FINAL PROJECT REPORT

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Conservation of vulture species in North West Zimbabwe through the mapping of nesting sites on protected land

This project was funded and could not be completed without support from:

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Project Background

Zimbabwe has recently been plagued by a surge in poisoning of wildlife for commercial poaching purposes. This has resulted in the deaths of more than 300 elephant in 2013 and at least 70 elephant in 2015. The spillover of the poison into other species is also of great concern. Vultures in particular have been found at many of the poisoning sites. By poisoning, and killing of vultures, poachers are able to continue their slaughter often undetected by local authorities. Unfortunately, this has led to mass killings of the different species of vultures, especially in protected wildlife areas.

This project initiated a survey to determine vulture nesting sites by species, habitat and vegetation type. A key outcome was to determine number of nests being used to estimate the population numbers of each species and identify "hot-spot" areas for vultures within the study area. The location of the survey area for this project included the Zimbabwe component of the Kavango-Zambezi Trans-frontier Conservation Area KAZA-TFCA), which spans the five neighboring countries. The five species of vultures identified for this project area included (White Backed Vulture (*Gyps africanus*), Lappet-Faced Vulture (*Torgos tracheliotos*), Egyptian Vulture (*Neophron percnopterus*) (reported to be a rear vagrant to the area), Hooded Vulture (*Necrosyrtes monachus*), and the White Headed Vulture (*Trigonoceps occipitalis*), all of which actively move between all the KAZA-TFCA countries. The IUCN lists all five of these species in decline.

Project Objectives

This project aimed to:

- Work with local wildlife authorities, tourism operators, guides, and wildlife experts to establish a set protocol for collecting data on vulture nesting sites and identification of species (when possible)
- Collect data throughout North-West Zimbabwe on vulture nesting sites and establish a data-base for this area.
- Map all the nesting sites (using Quantum GIS)

- Establish a baseline estimate of vulture population numbers based on nesting site densities
- Analyze vulture nesting sites preferences over different habitats and land use types
- Provide data and some management recommendations to wildlife authorities and conservation bodies to input into a country wide strategic management plan

Methods

Survey Area

The project survey area included protected land in the North-West region of Zimbabwe. The region includes multiple land use types including, National Park, Safari Area, Forestry Area and some resettled land. (Refer to Figure 1)

