



HWANGE LEOPARD PROJECT - ANNUAL REPORT - DECEMBER 2015

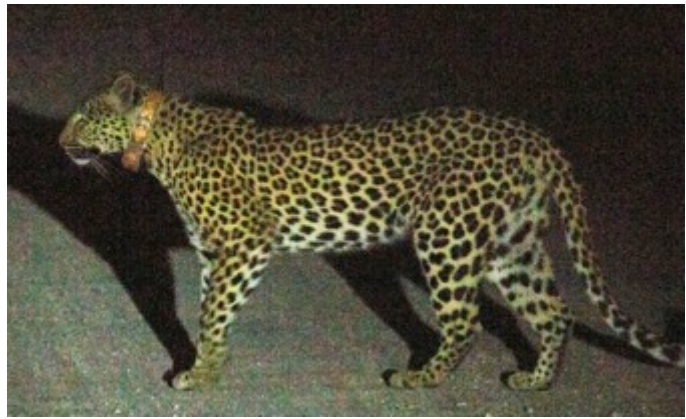
2015 LEOPARD PROJECT RESEARCH OBJECTIVES

Having finally fitted 3x Satellite and 1x VHF Tracking Collars to four leopards in the Main Camp study area at the end of 2014, the HLP Team was well prepared to begin the planned research objectives for 2015.

The 2015 Hwange Leopard Project Research Objectives were:

1. To monitor the territorial relationships and interactions taking place between the collared leopards.
2. To monitor seasonal movements and changes to territorial boundaries throughout a full season to investigate the impact that changing water availability and prey movement has on these leopards.
3. To monitor seasonal changes in foraging habits and dietary preferences and investigate the number and type of prey species killed in response to changing seasonal conditions.
4. To closely monitor and investigate the **Fecundity** of the 3x collared female leopards, (ie. To monitor their fruitfulness and fertility and their ability to produce abundant healthy offspring).
5. To remain alert for the possible birth of cubs so we could investigate den sites, cub mortality, cub growth and development.
6. To increase the leopard study group size to a total of 2x Collared Male and 5x Female leopards by finding, capturing and fitting satellite collars to an additional male and one more female leopard that share common territorial boundaries with the collared leopards in the Caterpillar/Dopi/Dom areas of the Main Camp study area.

INTRODUCTION TO 2015 COLLARED LEOPARDS



MALE LEOPARD "COWBOY" (without collar) FEMALE LEOPARD "CLAUHE" (with old VHF Collar)

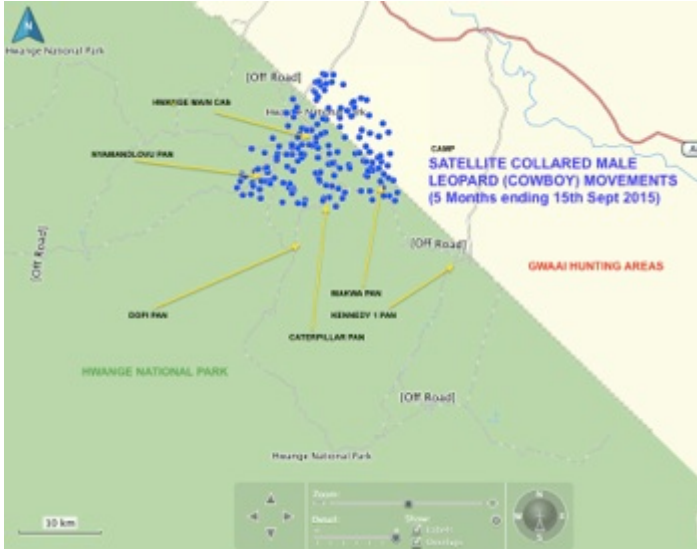


FEMALE LEOPARD "IVY" (with satellite collar)

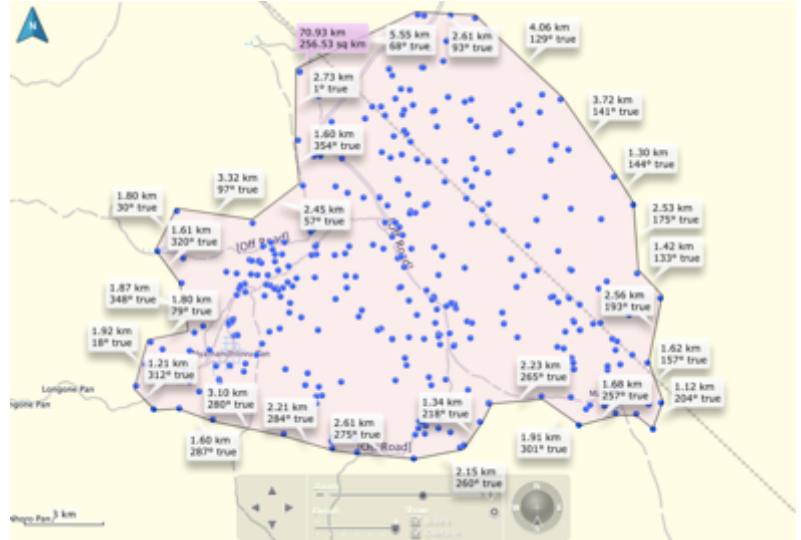
FEMALE LEOPARD "PUMI" (without collar)

