ursinus*) detected in the Nilgala section of Gal Oya NP in January 2020.

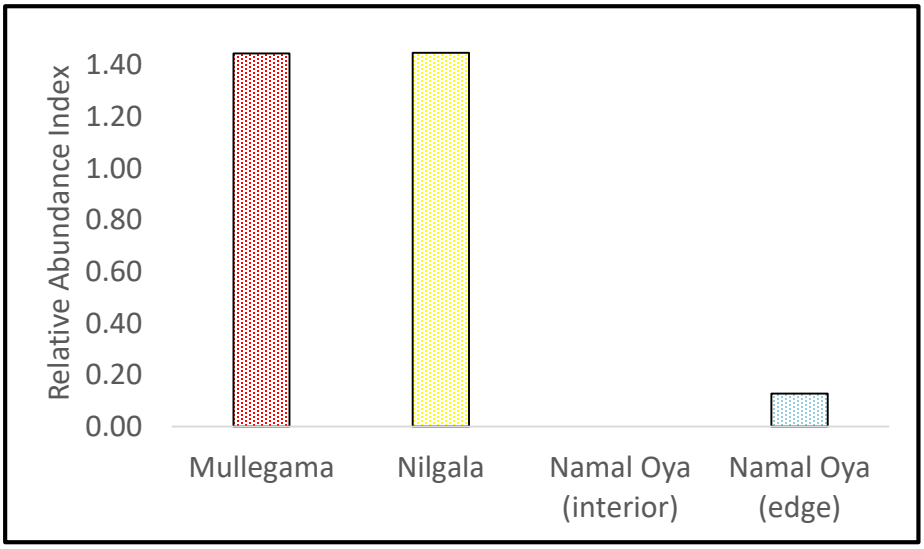



Figure 19: The relative abundance index (RAI; number of individual observations/100 24-hr camera periods) for sloth bears in the three-Gal Oya NP study areas. Bears were observed in the two interior forested sections (Mullegama and Nilgala) with similar frequency.

Figure 20: The relative abundance index (RAI; number of individual observations/100 24-hr camera periods) for sloth bears at Gal Oya NP and Wilpattu NP. Bears were considerably more abundant in Wilpattu NP.

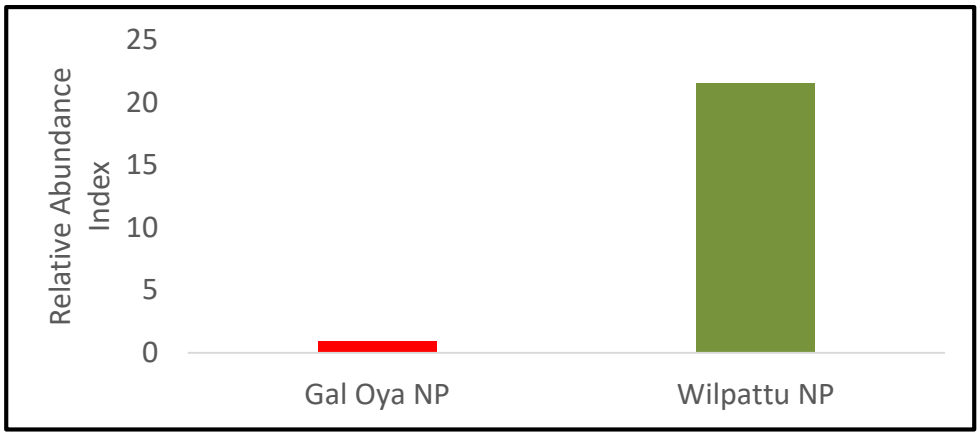



Figure 21:
A herd of Asian elephants (*Elephas maximus*) at Mullegama area of Gal Oya NP.

D. Yala buffer zone

*Leopards*

WWCT completed 1756 remote camera 24-hr periods in the southern buffer zone of Yala National Park's Block I in 2020 (Fig. 22). This brings the total camera effort in this region to 1972 24-hour periods, during which 72 leopard events have been photo-captured (Fig. 22) over 71 occasions giving an RAI of 3.65 leopards/100 24-hour camera periods. So far 4 adult and 2 young females have been identified, as have 4 adult and 3 young males. There is a single unidentified animal. Comparing between the two regions – the Nimalawa Sanctuary and the Hotel Zone Tourist Board land – the RAI for Nimalawa is 3.9 and for the Hotel Zone 3.4, with almost the same number of observations in each area (Fig. 23).