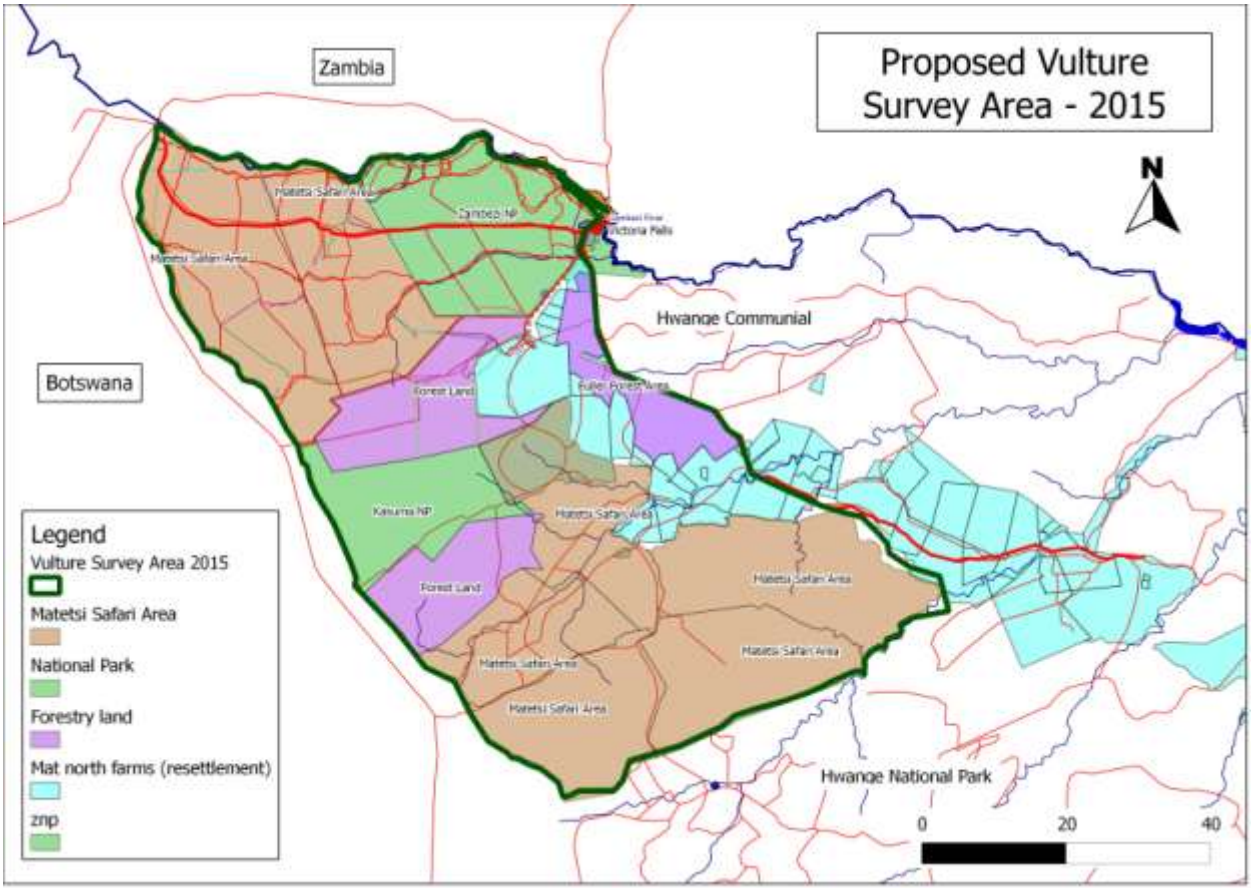

Figure 1- Survey area including the different land use types of National Parks and Wildlife estate, Forestry areas and resettled land in the North West region of Zimbabwe.

The Area was bordered by the Zambezi River to the North, the Botswana international border to the west, the north western boundary of Hwange National Park to the south and the main tar road (Victoria Falls to Bulawayo) to the east.

Data Collection

Given the large area that was included in the survey, early on in the project there needed to be a coherent strategy for data collection to involve multiple stakeholders. After consultation with the Parks Wildlife Management Authority of Zimbabwe (PWMA) and Bird Life Zimbabwe (BLZ), a set of protocols were established and a data collection sheets were drawn up (Appendix B & C). The equipment in the project proposal was purchased and given to the local wildlife authorities to assist in the survey. The GPS units and batteries went to the local authorities to provide them with the tools to be able to give a loc-stat for mapping component of this survey. Many of the local rangers had extensive knowledge of the different vulture species and knew of existing nesting sites. The data sheets were then distributed to the wildlife authorities (PWMA) as well as other stakeholders operating in the project area. This included hunting and photographic safari operators/guides, private anti-poaching units, conservation organizations and researchers. Verbal training was given to each recipient to ensure that the data that was collected was done so consistently. Data collected was correlated by the project manager and a data base was established and subsequently mapped and analyzed.

Aerial Survey

This survey used a low-flying aircraft (Lambada Ultralight Motor Glider) to assess nest sites to try and determine the species, nest location and nest activity during the breeding season (July-October). During October the project used a microlight to fly over nesting sites as well as to access some of the blocks in the survey that were not easily accessible by road to evaluate nesting sites.

Figure 2- Pilot of the Lambada Ultralight Motorglider downloading survey transect for flight preparation

Straight-line Transects were plotted over the survey area in an east-west direction 4km apart and flown at a height of 200-300ft above ground level at an average speed of 70 knots. Due to weather conditions, flights were carried out twice per day – early morning and late afternoon to avoid turbulent periods during mid-day. The following data was recorded by the observer:

- Nest site location (GPS)
- Nest site habitat
- Tree species of nest site (if possible from the air)

As per the request of PWMA, the following information was recorded in addition to that outlined for the project:

- Any Carcass location
- Carcass species (if possible from the air)
- Surface water location and status
- Animal Sightings and numbers