1. SATELLITE COLLARED MALE LEOPARD (COWBOY) STATUS

- a) 1st Sighting Photograph – 29th April 2014 (Little Makwa – Capture Cage)
- b) Total Observation Period – 20 Months
- c) Total Satellite Collared Period – 5 months
 - First Captured and Collared – 10th Dec 2014 – Nyamandlovu Pan Area
 - First Collar Stopped Working – 15th March 2015 (Collar Failed after 3 Months)
 - Second Capture and Re-collared – 17th July 2015 – Umtshibi Area
 - Third Capture & Collar Removed – 15th Sept 2015 – Caterpillar Pan Area
- d) Total Home Range Area – Approximately 256.53sq km



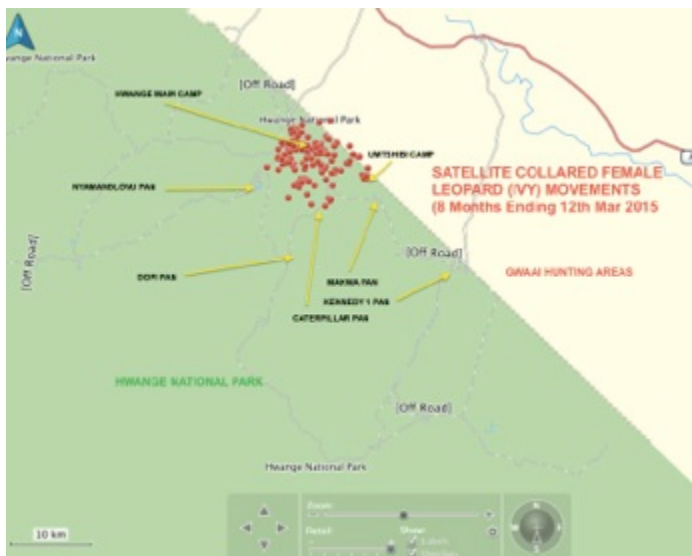
MALE (COWBOY) HOME RANGE LOCATION



HOME RANGE AREA CALCULATION

2. SATELLITE COLLARED FEMALE LEOPARD (IVY) STATUS

- a) 1st Sighting Photograph – 26th April 2014 (Dom Pan Area – Bait Tree)
- b) Total Observation Period – 20 Months
- c) Total Satellite Collared Period – 8 Months
 - Collar Now Deployed 17months
 - Captured and Collared
 - Satellite Battery Stopped Working
 - VHF Battery Remains Operational
- d) Total Home Range Area – Approximately 84.58sq km



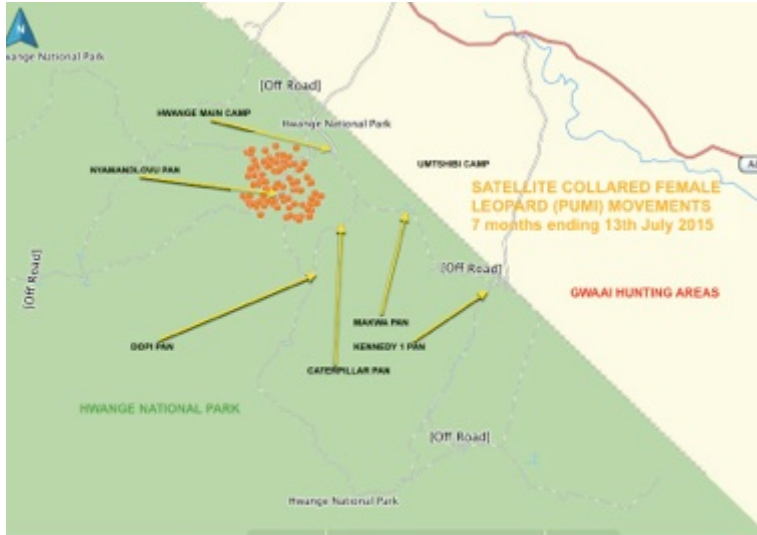
FEMALE (IVY) HOME RANGE LOCATION



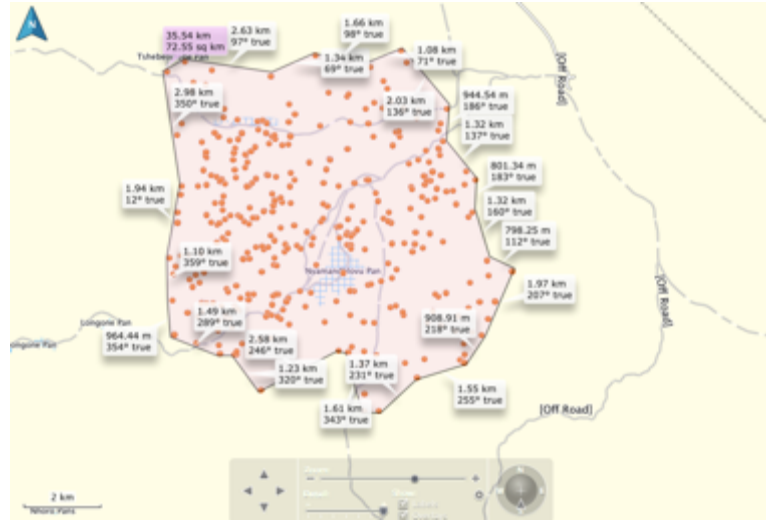
HOME RANGE AREA CALCULATION

3. SATELLITE COLLARED FEMALE LEOPARD (PUMI) STATUS

- a) 1st Sighting Photograph – 10th Nov 2014 (Nyamandlovu Area – Capture Cage)
- b) Total Observation Period – 13 Months
- c) Total Satellite Collar Period – 7 Months
 - Collar Now Deployed 12months
 - Captured and Collared
 - Satellite Battery Stopped Working
 - VHF Battery Remains Operational
- d) Total Home Range Area – 7th Dec 2014 – Nyamandlovu Pan Area
 - 13th July 2015 (Collar Failed after 7 Months)
 - Collar still deployed on Pumi.
 - Approximately 72.5sq km



