Painted Dog Conservation
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The painted dog (lycaon pictus), also known as the African wild dog, has suffered a dramatic decline in the past decades. The painted dog numbers have declined dramatically as a result of habitat loss, human persecution, and diseases (Fanshawe et al., 1991) Painted dogs requirements for large tracts of land to range and forage and their high mobility poses challenges for their monitoring, conservation and protection.

PDC values the importance of painted dogs as an indicator species and their presence, and density acts as an indicator of the conservation status of wildlife areas in Zimbabwe. Thus, successful painted dog conservation is beneficial to ecosystem conservation, as it results in the preservation of numerous species and natural processes in the wildlife areas, being protected.

Painted dogs in the Hwange ecosystem and the rest of the country are endangered and sharp declines are recorded in areas outside of protected areas, not only because of human induced mortalities, but also because human activities can make such areas uninhabitable by depletion of prey, illegal hunting of prey, habitat modification through clearance for agriculture and competition with livestock. (Creel and Creel 1996; Mills and Gorman 1997) The Gwaai areas in Hwange is considered now a sink, as a result of this and farmlands bordering HNP. The wide ranging behavior of dogs, means that some packs spend some time in human induced areas beyond the safe confines of protected areas. Here they encounter humans, snares, cyanide poison, cars on tarred highways and domestic dog diseases. The Nyamandhlovu pack, Tariro pack, Ganda pack, Gurangwenya pack Mabuye mabena pack and Nkwizizi pack have ranged beyond HNP and have suffered anthropogenic induced mortalities as a result.

The population status of painted dogs in Zimbabwe is fragile, the painted dogs in the PDC Core research area of Hwange is estimated at 98, known adults and 68 pups from 16 known packs. Only eight packs are known to have had pups, and one pack has already lost all pups, and less than half of these pups will reach twelve months. That said the number of pups born seems high. It is hypothesized that the unusual high pup numbers this year indicates to good rainfall and plenty of prey.

Permission during the year was given by ZPWMA to collar two separate dogs in Mana Pools and they are being monitored on their movements. In the core area of HNP eight dogs from five different packs have VHF collars and efforts are underway to collar peripheral dogs, which are prone to snaring.

Sighting questionnaire forms were distributed throughout the HNP and all Safari camps/lodges, to broaden wild dog sighting data in all areas and photographs were requested from tourist whenever available to identify the individual dogs in the packs.

HNP Packs.
Based on data available, a total count of all known packs in the HNP for the period January 2016 to December 2016, is 16,consisting of 98 adult / yearling dogs and 68 pups. Six packs were not seen in 2016 (recorded at 34 adults / yearlings) and it is estimated that an additional five packs consisting of approximately 30 adults/ yearlings exist in the unsurveyed areas of HNP.

Based on photographs taken, through monitoring and received in 2016, it is known that significant dispersal from Gurangwenya, Broken rifle, and Mabuya mabena took place during the current year, resulting in the drop of adult dogs in the packs.

The HNP population is thus estimated currently at 162 adults / yearlings in +/ - 27 packs.

Feacal analysis.
An analysis of painted dog scats during the year from six packs indicates to prey preference of dogs in HNP ecosystem for kudu and impala in larger packs (>five adults) and duiker in smaller packs (<five adults). Thus lending support towards the argument for a moratorium on hunting Kudu if the painted dog population is to thrive.

Road counts.
The road counts were conducted in collaboration with ZPWMA,CIRAD/CNRS and Hwange lion research to monitor and understand seasonal habitat use in relation to spatial distribution. The monitoring and analysis is aimed at assessing prey trends and abundance over a given period. Final results for road counts indicate a stable trend for all herbivores.

PAINTED DOG POPULATION RESULTS FOR HWANGE NATIONAL PARK (HNP)

Data on the HNP population demographics is collated from direct sightings, photographs and sighting sheets. Each dog has a unique coat pattern and thus photographs or video footage are the most valuable tool in determining pack and pack structures (number of adult males/ females, yearlings and pups) and distinguishing one pack/ individual from another. Pup survivorship is a key element that is recorded as photo capture / recapture method of recording the individuals seen each time a pack is encountered and this is entered on data capture sheets. Painted dog monitoring was undertaken through aerial and ground based telemetry of the collared packs, combined with opportunistic observations of uncollared packs. Population parameters were derived from data collected during the course of the year. Pack size is estimated as the number of adults and yearlings in each pack, preceding breeding.