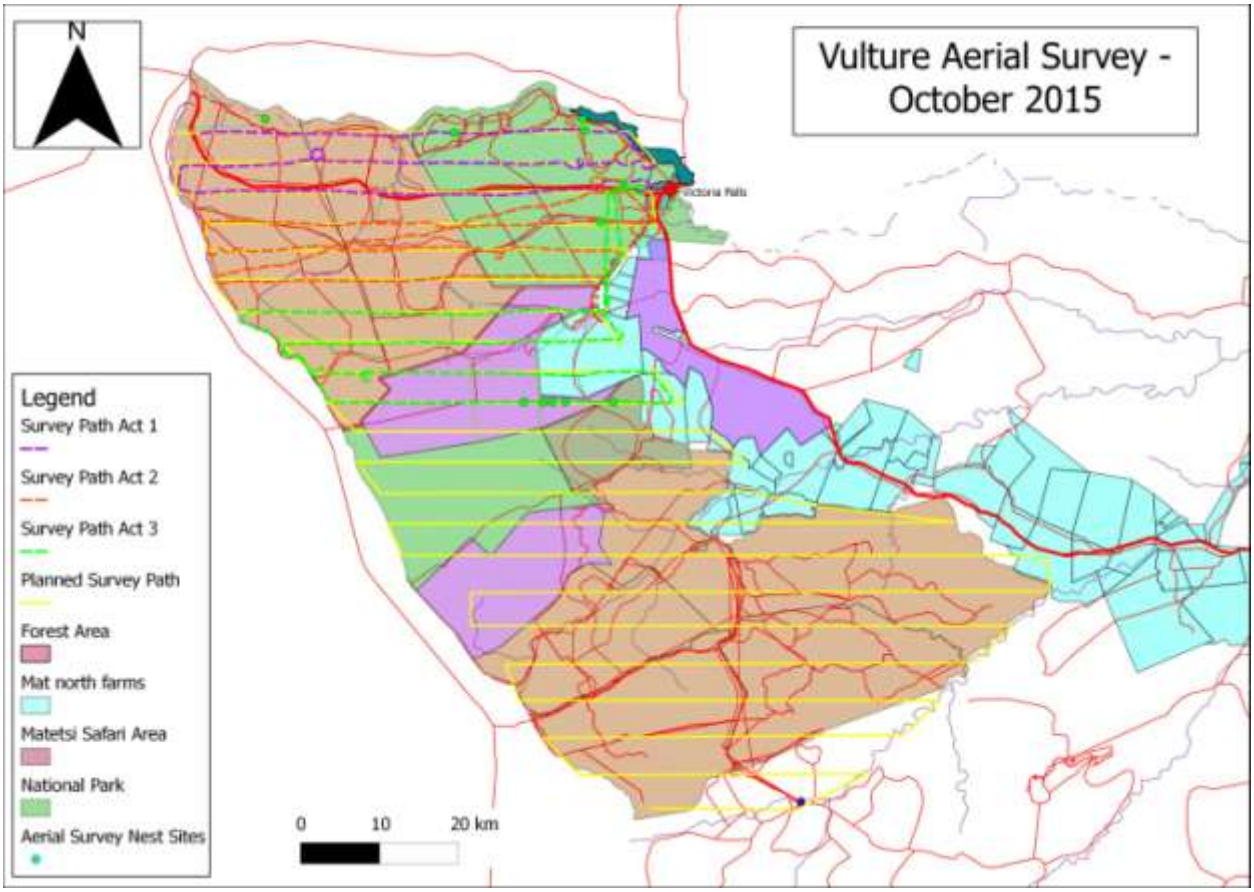

Figure 3 : Map Aerial Survey

Mapping of Nests

After the data from local stakeholders was collected, the information was input into a database. Some of the data was incomplete and needed to be re-evaluated. In addition there were areas where there had been no data collected. Therefore another component of the survey involved driving transects through prime habitat areas within the survey area to map as many nest sites as possible. These transects were determined from historical data and information received from collaborators. All data was collected as per the “Raptor Nest Count” data sheet (Appendix C) and entered into a data base for analysis and mapping. Mapping data included:

- Species information
- Details of birds present at nest site

- Nest height and orientation
- Tree species (of nesting tree)
- Habitat details
- Closest neighboring nests (density)

Quantum GIS was used to map all vulture nest data.