FEMALE (PUMI) HOME RANGE LOCATION



HOME RANGE AREA CALCULATION

4. SATELLITE COLLARED FEMALE LEOPARD (CLAUHE) STATUS

- a) 1st Sighting Photograph – 20th August 2013 (Umtshibi Area – Bait Tree)
- b) Total Observation Period – 30 months
- c) Total VHF Collar Period – 24 Months
- d) Total Satellite Collar Period – 2 Months
 - VHF Collar was Deployed for 2 Years – VHF Battery still working after >2years)
 - First Captured and VHF Collared – 13th Oct 2013 – Umtshibi Area
 - Second Capture to Remove VHF & Fit SAT Collar – 28th Oct 2015
- e) Total Home Range Area – Approximately 90.88sq km



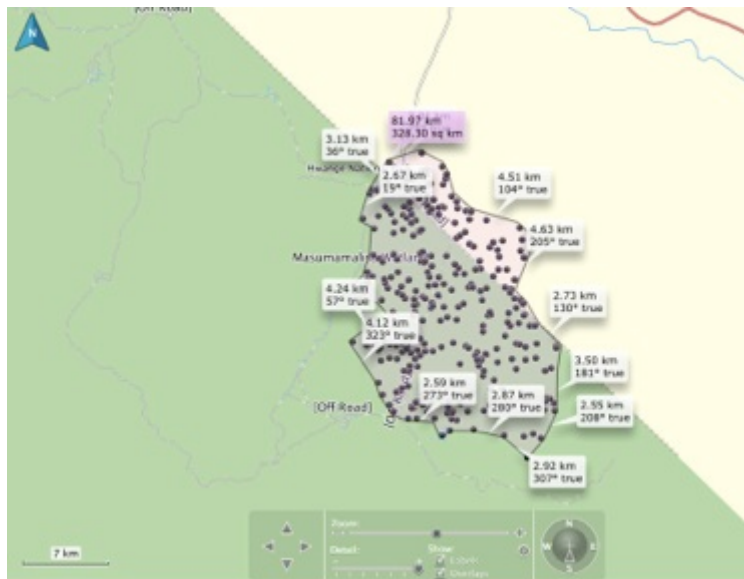
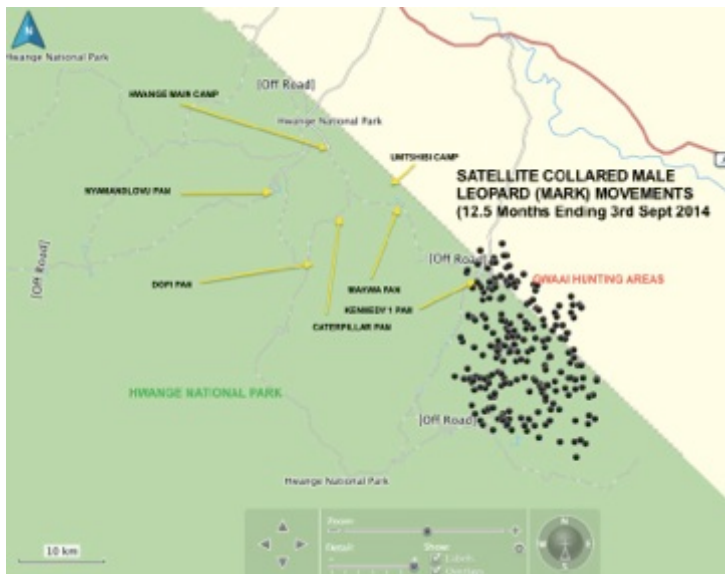
FEMALE (CLAUHE) HOME RANGE LOCATION