Data used in this report is based primarily on sightings recorded and received in the period January to December 2016. The only unusual phenomenon with the Lukosi pack is the absence of pups in 2016, despite the pack having nine adult dogs. The Nyamandhlovu pack failed to raise any pups in 2015 due to lions having raided the den and killing all pups and this year they had thirteen pups at the time of leaving the den, now only nine pups remain which reinforces the high mortality off take and low pup survival rate. See table 3.

Concern remains regarding the number of small packs consisting of 2 to 4 individuals and their apparent failure to produce pups since 2014. It is commonly believed that for packs to thrive and rear pups, there needs to be a pack of five or more adult dogs.

The average adults per pack for 2016 is 6.12 as compared to 5.19 for 2015, which is encouraging. See table 1 below.

Table 1: Demographic overview HNP dogs seen in 2016

Pack name	Total Number of Dogs	Total Ad	Ad M	AD F	Pups	Last seen
Nkwizizi	5	5	3	2	0	Feb-2016
baNyayi	19	10	6	4	9	Nov-2016
Lukosi	9	9	7	2	0	Sep-2016
Ngubombiri	2	2	1	1	0	Feb-2016
Manzichisa	4	4	2	2	0	Sep-2016
Tshakabika	6	6	1	5	0	Sep-2016
Mandavu	3	3	2	1	0	Sep-2016
Lukodet	20	10	6	4	10	Nov-2016
Brokenrifle	17	9	6	3	8	Sep-2016
Deteema	24	10	6	4	14	Sep-2016
New Robins	3	3	1	2	0	Nov - 2016
Mabuya mabena	10	4	1	3	6	Nov-2016
Nyamandlovu	16	7	5	2	9	Dec - 2016
Gurangwenya	21	9	5	4	12	Dec-2016
Dopi	2	2	1	1	0	Jul-2016
Masumamalisa	4	4	2	2	0	Jan-2016
TOTAL	166	98	55	43	68	
Number of packs	16					
Average adult dogs per pack/pack size	6.12					

Fluctuations in population size at local scale HNP

Populations of painted dogs are prone to marked fluctuations at a variety of temporal and geographic scales. At local scale, a combination of high mortality, high fecundity, and dispersal by both sexes means that pack size fluctuates substantially over short periods. Because painted dogs are seasonal breeders, fluctuations may be synchronised across

packs. These demographic characteristics lead to fluctuations at population scale. With painted dogs local extinctions are uncommon, under good conditions dog populations are able to grow quickly. It is a known fact that dogs have capacity for long range dispersal means sub-populations/packs reappear unexpectedly and grow rapidly. There are dispersers in HNP that have appearerd that were not captured in our date base previously.

Table 2: demographic overview for HNP dogs known but not seen in 2016

Pack name	Total Dogs	Total Ad	Ad M	AD F	Total YY	Pups	Last seen
Sappers	3	3	1	2	0	0	Oct-15
Kanondo	5	5	3	2	0	0	Sep-15
Jozi	15	15	10	5	0	0	Sep - 2015
Camp Hwange	2	2	1	1	0	0	Jul-15
Lodzi	3	3	2	1	0	0	Sep-14
New Guvalala	6	6	3	3	0	0	Dec - 15
TOTAL	34	34	20	14	0	0	
Number of packs	13						

Reference is also given to historical sightings and records, while whole packs/ individuals may not have been seen in 2016, it is unlikely that these dogs or packs no longer exist. The size of the area and the distribution of access roads makes it difficult to have full coverage of the park , a survey would partially indicate only occurance of the dogs. Solero previously with the Mabuya mabena pack in Main Camp, was missing for nine months, only for him to be photographed near Robins, having joined a new pack.

If an individual dog is not seen/recorded for a period of two years, the dog is marked as missing only and chances are the dog is still alive. The monitoring in HNP constitutes only about a third of the park, much of the park are inaccessible to vehicles, being largely roadless and covered with vegetation, hilly and rocky to the north, and the substrate being soft Kalahari sands. Hence painted dogs are difficult to observe and impossible to follow for any distance.