Figure 3- Survey leader collecting data on nest site, and vulture nest site

Project Results

Aerial Survey

It was soon evident that the aerial survey was not giving the required results and was therefore halted after completing 10 out of the 22 planned straight-line transects. Several factors were identified as contributing to this.

- The survey was done a little late for the nesting season and bird activity was reduced.
- Visibility of the nests was also reduced due to early leaf flush on the trees.
- The aircraft was a two seater, side by side and the one observer only had good visibility to the right of the aircraft.
- Due to the turbulent weather conditions and the risk of flying birds (possible bird strikes) the pilot was not able to assist with observations.
- Due to the above conditions, it was not safe to fly at the required lower altitude making it difficult to see the nests from the air.
- Air speed was also a little fast, adding to the reduced ability to observe the nest from the air.

10 nests were however located from the air and these sites will be checked from the ground and added to the data base. This has not been done by the end of the project period. Details of the nest data from the aerial survey can be seen below (Table 1)

Other useful data was collected however:

- 19 carcasses were located – Mostly old and not recent. This data was passed on to PWMA for follow-up and ground-truthing.
- Several ground water supplies were checked and recorded
- A Total of 510 buffalo, 169 elephant and 13 sable were recorded (as per PWMA's request) along the transects flown.

Vulture Aerial Survey 2015 - Nest Sites										
DATE							AERIAL SURVEY DATA SHEET			
GPS No	Date	Time	Long	Lat	NEST ANIMAL CARC	SPECIES	No	TREE SPECIES	PRES. AD/JUV	HABITAT TYPE
1	13-Oct-15	16:00:20	-17.849887	25.731632	Nest	vulture ?	1	unknown	not seen	riverine
4	13-Oct-15	16:17:18	-17.84655	25.35316	Nest	Raptor?	1	unknown	not seen	riverine
9	13-Oct-15	16:36:12	-17.863696	25.578597	Nest	Raptor?	1	unknown	not seen	Mixed woodland
10	13-Oct-15	16:41:52	-17.861979	25.734742	Nest	Raptor?	1	Baobab	not seen	Vlei edge
18	14-Oct-15	6:50:42	-17.966134	25.752389	Nest	Raptor?	1	unknown	not seen	Vlei edge
36	15-Oct-15	7:17:58	-18.172275	25.766528	Nest	unknown	1	unknown	not seen	open woodland
38	15-Oct-15	7:19:57	-18.171854	25.708816	Nest	unknown	1	unknown	not seen	open woodland
39	15-Oct-15	7:20:27	-18.171855	25.693613	Nest	unknown	1	unknown	not seen	open woodland
40	15-Oct-15	7:20:50	-18.171931	25.682761	Nest	unknown	1	unknown	not seen	Vlei edge
41	15-Oct-15	7:21:38	-18.171576	25.659965	Nest	unknown	1	unknown	not seen	Vlei edge

Table 1 – Vulture Aerial Survey

Nest Site Numbers

In 2015 a total of 176 nest sites for observations were recorded and mapped. Of these, 103 were within the study area. An additional 87 nest sites were mapped from historical data from 2014 (see figure 4). A total of 10 "hot-spot" nesting sites were identified within the study area and mapped. These were rated in terms of low, medium and high risk areas based on location and level of vulture nesting activity as follows:

- Hot-spot 1 – High risk based on its close location to the Botswana village of Lasoma which has a history of a number of poisoning cases over the last 5 years.
- Hot-spot 2 to 5 – Medium risk. Located along the Zambezi River, close to human communities in Zambia. There has been records of high poaching activity in this area with one known poisoning case.
- Hot-spot 6 & 7 – Medium risk. Located in the south east of Zambezi National Park close to human communities in Victoria Falls town and Hwange communal land

- Hot-spot 8 to 10 – Low risk due to number of nest sites and their remote location.