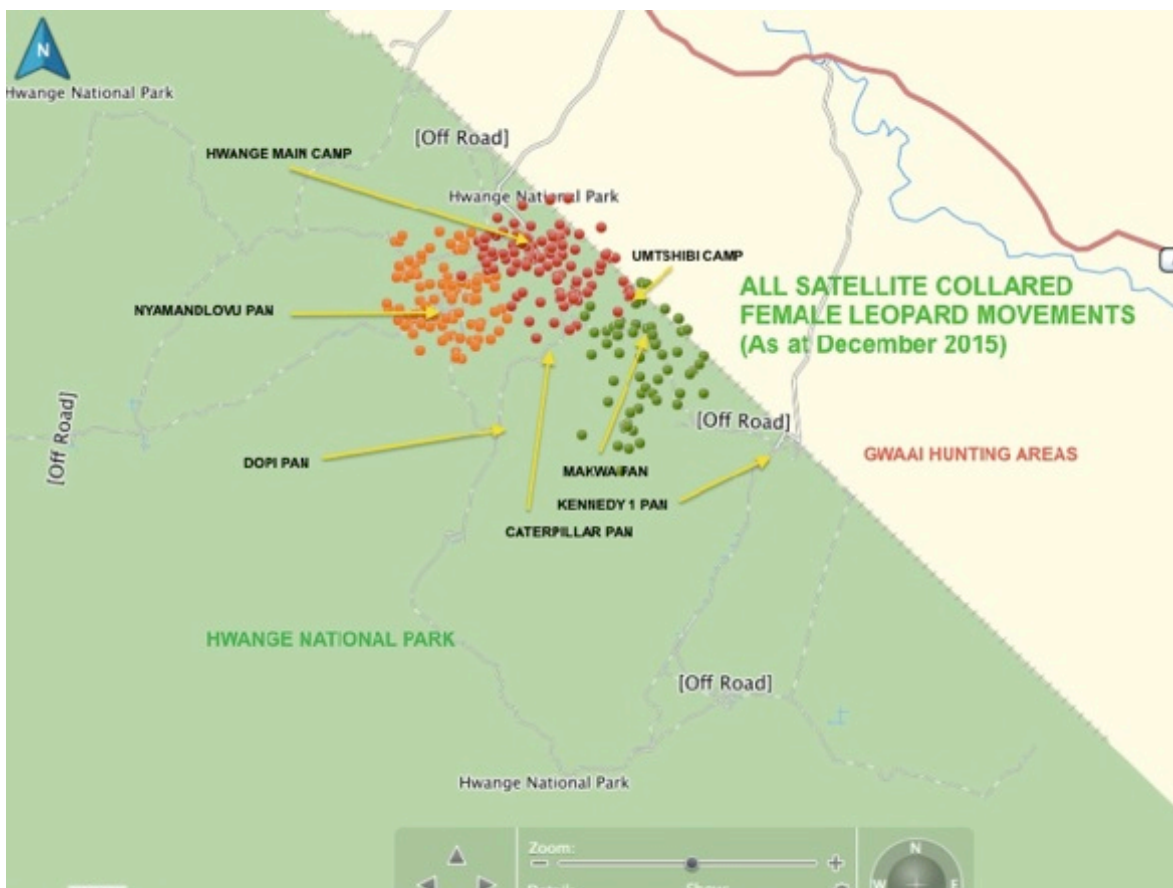
HOME RANGE AREA CALCULATION

HISTORICAL HOME RANGE INFORMATION - PREVIOUSLY COLLARED MALE LEOPARD (MARK)

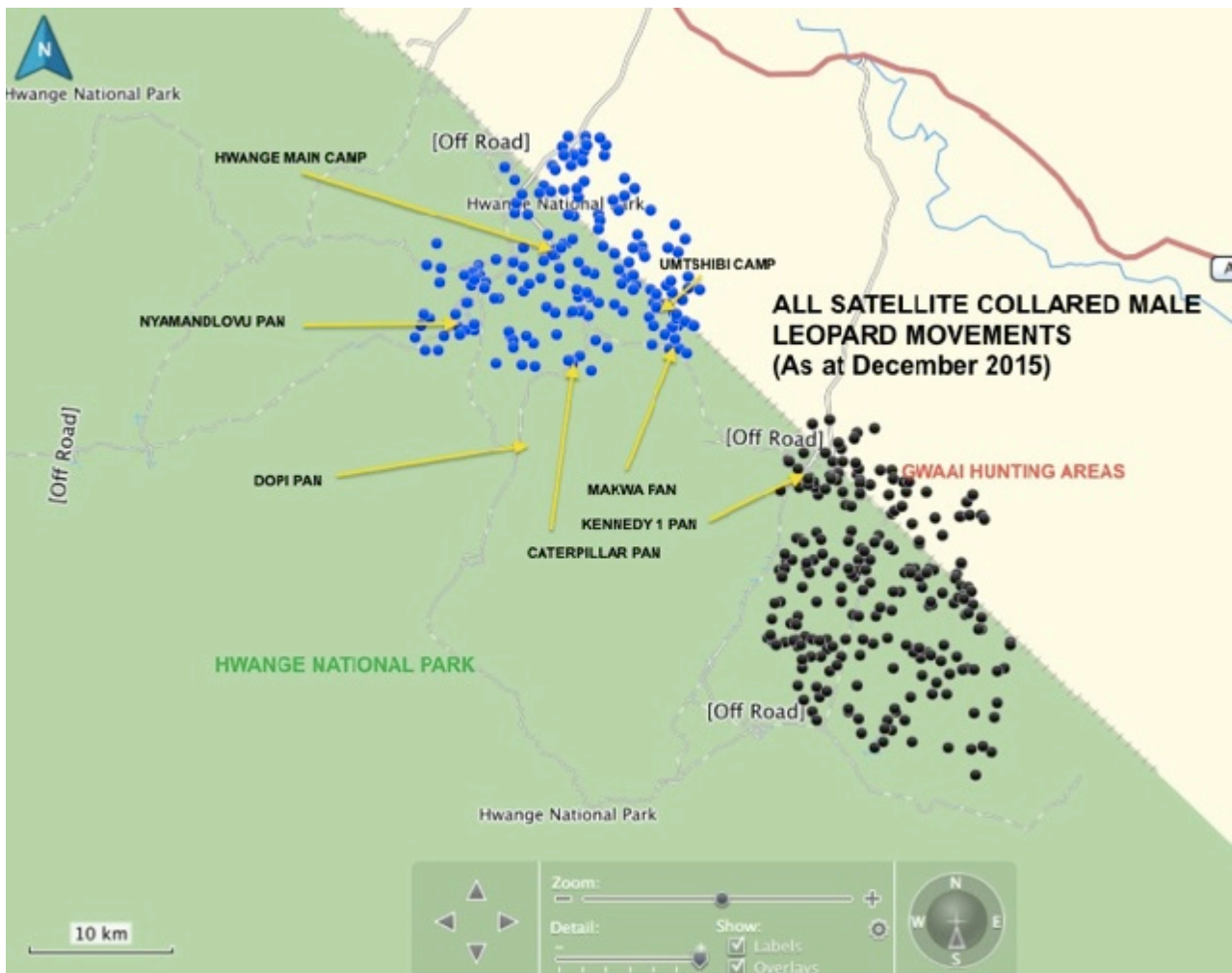
- a) 1st Sighting Photograph – 24th May 2013 (Sedina Pan Area – Bait Tree)
- b) Total Observation Period – 16 Months (All contact lost after this period)
- c) Total Satellite Collar Period – 12.5 months (381 Days)
 - Leopard Captured and Collared – 18th Aug 2013 – Main Camp Area
 - Leopard Satellite and GPS Signal Lost – 3rd Sept 2014 – Mabiza Area
 - Possible explanations for Signal Loss – Collar Malfunction OR Leopard hunted, killed & collar destroyed
- Total Home Range Area – Two distinct Home Range Areas Observed (A & B)
- Movement Period A (2 months) – 18/8/13 – 10/10/13
Initial Home Range Movements Discovered over approximately 400sq km
- Movement Period B (11 months) – 10/10/13 – 3/9/14
Subsequent Home Range Movements Discovered over approx. 328sq km
(See Map Below)–