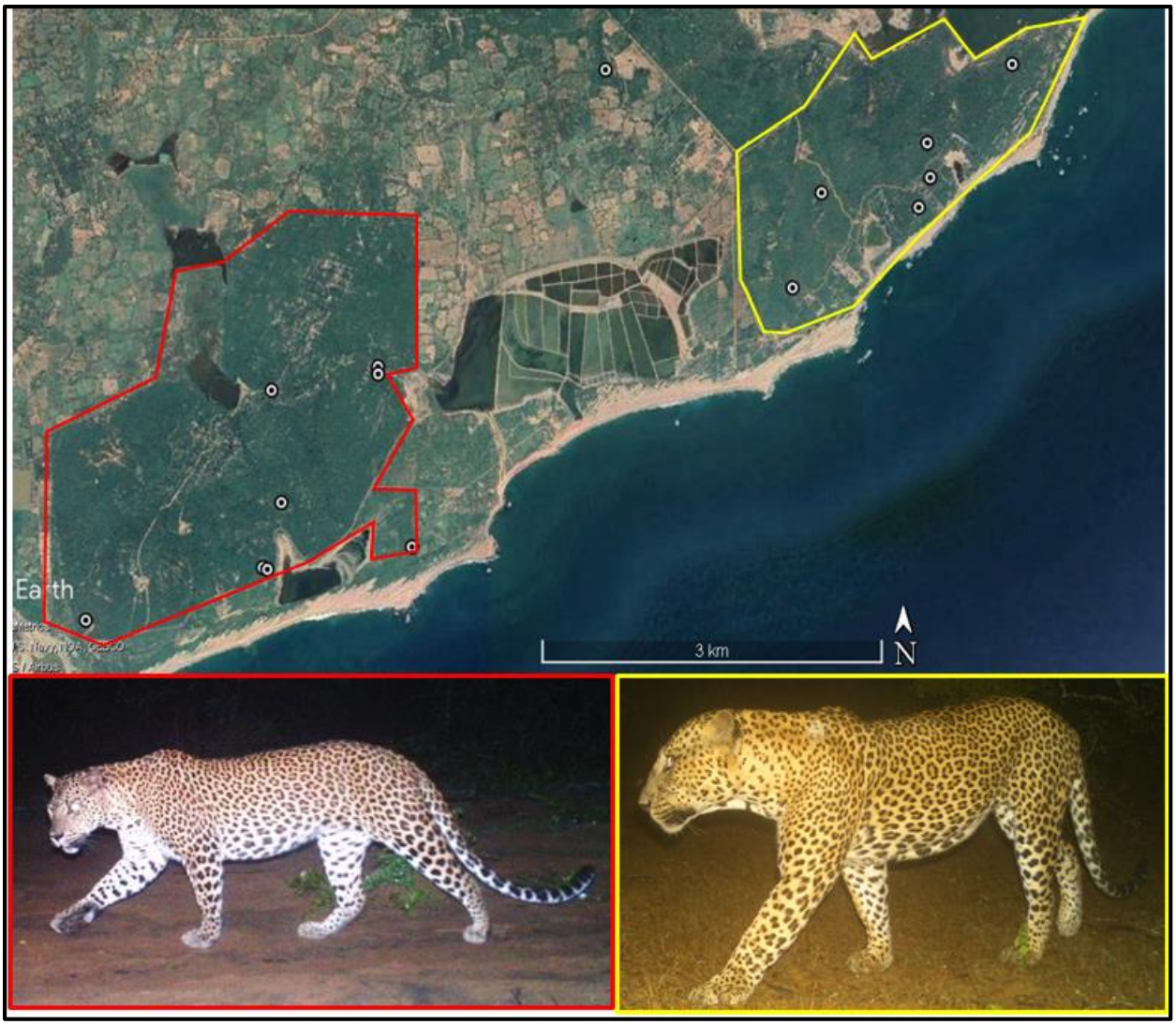



Figure 22: The Yala Buffer zone with camera locations (black dot surrounded by white). The Nimalawa Sanctuary is outlined in red and the Tourist Board hotel zone in yellow. The left hand side leopard is an adult female photo-captured in the Nimalawa Sanctuary in November and the right side leopard is a young adult male photo-captured in the Tourist Board hotel zone in September.

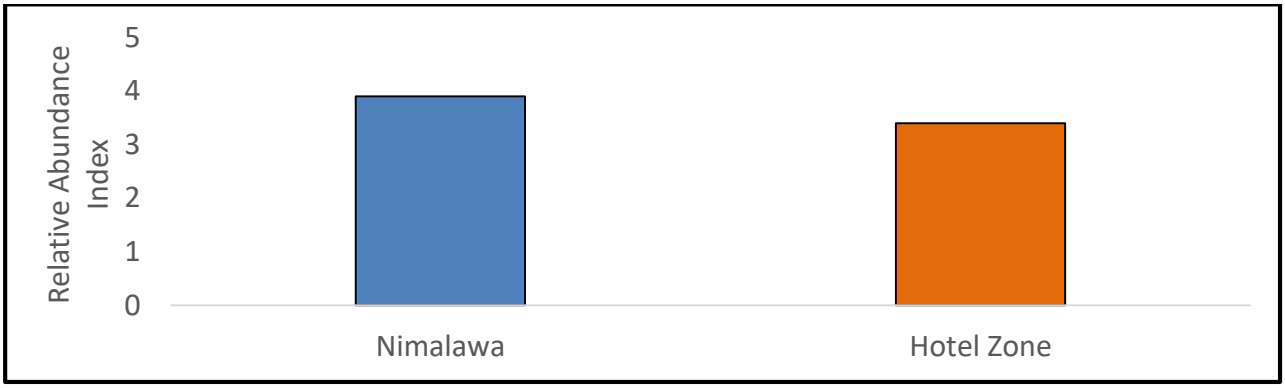



Figure 23: The Relative Abundance Index (RAI; # individuals/100 24-hr camera period) for leopards in the Nimalawa Sanctuary and the Tourism Board hotel zone. Both areas buffer Yala National Park's Block I to the south-west of Palatupana.

*Other Wild Cats*

As in Gal Oya and Wilpattu NPs, the rusty-spotted cat is far more common in the Yala buffer area than the other two small wild cats (Fig. 24).