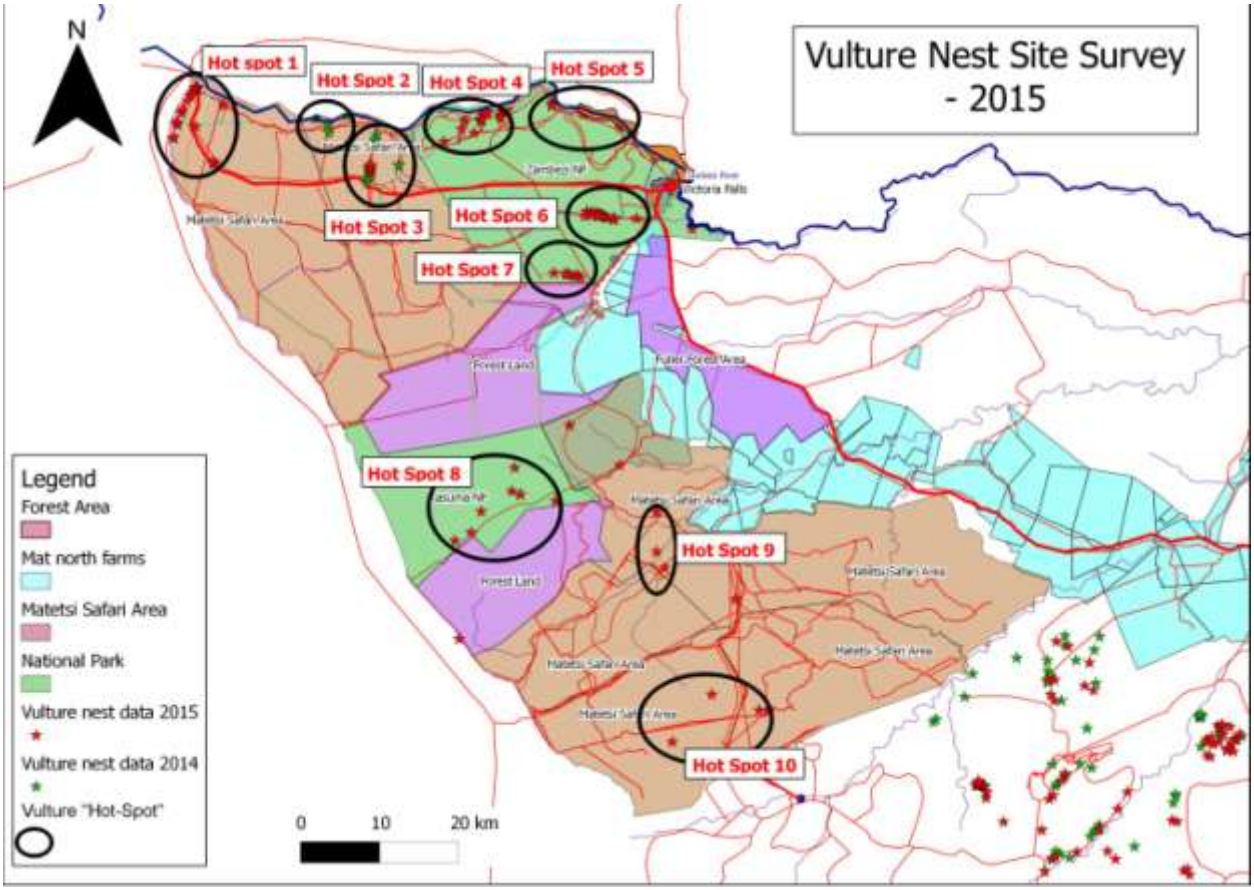

Figure 4 – Map nest sites

The majority of the nests identified within the study area were white backed vultures (48.5%). 49.5% of the nests recorded were not positively identified but were likely to be mostly white backed due to their location and habitat. On this assumption, 99% of all the nests recorded could be white backed vulture nests. Only 1 hooded vulture nest was confirmed. One Marabou stork nest was located which was in a prime white backed vulture nesting area and it is suspected that this nest site was taken over from a white backed vulture. No nests for both lappet-faced and white headed vultures were confirmed.

Summary of Nest sites Recorded													
	Total	White Back		Hooded		Lappet-faced		White Headed		Unknown		Other Raptor	
		No	%	No	%	No	%	No	%	No	%	No	%
Total Nest Recorded	176	119	67.6%	1	0.6%	0	0.0%	0	0.0%	55	31.3%	1	0.6%
Out of Study Area	73	69	94.5%	0	0.0%	0	0.0%	0	0.0%	4	5.5%	0	0.0%
In Study Area	103	50	48.5%	1	1.0%	0	0.0%	0	0.0%	51	49.5%	1	1.0%

Table 2 – Summary of Nest sites

Nests on different land use designations

All the nests located within the study area were located on Parks and Wildlife estate - 59% in National Parks and 41% in Safari Areas. (See Table 2 for more details) No records were received from Forestry Land or any of the farm resettled areas (despite collaboration requests).