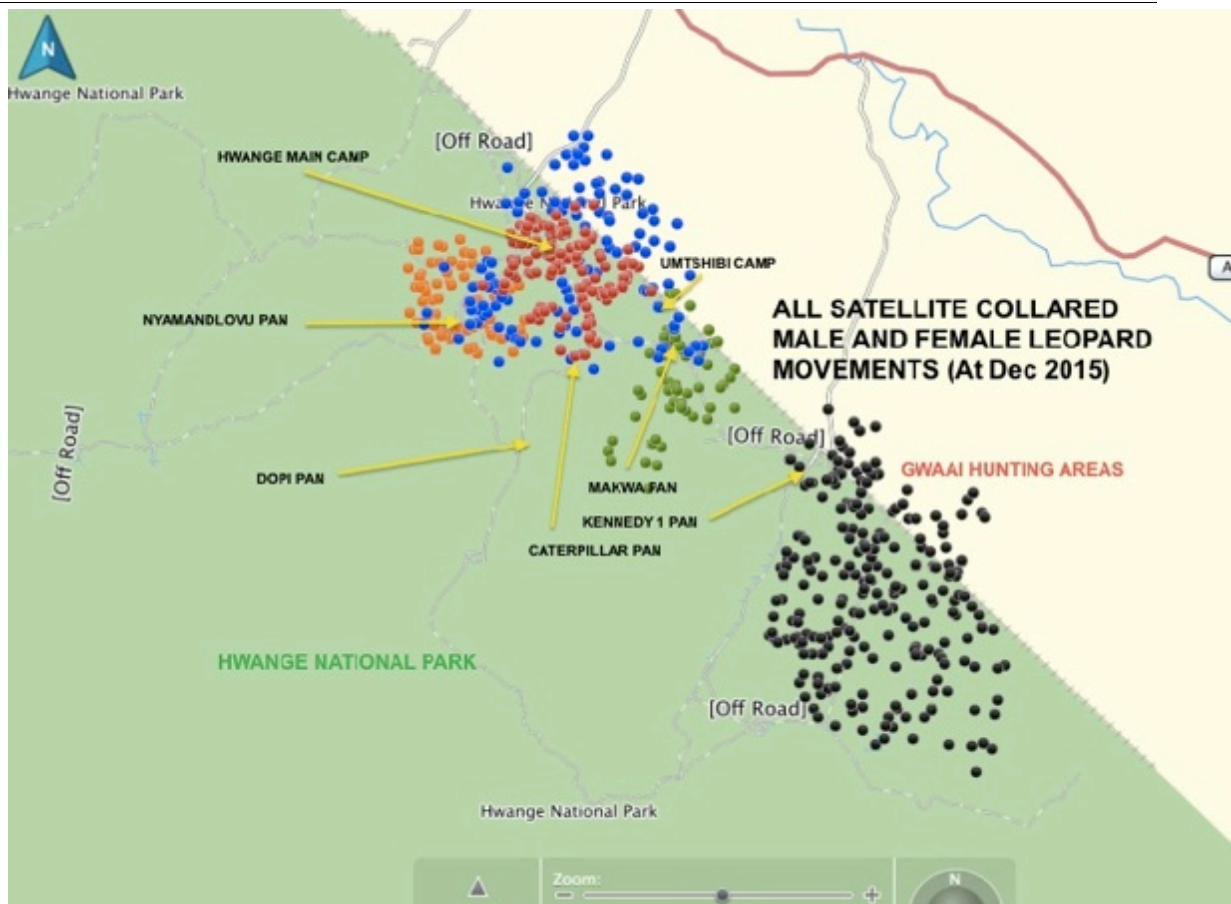
COMPARATIVE LOCATION ANALYSIS OF COLLARED FEMALE LEOPARD TERRITORIES



COMPARATIVE LOCATION ANALYSIS OF COLLARED MALE LEOPARD TERRITORIES



COMPARATIVE LOCATION ANALYSIS OF ALL COLLARED LEOPARD TERRITORIES

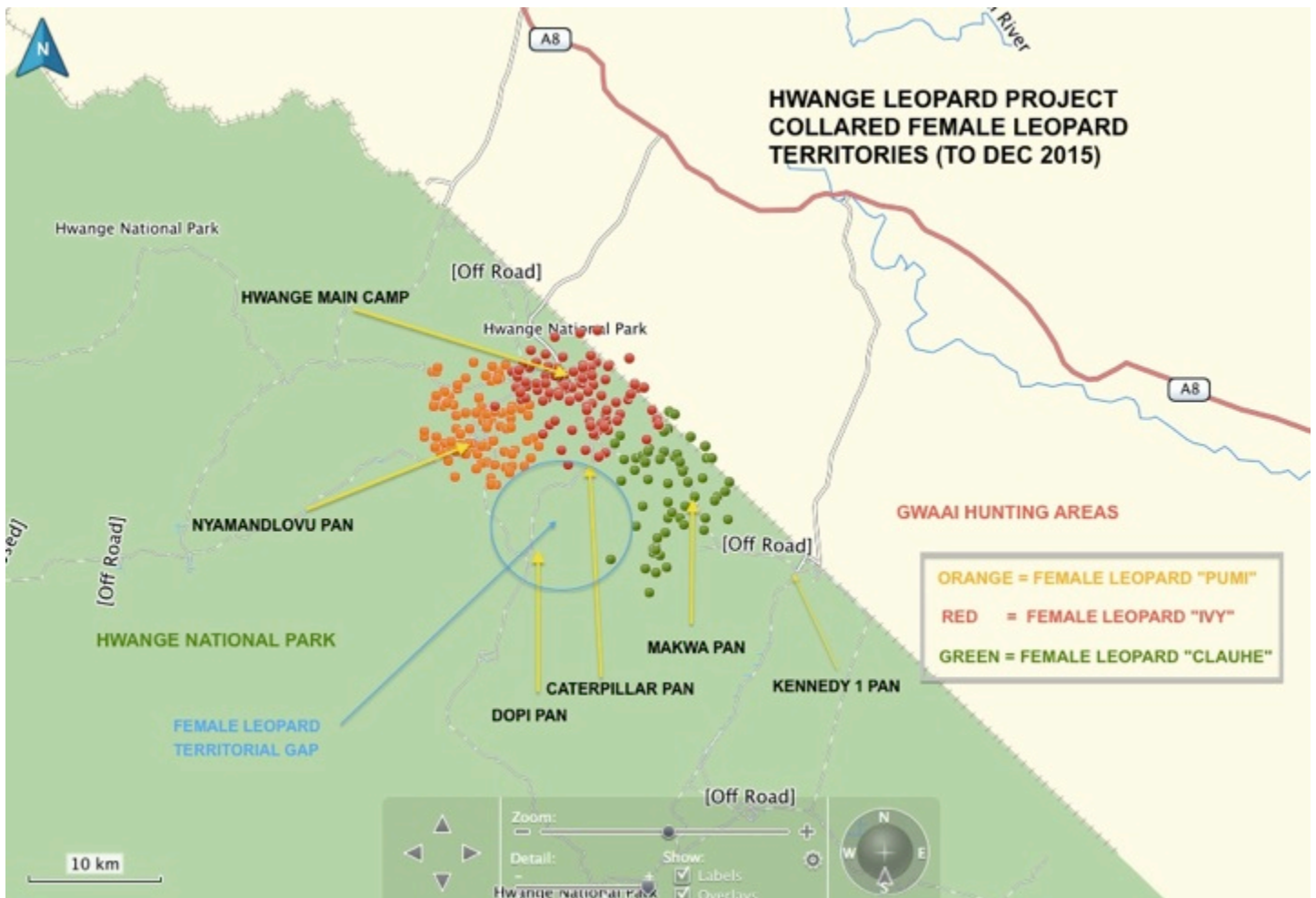


2015 RESULTS OVERVIEW

2015 began very well for the project with combined GPS locations downloaded from the 4x individually collared leopards starting to yield the high quality data needed to achieve the 2015 target objectives.

COLLARED FEMALE LEOPARD TERRITORIES

With 3x collared female leopards sharing neighboring territories and the 1x male (Cowboy) covering all three females, the 2015 research findings were eagerly anticipated.



Once each collared female leopard's territory had been identified, additional missing pieces of this slowly developing puzzle started to become apparent.

The first obvious "territorial gap" could be seen in an area between Doopi and Caterpillar Pans.

Baits were set in this area and eventually a new female leopard was located in the Caterpillar area consorting with Cowboy. A discrete camera even managed to get a partial photo of them mating.