Table 3: Mortalities recorded in 2016 in HNP

NAME OF DOG	DATE OF BIRTH	NAME OF PACK	CAUSE AND DATE OF DEATH
Unnamed pup	May - 2016	Nyamandlovu	Killed by Hyenas 18/09/2016
Momotheka	2015	Gurangwenya	Killed by a cable wire snare 24/09/2016
Unnamed (Pup)	May - 2016	Nyamandlovu	Presumed dead or killed by hyenas or lions 09/10/2016

Unnamed (Pup)	May - 2016	Nyamandlovu	The pup was run over by a car 08/10/2016 along the Byo-Vic Falls road, Mabale area
Unnamed (Pup)	May - 2016	Nyamandlovu	Presumed dead, killed by hyenas or lions 03/11/2016

Until 2015, road kills, rail kills and snaring have been recorded as major causes of mortality, however a new emerging threat was recorded in the Protected areas, of cyanide poisoning at water points. In the current reporting period five mortalities were recorded as compared to ten for 2015 in HNP. Momotheka of Gurangwenya pack was found caught in a cable wire snare by chance in Nkwizizi at Sinamatella, despite the efforts of our resident vet, he died of a broken spine.

One pup of the Nyamandhlovu pack was killed by a car along the Vic Falls- Bulawayo road.

One adult male (Momotheka) of the Gurangwenya pack died during field veterinary operation in the field after being found in a snare.

Three pups of Nyamandlovu pack were presumed killed by lions or hyenas.

Seven dogs had snares removed and were treated successfully, the survival rate after collar placement has remained at 100% since inception of the programme.

It is apparent that regular PDC daily patrols deter and are effective in protecting wildlife and painted dogs.

Inadequate land management practices in the Gwaai and Forestry contribute enormously to loss of painted dogs and prey and the Gwaai has remained a critical source of sink for years. Currently only two packs are ranging in the area as compared to seven packs that utilized the Conservancy at its peak.

Indications from the spoor transects undertaken in the Gwaai in 2014 suggest a massive decline in herbivore population especially kudu, impala, sable and eland and combined with the PDC APU data, thus the need to urgently reduce the sport hunting quotas and the removal of prey species for dogs from these areas quotas or a moratorium on the hunting of some species.

Table 4: DOGS COLLARED IN 2016

PACK NAME	DOG NAME	TYPE OF COLLAR	DATE COLLARED
Gurangwenya	Spooner	VHF	26/01/2016
Mabuyamabhema	Tembi	VHF	03/02/2016
Mabuyamabhema	Rocket	VHF	03/02/2016
Mabuyamabhema	Target	VHF	04/02/2016
Nkwizizi	Biggie	VHF	08/02/2016
Nyamandlovu	Don	VHF	11/04/2016

Nyamandlovu	Ring	VHF	27/10/2016
BaNyayi	Will	VHF	01/11/2016

Hair Analysis of prey species in dog scat.

Diet of painted dogs was also investigated through scat analysis and opportunistic observations of kills. Painted dog scats/faeces were collected opportunistically during the course of monitoring and were distinguished from those produced by other species on the basis of appearance and distinctive smell. Observers recorded the location of scats and named the packs where possible. Prey species were identified by comparing appearance of hairs, hooves, bones and even teeth found in faeces.

The prey hair analysis objective is to collect prey data to establish the extent of the predatory role of lycaon pictus and its impact on the ecology of the HNP ecosystem and provide informed recommendations to Parks Management on sport hunting and ration usage.

During the course of the year, 66 faecal samples were analysed ,table 5, for hairs from prey species, the dogs, from different packs consumed.

The hair samples were taken from several parts of the body, specifically the neck area, tail, thigh, belly and shoulder. Plucking on different parts of the animal was done to see if the hair patterns were changed with location on the body and were compared with a hair reference data base compiled from the Bulawayo Museum.

Both the scale and cross pattern and cross section of the prey hairs was used to determine which species the different pack consumed within the Hwange Ecosystem.

Results were analysed and compiled, the most preyed upon species as with the records, was kudu, for the HNP, followed by impala and duiker. The data shows a significant portion of some packs (Nyamandhlovu, Gurangwenya) showing bat eared fox in their diet. The importance of kudu and impala in the diet of dogs re-enforces the argument and recommendations by PDC for the reductions or alternative species for management quotas for Parks and the Gwaai Area.

Table 5: Painted dog diet analysis results by species.