Land Use Type for Nest Sites recorded in Study Area								
Land Use Type	Total	%	ZNP	Kazuma NP	VFNP	Matetsi SA - Unit 6	Matetsi SA - Unit 7	Matetsi SA - Unit 3&5
National Park	61	59%	50%	8%	1%			
Safari Area	42	41%				20%	10%	11%
Forestry	0	0%	0%	0%	0%	0%	0%	0%
Farm Resettlement	0	0%	0%	0%	0%	0%	0%	0%
Total Nest Sites	103	100%						

Table 2 – Land use types

Nests sites based on habitat

The analysis on habitat preference showed that the preferred habitat types were Acacia woodland (34%) and mixed river-line (20%). Nest sites along the edges of vleis within the ecotone areas were also significantly high (14%). (Table 3)

Nest Site Habitat Preference		
1	Mopane woodland	0%
2	Mopane/Combretum woodland	0%
3	Mopane bushed grassland	5%
4	Combretum bushed grassland	5%
5	Acacia woodland	34%
6	Biakiaea woodland (Teak)	11%
7	Burkea/Erythrophleum woodland	0%
8	Open grassland/vlei	0%
9	Mixed riverine	20%
10	Brachystegia woodland	0%
11	Vlei edge	14%
12	Flood Plane	11%

Table 3 – Habitat Preference

Nest site locations indicated a preference to open to moderately open areas (64%). (Table 4). There were also indications to a preference of sparse tree layer (72%), moderate shrub layer (70%) and sparse grass layer (88%) (Table 5)

Nest Site Openness Preference		
1	Open	9%
2	Open to Moderate	64%
3	Moderate	22%
4	Moderate to Dense	5%
5	Dense	0%

Table 4 – openness preference

Nest Site Layer Preference		Tree	Shrub	Grass
0	None	0%	2%	3%
1	Sparse	72%	23%	88%
2	Moderate	28%	70%	8%
3	Dense	0%	5%	2%

Table 5 – Vegetation layer preference

Conclusion and Suggestions

Achievements

- Vulture nest site data-base for the Victoria Falls area has been well established with 103 nest well documented. These were almost all white-backed vultures which highlights the need for data on other vulture species for the area. Habitat

preferences for white-backed vultures within the project area was confirmed to be riverine, floodplain and vlei edge ecotone areas.

- This project established baseline data that will be shared with VulPro, PWMA and Birdlife International, Zimbabwe for future monitoring of nest sites to see how vulture population numbers are maintained
- In March of 2015, VFWT presented at a Birdlife International conference in Victoria Falls open to visitors from the region on the plight of vultures, particularly to that region and a major tourism destination, this included an interaction with the ambassador white backed vulture and was very successful in raising awareness
- Subsequent to the conference in Victoria Falls and Bird Life International Zimbabwe meeting, VFWT agreed to collaborate with Bird Life International on this project and to be their partner in North West Zimbabwe on monitoring vultures
- Data collection protocols are well in place and will hopefully help facilitate the continued collection of nest site data for the future
- 10 “hot spot” vulture nesting areas have been identified.
- Stakeholder interest has been increased and a much larger level of awareness is now present within the wildlife and conservation community
- Given the 103 nest sites within the project area approximately 80% were active. Therefore the estimate of mainly white-backed vultures is estimated at a minimum of 83 breeding pairs within the study area. Chick mortality is not know at this time. There is also a gap in the data for the area the aerial survey/road survey was not able to cover, increasing this number accordingly. Total populations estimates are therefore not yet conclusive.
- Lappet faced, white headed, white backed and hooded vultures are seen on a regular basis at vulture “restaurant” feeding sites within Victoria Falls. There has been two unconfirmed sightings of Egyptian vultures at these sites by reputable conservationists confirming possible vagrant visitors of this species to this area.
- More than 800 children from the area around Victoria Falls participated in a hosted activity for a day (held once a week by VFWT for groups of 20-25

children) that discussed poaching and poisoning and the ramifications including the effects on the vulture population and spillover within the ecosystem. This activity is a long-term project of VFWT to help raise awareness