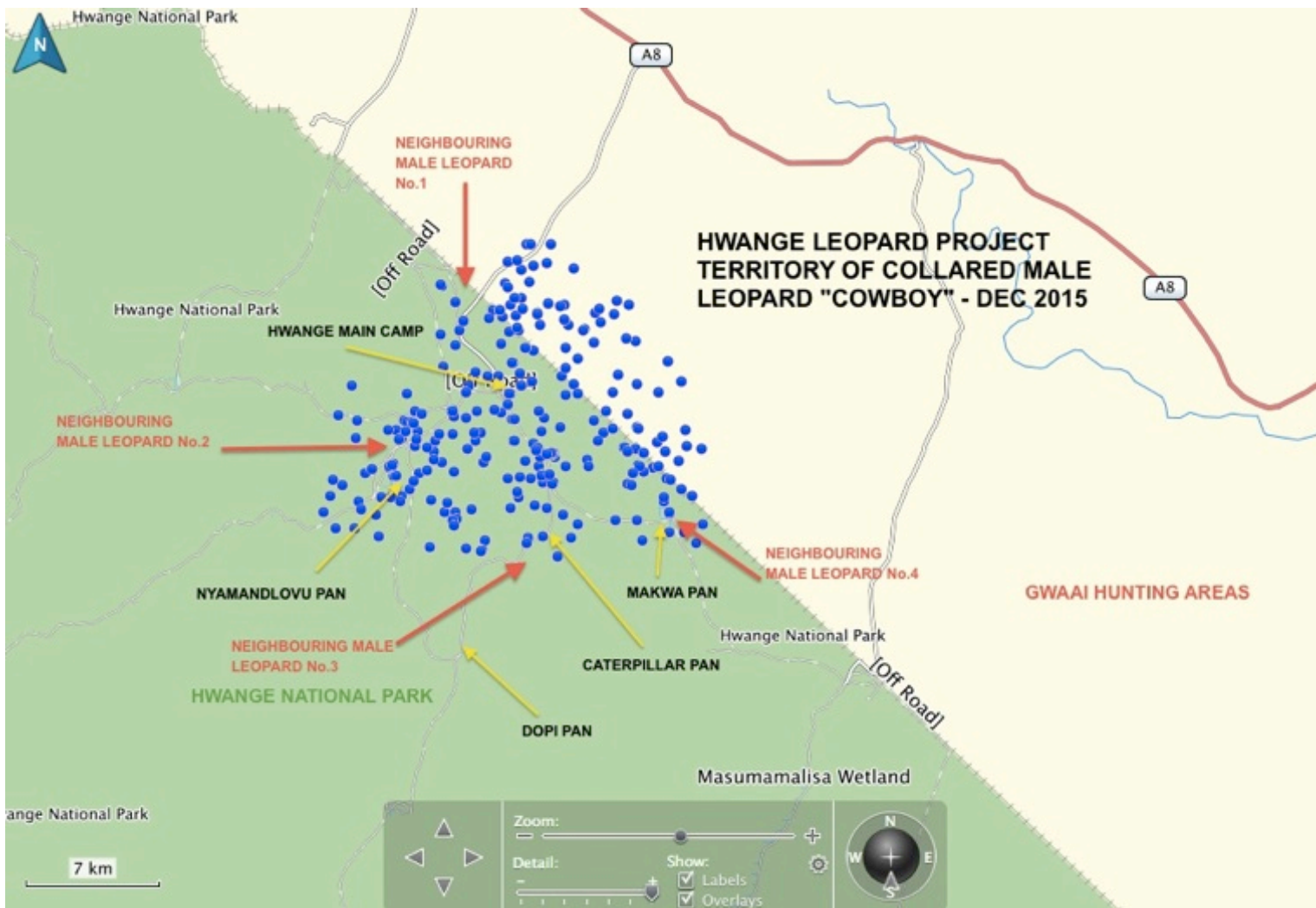


CATERPILLAR FEMALE



COWBOY AND CATERPILLAR FEMALE MATING

COLLARED MALE LEOPARD TERRITORIES



The territory of the satellite collared male leopard known as “Cowboy” became apparent during the course of the year. Four other male leopards have been photographed at various boundary locations on the edge of “Cowboy’s” territory. Photographs of these competitive neighbors are shown below:



MPOFU PAN MALE LEOPARD - No.1



DOM / NYAMANDLOVU AREA MALE – No.2



DOPI / CATERPILLAR MALE LEOPARD – No.3



MAKWA AREA MALE LEOPARD – No.4

MAJOR UNEXPECTED RESEARCH SETBACK –

Unfortunately in March 2015 the first of our satellite collars malfunctioned and suddenly, without warning it stopped working.

The remaining two Satellite collars soon followed.

Satellite collar batteries are manufactured to produce a maximum of 3000 GPS downloads and have an expected satellite battery life of around 12months.

These three satellite collars were critically important research tools for the project and the premature loss of the satellite GPS data they were expected to provide made it impossible to achieve many of the planned research objectives for 2015.

The three leopard satellite collars that stopped working prematurely are:

- a) Male Leopard Collar (Cowboy) – Fitted 10 Dec 2014 – Failed 15 Mar 2015 – Lasted only 3mths
- b) Female Leopard Collar (Ivy) – Fitted 22 Jul 2014 – Failed 13 Mar 2015 – Lasted only 8 months
- c) Female Leopard Collar (Pumi) – Fitted 6 Dec 2014 – Failed 13 July 2015 – Lasted only 7mths

The failure of these collars were a huge blow to the project in many different ways:

- ✓ Financially - At a cost of US\$2,500 per collar, these collars could not easily be replaced.
- ✓ Scientifically – Many months of potential data has been lost because it is not possible to obtain precise GPS location information for these leopards while the collars are not working.
- ✓ Wasted time, effort and resources – Finding, catching and collaring a solitary, dangerous and illusive animal like a leopard is not easy. Having to repeat the process simply to change a failed collar is not only an enormous challenge but also a waste of time and resources.