Species	Totals	Percentages %
Bushbuck	10	15.15
Kudu	31	46.97
Impala	15	22.72
Steenbok	3	4.55
Common Duiker	6	9.09
Bat eared fox	1	1.52
TOTAL	66	100%

Table 6:Faecal Hair analysis by pack.

NEW ROBINS PACK: Sinamatella/ Robins

Species	Totals
Bushbuck	1
Totals	1

NYAMANDLOVU PACK: Main Camp

Species	Totals
Bushbuck	5
Kudu	1
Impala	13
Common Duiker	2
Totals	21

MABUYAMABHEMA PACK: Main Camp

Species	Totals
Bushbuck	1
Kudu	1
Impala	1
Steenbok	2
Common Duiker	2
Totals	7

DETEEMA PACK: Sinamatella/Robins

Species	Totals
Kudu	4
Impala	1
Totals	5

GURANGWENYA PACK: Sinamatella

Species	Totals
Bushbuck	3
Kudu	9
Impala	10
Baboon	1
Bat Eared Fox	1
Totals	24

GANDA PACK Main Camp/ Forestry Area

Species	
Kudu	4
Impala	2
Steenbok	1
Common Duiker	2
Totals	9

HERBIVORE POPULATION TREND MONITORING

PDC participated and provided logistical support to the yearly PDC, ZPWMA, CNRS, CIRAD road counts in HNP. The objective of this monitoring and analysis is prey trends and abundance over given period.

Road counts

Road counts were carried out in May and October in the Main camp area, Sinamatella and Robins camp. The most available roads were used as transects. Each transect was driven at least twice at different times of the day. The road count was followed by line transect method where perpendicular distances are calculated by using the angle and the direct distance between the animal and vehicle at first detection. Although the use of road transects has been under debate (Buckland et al….., 2001) it is often the only way to estimate densities over large areas and does allow for comparisons between sides and years. Data analysed for 2016 indicates a stable densities for most species. However the current densities are much lower than the game populations in the 80s. The population densities for impala are 2.23 impalas per sq.km, 1.87 kudu per sq.km. The standard deviation for the same period for impala and kudu is 0.26 impalas per sq.km and 0.78 kudu per sq.km respectively. The average range for kudu is 1.15-3.97 kudu per sq.km and 1.31-3.80 steenboks per sq.km. All the densities are for the dry season period when detection rates for animals are at maximum and impala have shown a dramatic recovery from the 2003 -2008 period where the densities were at below 1.00impalas per sq.km.

Additional Activities undertaken during the year:

Mana Pools. The PDC made has a vehicle based permanently at Mana pools during the dry period only.
Three packs are monitored and population parameters taken as a data base is being collated for the valley.

Nyamatusi pack is made up of ten adults and two pups, originally there were five pups. One pup was filmed being killed by lions and the other two are presumed killed by lions/hyenas.

Nyakasanga pack is made up of eleven adults and nine pups. One adult was killed by a crocodile while the pack was drinking water in the Zambezi river. One adult dog is recovering from wounds.

Cheruwe pack consists of thirteen adult dogs and six pups and this is the pack without a VHF collar.

PDC provided support to HNP Main Camp in terms of fuel and vehicle use and main power for Anti-poaching operations.

PDC has provided support to Sinamatella Camp in terms of fuel and vehicle use for Anti-poaching operations

Genetic profiling is ongoing with Stanford University and PDC

A joint disease surveillance on anthrax at the wildlife-livestock is being undertaken between PDC, CNRS and University of Zimbabwe

PDC runs its own Anti-poaching Units that patrol the buffer zones around HNP.
PDC provides material support and a hotline between Parks and the community in cases of poaching and human wildlife conflict.

PDC conducted a series of community based meetings to tackle snaring and poaching.
PDC meets the material needs of a Zero Tolerance to Wildlife Crime Campaign.

PDC attended and participated in the KAZA carnivore workshop held at the Safari Lodge.

PDC provides learning experiences for Zimbabwean students and provided four internship opportunities listed below for this period:

Constantine Mpofu: Geography and population studies, Lupane State University.

Andreatah Mathema: Rangelands and Wildlife Management, Lupane State University.

Takunda Tauro: Animal and Wildlife Sciences, Midlands State University.

Kundai Dube: Forest and Wildlife Sciences, National University of Science andTechnology.

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