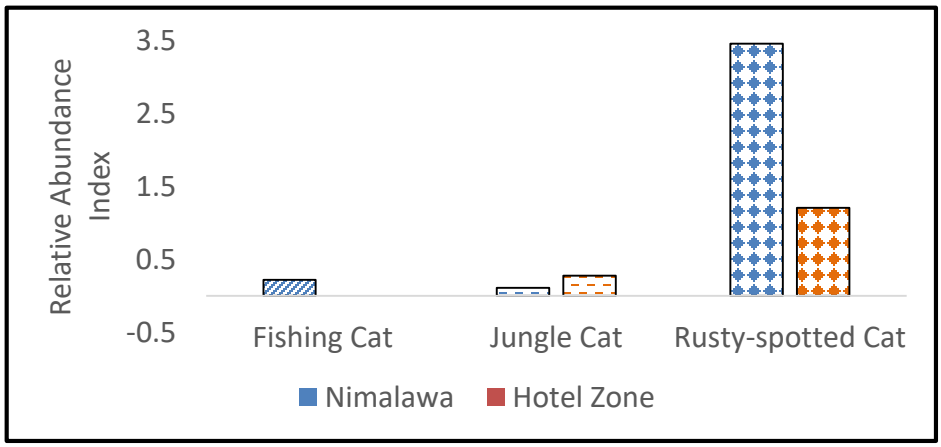


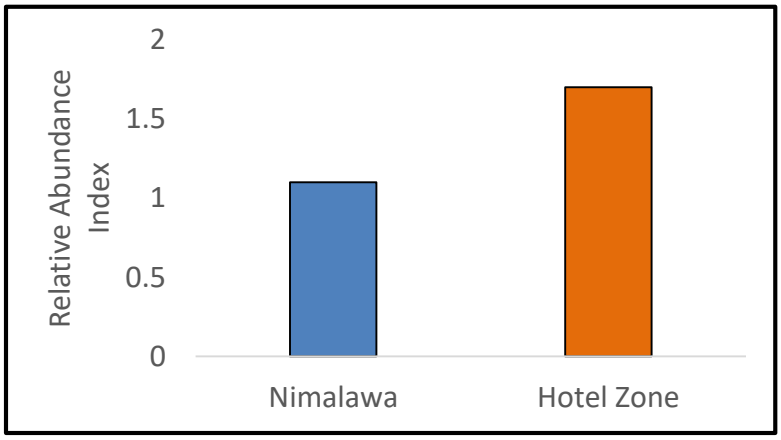

Figure 24: The Relative Abundance Index (RAI; # of individuals/100 24-hr camera period) for small wild cats in the Nmalawa Sanctuary and the Tourism Board hotel area. Both areas buffer Yala National Park's Block I to the south-west of Palatupana.

***Sloth Bears***

Sloth bears (Fig. 25) were detected slightly more in the Tourism Board hotel zone (which is closer to Yala National Park) than in the Nimalawa Sanctuary (Fig. 26), with RAI similar overall to what is seen in Gal Oya NP and far lower than Wilpattu NP observations.

Figure 25: Three sloth bears (a mother on the left, and two cubs) at the Nimalawa Rock.

Figure 26: The relative abundance index (RAI; number of individual observations/100 24-hr camera periods) for sloth bears in the Nimalawa Sanctuary and the Tourism Board hotel zone. Both areas buffer Yala National Park's Block I to the south-west of Palatupana.



E. Patch Forest Project

Sigiriya - *Leopards*

Due to Covid-19 restrictions we were only able to continue the remote camera work at the Back of Beyond properties at Dehigahaela and Pidurangala. Running 3 cameras on each property, we managed to get 991 24-hr camera periods at Dehigahaela and 937 at Pidurangala for a total of 1928 across the two properties. We photo-captured leopards on 17 occasions, 14 at Dehigahaela and 3 at Pidurangala with 10 of the Dehigahaela photos of the resident female “Daria” (Fig. 27). There was another female and male photo-captured at Dehigahaela and a different male and female at Pidurangala (Fig. 28).

Figure 27: “Daria” the adult female resident in the Dehigahaela area. She was photo-captured on 10 different occasions in 2020, including in July (left) and November (right).

Figure 28: Clockwise from top left: Adult female leopard at Dehigahaela in March 2020, Adult male at Dehigahaela in April 2020, young adult male at Pidurangala in May 2020, and adult female at Pidurangala in December 2020.

*Other Wild Cats*

Although no small wild cats were detected on the Pidurangala cameras in 2020, all three were photo-captured at Dehigahaela, including fishing cat on 6 occasions, rusty-spotted cat twice and one jungle cat - or its back end at least! (Fig. 29).

Figure 29: Small wild cats in Dehigahaela 2020 - left to right: Fishing cat in March, jungle cat (back end) in October and rusty spotted cat in December.

F. Human-leopard Co-existence

Island-wide there were 14 leopards reported killed by humans in 2020, the highest number in a single year since 2016 when there were 13. This is part of an on-going trend which shows an increase in the number of human-induced leopard mortality incidents in Sri Lanka since 2000, from ~3.5/year in the early 2000s to ~ 8.5/year over the past decade (Figs. 30 & 31). The number of individual leopards known to be killed has risen less sharply, mainly due to the fact that there were several busts in the early to mid-2000s which detected multiple dead leopards, whereas the trend since 2010 has been single leopard mortality events (Fig. 30).