Project Response

- a) Budget constraints prevented the satellite collars of female leopards Ivy and Pumi from being replaced. Their satellite collars had already yielded a significant volume of data showing their territorial home range and movements. In the meantime the VHF signal from these collars remains operational allowing these leopards to be located manually with receiver and tracking aerial when necessary.
- b) The value of precision satellite data to this project outweighed the budget challenges, and so in June 2015 two additional satellite collars were purchased for the Project. One was immediately fitted on Cowboy as the collection of detailed GPS location data for a large male leopard like him was definitely a priority. His recapture was easier than anticipated and a further 2 months of valuable data has since been obtained. This collar was then removed with the intention of fitting it to another male leopard as soon as possible. The second collar was fitted to female leopard (Clauhe) and has already helped us find the first newly born leopard cub seen by this project.
- c) With a limited satellite battery life it is now our intention to maximize the potential data return per collar by re-using a single collar on more than one leopard.

Despite the premature failure of these satellite collar batteries a great deal of valuable information was still obtained for these leopards during 2015.

1. Home Range Analysis –

- ✓ Territorial Size for 3x Female leopards = (Ivy 84.6sqkm; Pumi 72.5sqkm; Clauhe 90.9sqkm)
- ✓ **Average Female Leopard Territorial Size = 82.6sq km**

- ✓ Territorial Size for 2x Male leopards = (Mark 328.3sqkm; Cowboy 256.5sqkm)
- ✓ **Average Male Leopard Territorial Size = 292.4sq km**

Though the sample size might be small, it still provides useful information regarding the size of leopard territories within these specific Kalahari Sand sample areas of Hwange.

As tempting as it may seem, it would be highly inaccurate to extrapolate these figures across the entire 14,600sq km area of Hwange to arrive at a possible total leopard population because of the many and widely diverse habitat types contained in this Park.

The most obvious habitat distinction is based on the underlying geology of the Park that separates the basalt and granite of the North from the Kalahari Sand areas of the South. These regions are made up of different geological and vegetation zones that are further complicated by the fluctuating availability of water. In addition the regular persecution of leopards living along the boundaries of the Park by hunting concessions and communal lands directly impacts the boundary sample leopard populations.

For this reason the Park has been divided into a number of specific research areas that represent these diverse environmental zones. Extrapolation of data is only possible between similarly classified zones and a total population for the Park can then only be obtained by adding population estimates from the many different zones. For this reason there is still much work ahead for the Hwange Leopard Project.

2. Core Home Range Within Territory –

Core home ranges and areas where leopards spend more time have been identified.

3. Average Daily Distance Walked –

Satellite downloaded GPS locations make it possible to calculate daily distance walked and periods of rest and inactivity for each leopard. Seasonal comparisons have also been made.

4. Possible Patterns and Regularity of Return to Specific Locations -

How often a leopard returns to a specific location like a favorite resting tree or a kill site or a bait site has been investigated in order to understand predictability of movement.

5. Territorial and Home Range Movement Patterns –

Seasonal movement and activity within a leopard's home range has been investigated to understand the impact that seasonal and fluctuating water availability may have on leopard territorial boundaries and the tolerance of trespass to obtain water during the dry season.

6. Kill Sites Investigated –

A large number of leopard kills have been located and investigated. It is already well known that leopards will eat a wide-ranging diet that includes insects, reptiles, fish, birds, primates, porcupines and small to medium sized antelope.

It did surprise us however to discover two separate cases, one involving a male and the other involving a female leopard which each killed and consumed a sub-adult cheetah. Cases of cheetah mortality are more often attributed to lions and hyena so these confirmed cases have proved valuable to cheetah researchers.

Another surprise was the confirmed kill of an adult female sable by a male leopard (Cowboy) who fed undisturbed on this carcass for 6 days.

Also of interest was the number of times a leopard took its prey into a tree compared to the times it would feed on the ground. Many reasons were considered for this difference including prey weight to leopard size considerations; plus the population of lions and hyena in the immediate area; plus

the size and gender of the leopard that might determine its ability to defend a ground-based prey from hyena.

Another significant factor observed with most kills was the neat and tidy behavior of leopards including burial of the prey species gut and stomach contents and scratching sand over them to reduce smell and hinder discovery by hyaena and other scavenging carnivores.

7. Leopard Cub Births -

Since the commencement of this project it was only within the last few weeks that the first discovery of a study leopard giving birth to cubs has been made. The female leopard (Clauhe) that the Project has been monitoring for the last 30 months gave birth in early September. The cub was first observed in November. Since then Den sites have been located, photographed and closely monitored. The number of days each den has been occupied has been recorded together with the number of times the cub and the den location has been moved. Much more information remains to be discovered about the survival of this cub and its progress into adulthood in the dangerous and difficult environment for a leopard like Hwange.

The HLP would like to take this opportunity to extend grateful thanks the Director General, the Chief Ecologist and all The Senior Ecologists in the Department of Scientific Services in Harare together with the Area Manager – Hwange Main Camp, The Senior Ecologist and all Ecology Rangers and Staff of the Zimbabwe National Parks and Wildlife Management Authority for the on-going support, encouragement and help they so generously provide to the Hwange Leopard Project.

With grateful thanks and best wishes for a Merry Christmas and a Happy New Year.

Paul and Stephanie de Montille
(Hwange Leopard Project)