- Due to the importance of this project and the growing concern of the increase in poisoning, VFWT have developed a booklet highlighting the plight of vultures titled “Vusa the Vulture Guardian” that is in the process of being printed. This booklet will be given to every child from the area that participates in the 2016 Conservation Education Activity that is held every Friday.
- Three more white backed vultures were brought into VFWT rehabilitation centre and treated for poisoning and human inflicted injuries. Sadly two of the vultures which were treated by a reputable wildlife veterinarian died shortly after surgery and the third died despite being given antidotes to the toxic poisons

Challenges

- Data is biased towards white-backed vultures and there is a need to collect more data on other species
- Road access may have limited nest data.
- Interested collaborators entering data may have caused a bias to their respective area of operation.
- Lack of availability of a suitable microlight at a reasonable rate of hire made aerial transects problematic
- Minimal historical data before this project precludes us from determining if populations are being maintained, increasing or decreasing
- Full population assessment of all vulture species nesting sites (regionally) is needed to make a more accurate conclusion on bird population numbers

Recommendations

- VFWT looks forward to continuing to work with Bird Life International, VulPro and local stakeholders to monitor the nest sites and populations in the future
- There have been reports of nesting sites on some of the islands in the Zambezi and in neighboring Livingstone of Lappet faced and possibly Hooded vultures, it is suggested we work with local conservation partners in Zambia (5kms away

from Victoria Falls) to map these nest sites using the established protocols and data collection sheets (VFWT have established contacts in Livingstone, Zambia and hope to do this in 2016)

- Monitor vulture feeding sites (restaurants, know carcasses, etc) to assess vulture species and numbers
- Expand the survey area with other collaborators 2016 to Hwange National Park which is a hotspot for poisoning and establish baseline numbers to monitor in the long-term
- VFWT will work with local stakeholders to refine basic data collection techniques and add information to the existing database on both new and existing nest sites, habitat and land use
- The study needs to have more information on any nests in Forestry and resettlement land. VFWT will work with other conservationists to collect this data when they are doing other research on the ground in these land use types
- Should funding be available, placing tracking devices and tagging of vultures, especially those with little known data (lappet faced, white necked, and hooded vultures) to determine their range and nesting site areas as well as monitor their movements
- VFWT is interested in establishing a rescue and rehabilitation centre in Victoria Falls. The one white backed vulture is already acting as an ambassador and will be in the long-term care of VFWT. It is recommended we continue to act as a source for rehabilitation of birds, and we will continue to keep antidotes on hand for all poisons currently being used to treat any affected animals. A better long-term care aviary needs to be erected but site designation, funding and design have not yet been determined.
- Ultimately the conservation of vultures and many other species is dependent on humans both to respond and to prevent poisoning and poaching cases. Therefore one of the best recommendations is to continue providing both the local people in the area, conservationists, PWMA, and international tourists with the information about vultures, their current volatile status and the urgent need to improve conservation of these birds

Acknowledgement

This project and survey could not have been done without the financial support from the African Bird Club (ABC). It provided the means to purchase the equipment used in the survey as well as cover the direct costs of conducting the survey. We thank ABC for their generous support. The project also would like to thank the Zimbabwe Parks and Wildlife Management Authority, Bhejane Trust, Stephen Long, Trevor Lane, Jed Robinson, Wild Horizons, and the Forestry Commission for their collaboration on the survey and assistance in mapping many of the sites. Bird Life International, Zimbabwe assisted with setting the protocol and providing awareness to local stakeholders.

Report By: Roger Parry (roger@vicfallswildlifetrust.org)

Appendix A

Financial Statement

Project Expense	Details	ABC	Project	USD $	GBP £
2 x GPS units for PWMA	2 x Garmin GPS units @$300 each	566		566	354
Stationary and Printing	20 booklets @$3 each	60		60	37.5
GIS Mapping Software	$120 package		120	120	75
Fuel for Monthly Road surveys	100L/month x 9 months @1.50/L & 250L in Sept/Oct/Nov	2025		2025	1265
Micro-light hire	15 hours @80/hr	600		600	375
Rechargeable Batteries & SD Cards	16 batteries	40		40	25
Mileage in Vehicle	.40/km x 4800kms		1920	1920	1200
Wildlife Manager Time	$750/month x 9 months		6750	6750	4219
Totals		$3291	$8790	$12081	7551

Conversion rates based on current currency data of USD$1.6= GBP£1 (Note when the project began it was estimated that USD$1.7= GBP£1)

The GPS Units are the only equipment that were purchased with funding for this project were given to PWMA for use in the National Park and future research and monitoring of vulture populations and other wildlife and bird species.