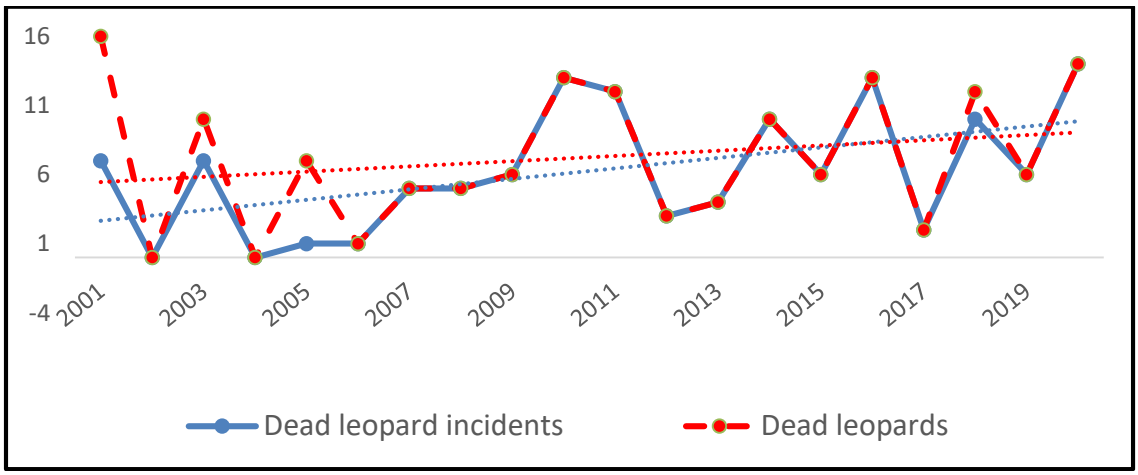



Figure 30: The number of incidents where dead leopards were detected and the number of individual dead leopards from 2001 – 2020 recorded in Sri Lanka. The discrepancy between the two lines in the early to mid-2000s is due to several busts by the DWC which detected multiple dead leopards/skins during a single incident. The trend since the mid-2000s is towards more incidents, mostly of single mortality events.

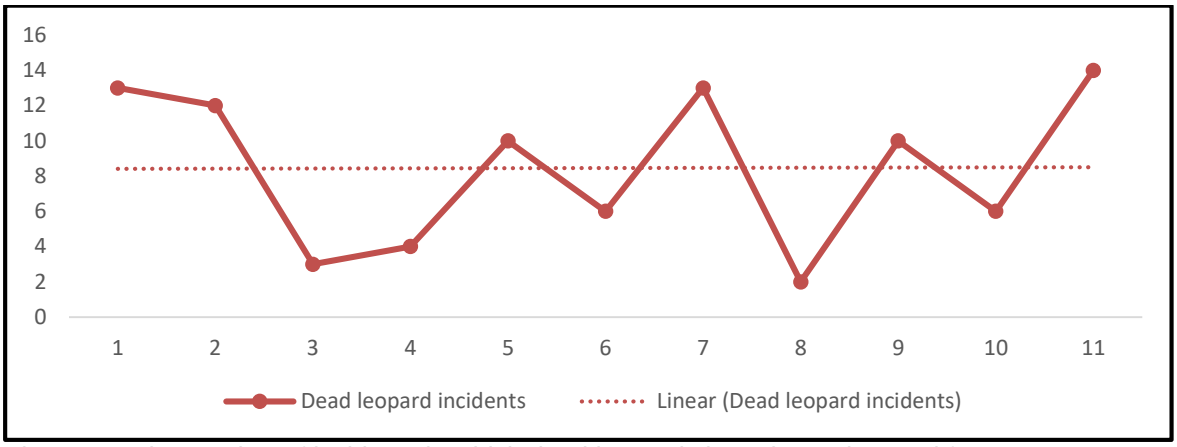



Figure 31: The number of incidents in which dead leopards have been detected from 2010 to 2020. Although inter-annual variation exists, the average of ~8 incidents/year is fairly stable.

## i. Central Highlands

Twenty-twenty was a challenging year for WWCT in Sri Lanka's Central Highlands – as it was for most of us all over the world! In the first half of the year there was a spate of leopard deaths caused by animals getting caught in wire snares. Although these snares are typically set to capture wild boar, either for meat in the forest areas or to protect vegetable crops in closer proximity to human habitation, they are indiscriminate and are a serious threat to all wildlife in the vicinity. A total of 17 leopards were reported caught in snares in 2020, 14 in the Central Highlands with 11 of them dying from their injuries. This appears to be an increasing trend (Fig. 32) although it is also possible that 2020 will turn out to be an exceptional year brought on by Covid-19 scenarios.

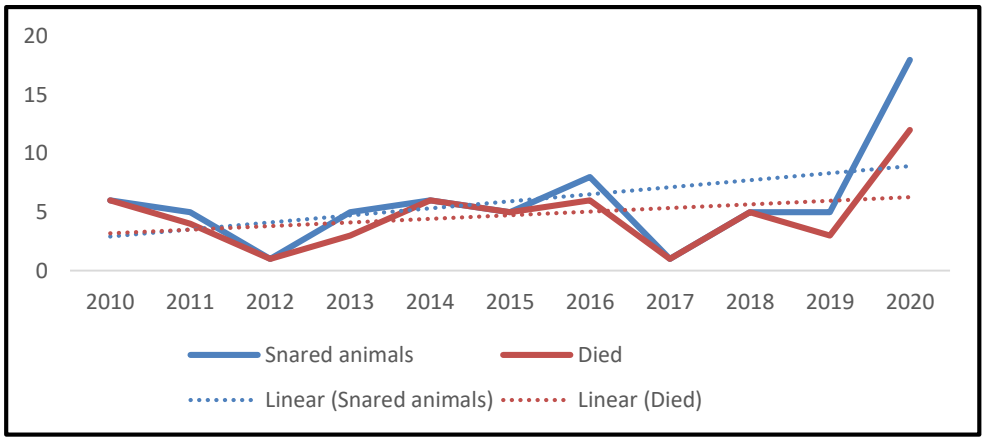



Figure 32: Number of snaring incidents and the number of individual leopards killed in these incidents from 2010 to 2020. The general trend in snaring appears to be increasing at a higher rate than that of animals being killed suggesting that protocols to save snared leopards might be improving.

An important factor which may have influenced these observations, is the social impact of Covid-19. Between mid-March and the end of June 2020 Sri Lanka was in a lock-down whereby people were not permitted to leave their homes except with written Government permission. When the lockdown was announced, thousands of people who are from tea estate areas but live and work in Colombo, returned to the estates to sit out the lockdown. This resulted in a large increase in the number of people in the estate areas, many of

them without employment and due to lockdown restrictions, with more difficult access to normal food supplies. As such, there appears to have been an increase in both vegetable farming in estate lands and poaching for meat, both of which often utilize wire snares for protection and capture, respectively. Although this might help to explain the higher snare figures from April through July, it does not explain the elevated number of incidents in January and February 2020 (Figure 33). Another possible explanatory variable impacting leopard snaring frequency in the Central Highlands is the Sri Pada pilgrim season (Dec – May) which typically sees thousands of devotees visiting the Peak Wilderness Sanctuary to climb the sacred Sri Pada (Adam's Peak) mountain. Often in Sri Lanka, ironically, religious festivals coincide with an increase in the consumption of bushmeat. Additional investigation is required to understand the drivers behind observed snaring incidents, but what is encouraging is the fact that a sharp drop off in snaring incidents occurred in the latter half of the year. Whether this was in direct response to the concerted and coordinated efforts by WWCT, the Department of Wildlife Conservation (DWC) and other interested parties in July to address the snaring issue – using dedicated awareness material (see below), anti-snare patrolling, and a publicity campaign to alert the public about the illegality of the practice - is uncertain, but the pattern appears to support this (Fig. 33).

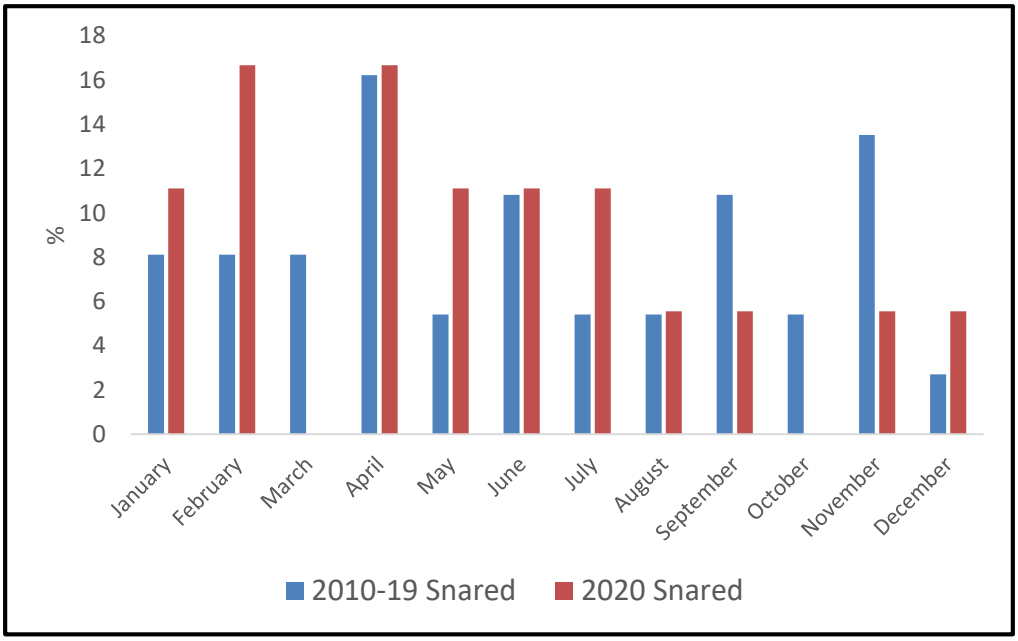



Figure 33: The percentage of snared leopards by month in 2020 compared to the previous 10 years (2010-19). The island-wide lockdown in 2020 was from mid-March to end June and a coordinated anti-snaring push with WWCT, DWC and others was launched in July.

Key to this anti-snaring push was the fact that one of the leopards killed by a snare in the Central Highlands was a black leopard (Fig. 34) which garnered a tremendous amount of media (both social and traditional) attention and galvanized the public towards an interest in this issue.

Figure 34: The adult male black leopard that was caught in a snare on a tea estate beside Peak Wilderness Sanctuary in the Central Highlands on May 26, 2020. He was rescued by DWC personnel but later succumbed to its wounds at the holding facility.

## II. Education and Awareness

*A. Events*

Colombo Fashion Week is an annual celebration of designers and their clothing designs, which has gained a large reputation in Colombo. In 2020 the organizers decided to expand the concept and invited a selection of artists, novelists, photographers and even researchers to give public lectures/talks in the new Galle Face One shopping complex during a couple of weeks in September. WWCT was one such invited speaker and we gave a well-attended talk on “The leopard as an umbrella species for biodiversity conservation in Sri Lanka”.

The unique format, whereby the talk was delivered in the middle of the public concourse of the shopping centre, ensured interested members of the public could join the Covid-19 restricted 50 or so invited guests to listen to the presentation. WWCT also took this opportunity to hand out our educational pamphlets and other items of outreach.

*B. Presentations/Training Sessions*

In February, WWCT presented its findings from the Gal Oya National Park research project to that project’s primary funders, Rockland Conservation and Olu Water, where staff and invitees attended the talk.

In September 2020, WWCT’s lead scientist, Dr. Andrew Kittle, participated in a workshop organized by DWC and a new public interest group - Hill Country Leopard Conservation Initiative - at the Laxapana Estate for the staff and managers of several estates owned by Maskeliya Plantations (Pvt) Ltd. Laxapana was where the black leopard was snared earlier in the year, and this was a follow up workshop aimed at educating managers and key estate staff in the broader Maskeliya valley, about leopard ecology in the region as well as how to avoid and if necessary, deal with leopard sightings and interactions.

*C. Awareness Materials*

Due to the widespread use and popularity of our “Wild Cats of Sri Lanka” and “Living with Wild Cats” pamphlets, we did 5000 reprints of each in 2020 which are being disseminated widely.