Appendix B

Data Sheet A

	Ref No	**RAPTOR COUNT**				
	rev Visits Ref No	**NEST SITES**				
Species	Vulture/Raptor?	Species Name (full common name)			**Date Recorded**	Date (dd/mm/yy)
Location and GPS co-ordinates (UTM) of nest or colony		Name of area where nest located	**GPS Co-ords (UTM): (Note: give full GPS co-ordinate)**		Eastings (7 figure)	Northings (7 fig)
Details of nest/colony and birds present (NOTE: One data sheet per nest)		No Nests?	Species?	No Adults / No SA	No Juv	Other
		Tree Species	location of nest(s) in tree (top/mid/low canopy		Nest active Y/N	Other info/comment
Additional Nest Details		Tree Height	Nest Height	Orientation in Tree NSEW?	Other nest comments	
Any adults sitting on Nest or close proximity - give details?		Details				
Habitat Information for area surrounding Nest site (See over)		Habitat Type (1-9) Dominant species	water close by (Y/N) - Dist. (m)	Openness (1-5)) open =1and Dense = 5 / Tree Layer (1-3)	Shrub Layer (1-3)	Grass Layer (1-3)
Distance/Direction to nearest Neighbouring nest (if applicable)		neighbour 1	neighbour 2	neighbour 3 / neighbour 4	neighbour 5	neighbour 6
		ive the dist. (m) and Direction (deg) to all nest neighbours in colony (m/deg				
Observer's Name and Contact details (one cell No and one email sufficient)		First name		Cell Number 1(include country code)		Email Address 1
		Surname		Cell Number 2 (include country code)		Email Address 2
Observers professional position (e.g. ranger, manager, etc.)		Position		Employer/Organisation		Sign
Observers time spent at site		Start time (24hr clock)		End time (24 hr clock)		Total time at nest site (hh:mm)
Additional Info (Notes)						

NOTE- Survey Sponsored by: ABC

1. One data sheet to be filled out per nest.
2. GPS Position in UTM - as per GPS (e.g. E 0379523 N 8011753). 6 fig UTM (in red) off map if no GPS.
3. Compass may be required to record direction to neighbouring nests - use compass on GPS if need be.
4. Please refer to habitat codes on the back of this data sheet for habitat section.
5. Please include any other info. Thought to be important in "Other Info" section.
6. Completed Data sheets to be sent to R Parry (roger@vicfallswildlifetrust.org cell +263712217171).

Appendix C

Data Sheet B

VULTURE COUNT
CARCASS

Date				Page No		
Location and GPS co-ordinates (UTM)	Place where?		Eastings		Northings	
Weather conditions	wind (dir./strength - mild/med/strong)			cloud 1-8	Temp deg C	other
Was there a carcass available? Details of species and age of	Y/N	Species?	Sex?	Ad/Sa/J	How old carc.?	Dist. from Observer
Observer's Name and Contact details	Name			Organisation		
	Email			Cell No		
Observation start time		**Observation end time**			**No Observers**	
General Comment						

SPECIES (If unknown - specify) Record all raptors.	**TIME**	**TOTAL NUMBER**	**AGE GROUPS**		**MARKINGS (if any)**		
			NUMBER OF ADULTS	**NUMBER OF JUVENILES**	**TYPE OF MARKING**	**WING OR LEG**	**TAG OR RING NUMBER**
TOTAL BIRDS AT SITE							

SUMMARY OF COUNT (All pg's)	TOTAL	ADULTS	JUVENILE	**Additional Pages?**
White backed vulture				
Hooded Vulture				
White Headed Vulture				
Lapped Faced Vulture				
Cape Vulture				
Other (specify)				
TOTAL				