In response to the spike in leopard deaths caused by wire snares, WWCT rapidly designed in partnership with the Parrotfish Collective artists an anti-snare pamphlet which used simple, clean images and direct text to clearly explain the problems with using snares (cruel, indiscriminate and not very effective at protecting crops; Fig. 36). We printed an initial 5000 of these and have distributed them widely, mostly to tea estate companies to further distribute to their various estates, divisions and community members.

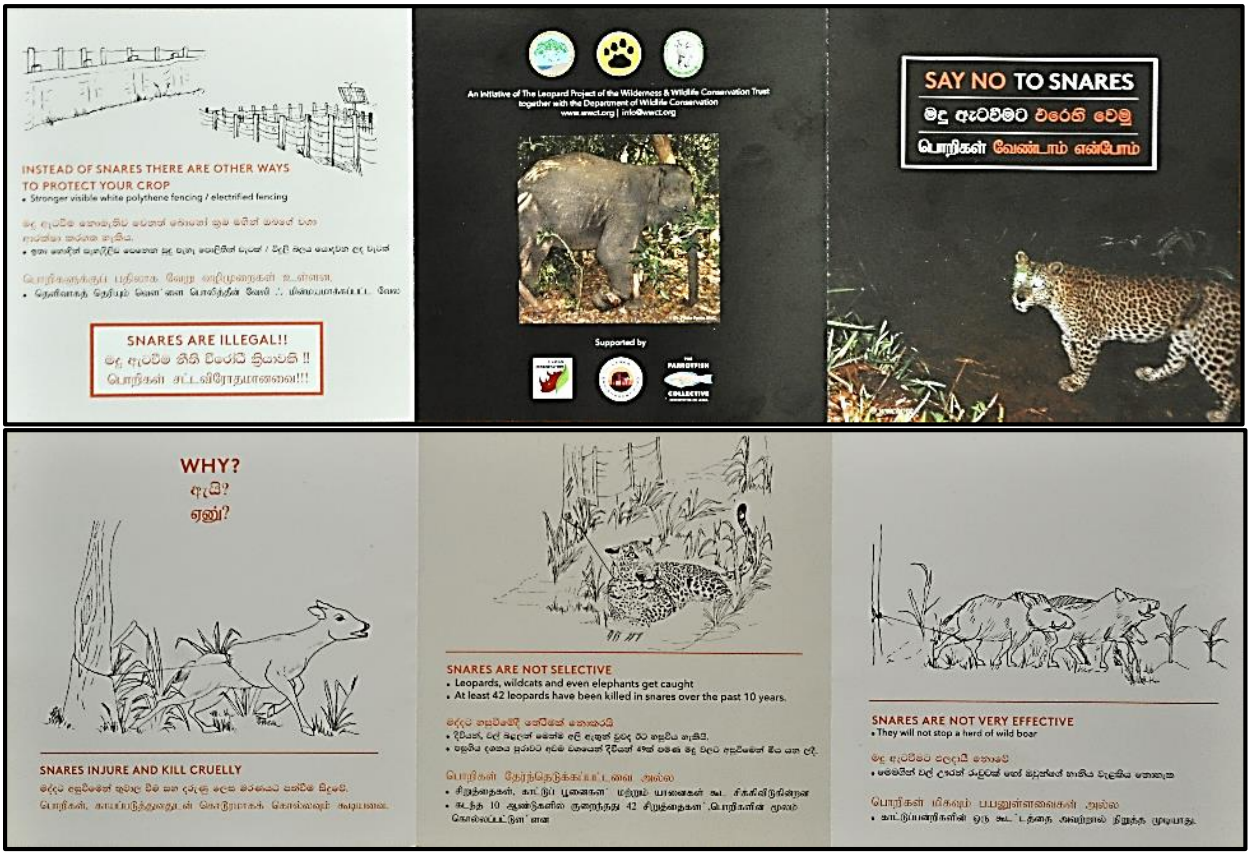



Figure 36: The anti-snaring pamphlet created and disseminated by WWCT in response to a sudden increase in leopard deaths caused by wire snares, mostly in the Central Highlands.

To improve the reach of this message, WWCT contacted one of the island’s largest media companies, Wijeya media, and secured free coverage in the form of a half page newspaper notice in their daily and weekly English, Sinhala and Tamil newspapers. This notice is in conjunction with the DWC as we wanted them to be the voice behind the message given that they ultimately are the authority in dealing with this illegal issue.

The actual content of the piece was to explain about the legal aspects of using wire snares, including the fines and jail terms relevant to this illegal act. There was also a prominent DWC hotline number which can be used by the public to report incidents that they might witness. The point of this message was to make everyone aware that this would not be tolerated as many people claim that they are not aware of the illegalities of these kinds of issues. The resulting insert (Fig. 37) was therefore communicated island-wide in a clear and concise manner.

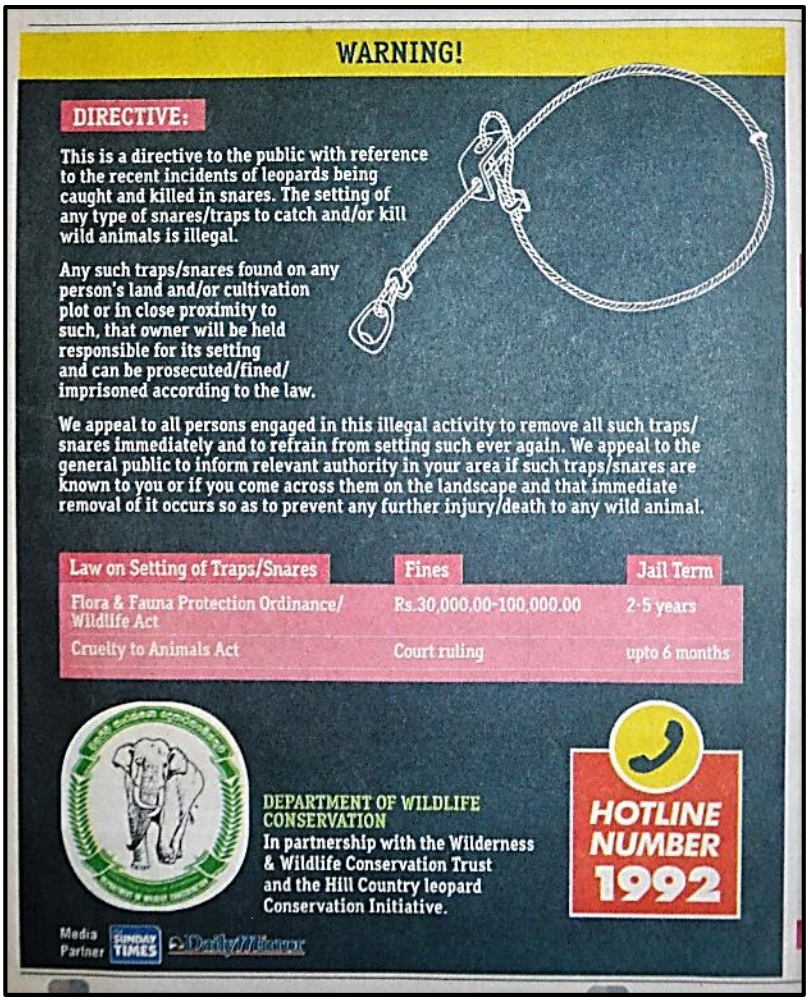



Figure 37: Newspaper notice on snaring information that was inserted on several occasions in all of Wijeya Newspapers English, Sinhala and Tamil daily as well as weekend newspapers.

This same design was then used to create posters which were then laminated and put up at communal gathering points (e.g., muster sheds where plucked tea is gathered and sorted, the tea factory etc.) on the tea estates upon which WWCT are working. This allows the information to get transmitted to the communities without transgressing the current Covid-19 restrictions.

*D. Social Media*

Twenty-twenty was the year that WWCT joined the Social Media arena, launching its Instagram account -wwctsrilanka. Here we put out numerous updates about our activities as well as more generally about wildlife conservation and biodiversity. One of our Instagram threads was an attractively designed set of informative posts about leopard facts called “Did you know?” which also included tips about what people can do to work towards leopard conservation in day-to-day life. This was so well received that we turned it into a small printed booklet/notebook that we plan to disseminate widely (Fig. 38).

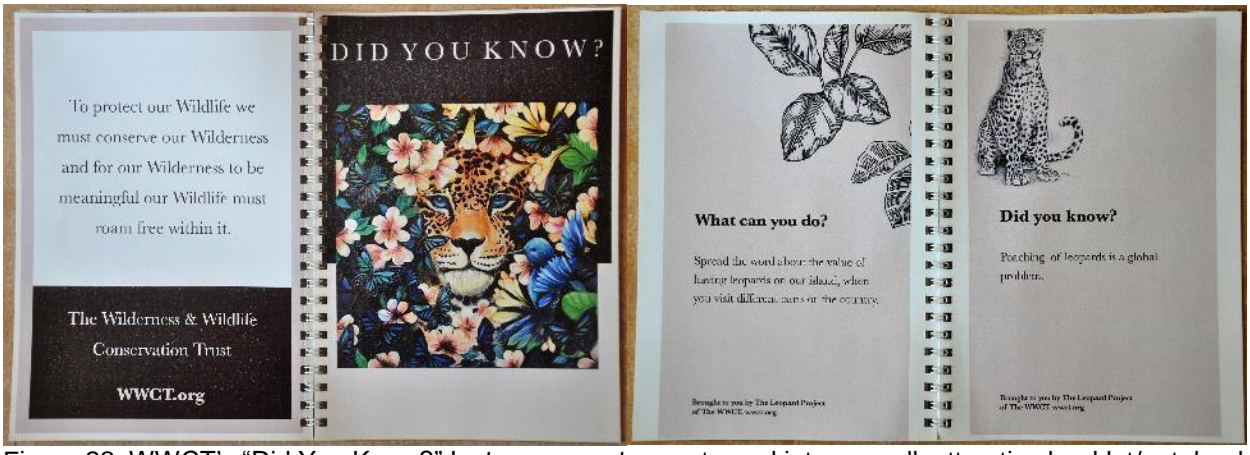


Figure 38: WWCT's "Did You Know?" Instagram posts was turned into a small, attractive booklet/notebook (left). The inside content included facts about leopards and their threats as well as brief ideas of what people can do to help.

*E. Staff/Students/Interns*

**Nimalka Sanjeewani** one of WWCT's long term versatile members continues to do our outreach work and now handles our plant identification for reforestation as she is doing her PhD in a related field.

**S. Krishnakumar** continued as the Dunkeld Conservation Station assistant. Although visitors were few his other work including updating the database, checking remote cameras, assisting with the butterfly garden and re-forestation project continues.

**M. Rajaram** continued as the Dunkeld Conservation Station resident gardener, maintaining the Peak Ridge Corridor forest plant nursery, collecting and propagating seedlings and planting of the Ridge re-forestation project.

**Sean Jayasinghe**, a recent graduate, joined WWCT in July after a long and patient wait for the end of the Covid-19 lockdown in Sri Lanka. He assisted with remote camera checking in the Central Highlands, Yala buffer and Sigiriya. He also spent a lot of time at the DCS where he organizes and oversees the ongoing re-forestation work. He has also visited a number of estate managers for outreach and accompanied MSc. student Chanaka Kumara.

**Chanaka Kumara** is WWCT's current Masters student who undertook his final year undergraduate project in 2008, after which he worked with WWCT as a Research Assistant until 2012. In 2019 he re-joined WWCT to undertake his MSc research in the Central Highlands, which is part of a larger project aimed at understanding the ecological and anthropogenic factors driving human-leopard interactions in the region.

**Kaitlin Manuel** worked with WWCT in 2018 as an intern and like so many, Kaitlin was a victim of the global pandemic in that she had to pause her studies over the past year. Her academic setback was WWCT's temporary gain as she has been handling WWCTs design and social media component. She has been focused on education and awareness creation and design which has been of immense import during this challenging year.

*F. Media*

WWCT was interviewed many times in 2020 to give opinions and/or supply data for programs and newspaper articles about leopards. Much of the interest was due to the highly publicized snaring of a black leopard in May which brought to light the relatively high number of snaring incidents of all leopards during the past year. WWCT also wrote a dedicated article for the national newspapers to detail the status change of the Sri Lankan leopard from Endangered to Vulnerable, and to explain what this means. As described above, we also joined with the Department of Wildlife Conservation and one of the island's largest media companies, Wijeya Newspapers Ltd. to run a trilingual public service message about the legal ramifications of setting snares.

*Digital / Television / Radio:*

- In January a CNN crew came to film WWCT's work in the Central Highlands tea estates as part of their International "Call to Earth" series. The focus of the piece was on WWCT co-founder and Managing trustee, Anjali Watson, and her efforts to ensure the long-term conservation of the leopard in Sri Lanka. The piece was entitled *Sri Lanka's leopards are under threat, but this woman is determined to save them*, and was posted on January 16. Sri Lanka's leopards are under threat, but this woman is determined to save them - CNN
- In response to the unfortunate death of a black leopard in the Central Highlands, local media was suddenly very interested in human-leopard co-existence and WWCT was interviewed for social media clips, radio programs and a television documentary. The radio program was conducted by YesFM and while the interview went over the airwaves, it was also recorded for their social media channels. How can we coexist without getting in nature's way? - YouTube
- The television documentary entitled "The leopard and the snare" was an exclusive investigation into the death of the black leopard, filmed by NewsFirst, one of Sri Lanka's premier news networks. The Leopard and the Snare - YouTube

*Print / Newspapers:*

- *Calling for stricter protection to save leopards*. Daily Mirror, Thursday, January 9. (WWCT opinion) Daily Mirror - Calling for stricter protection to Save Leopards
- *CNN spotlight for ecologist working to save the Sri Lankan leopard.* Daily Financial Times, Saturday, January 18 (WWCT focus) CNN spotlight for ecologist working to save the Sri Lankan leopard | Daily FT
- *On the trail of an elusive wildcat.* Sunday Observer, Sunday, January 26 (WWCT opinion). On the trail of an elusive wildcat | Sunday Observer
- *The clock is ticking for the Environment*. Daily Mirror, Wednesday, June 3. (WWCT opinion) Daily Mirror - The clock is Ticking for The Environment
- *When predator becomes prey*. Daily Mirror, Saturday, June 6. (WWCT opinion & data) Daily Mirror - When predator becomes prey...
- *Bushmeat business puts leopards in peril*. Daily Mirror, Tuesday, June 9. (WWCT data) Daily Mirror - Bushmeat business puts leopards in peril

- *The fate of Kalu, the black leopard, a wake-up call from the wilds*? Sunday Observer, June 14. (WWCT opinion) The fate of Kalu, the black leopard, a wake-up call from the wilds? | Sunday Observer
- *Snare kills another leopard in Doluwa*. Daily Mirror, August 24. (WWCT data) Daily Mirror - Snare kills another leopard in Doluwa
- *Three nabbed with body parts of a leopard*. Daily Mirror, Saturday, September 26. (WWCT data) Daily Mirror - Sri Lanka Latest Breaking News and Headlines - Print Edition Three nabbed with body parts of a leopard
- *Understanding the leopard in a variety of habitats*. Daily Mirror, Wednesday, September 30. (WWCT feature – Gal Oya project) Daily Mirror - Understanding the leopard in a variety of habitats
- The surging threats to Lanka's big cats. Sunday Morning, online, October 4. (WWCT opinion and data). The surging threats to Lanka's big cats - The Morning - Sri Lanka News
- *Vulnerable leopards treading with caution*. Daily Mirror, Wednesday, November 25. (WWCT-authored article) Daily Mirror - Endangered no more… 'Vulnerable leopards' treading with caution!
- *Another leopard succumbs to snaring*. Daily Mirror, Monday, November 30 (WWCT data) Daily Mirror - Sri Lanka Latest Breaking News and Headlines - Print Edition Another leopard succumbs to snaring
- *Let the leopard roam: Ensuring the long-term survival of the leopard in Sri Lanka*. Sunday Times, December 6 (WWCT-authored article) Let the leopard roam | Times Online - Daily Online Edition of The Sunday Times Sri Lanka

*G. Publications*

Kittle, A. M. & Watson, A. C. 2020. *Panthera pardus* ssp. *kotiya*. *The IUCN Red List of Threatened Species 2020*: e.T15959A50660847. https://dx.doi.org/10.2305/IUCN.UK.2020-2.RLTS.T15959A50660847.en.

## III: Acknowledgements:

All WWCT work within Sri Lanka is conducted under the purview of the Department of Wildlife Conservation (DWC) and the Forest Department (FD) where needed and we sincerely thank them for continued collaboration.

Funding support has been provided by Whitley Fund for Nature, Oxford University's WildCRU, Alliance Finance PLC, Resplendent Ceylon/Dilmah Conservation, CERZA Conservation, EcoFaune, Olu Waters/Rockland Conservation, Back of Beyond, Gal Oya Lodge and Lanka Environment Fund. We thank these partners without whose support the extent of WWCTs work would not be possible.