

**0194312 - CONSERVATION OF SAVANNAH ELEPHANTS
LOXODONTA AFRICANA IN YANKARI GAME RESERVE,
NIGERIA**



Host Country: Nigeria

Site Location: Yankari Game Reserve

Project Duration: September 2012 – June 2013

Aim: *Contributing to the Conservation of Savannah elephants in Sub-saharan Nigeria*

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We would finally wish to express our gratitude to the rangers and staff of APLORI in the Yankari Game Reserve for contributing to a smooth implementation of the project on the field.

Section 1:

1.1 Summary

Elephants in Yankari Game Reserve are threatened by an unprecedented rate of poaching (fueled by the huge illegal ivory trade market existing in the region and apathy resulting from the destructive behavior of elephants) and the illegal presence of cattle in the reserve. With a better knowledge of the distribution of elephants in the Yankari Game Reserve, conservation efforts can be concentrated to areas where elephants can be found. Elephants primarily utilize the banks of the Gaji River, the main source of water supply of the reserve, but evidence of their presence can also be found in other parts of the reserve. Photo analysis of elephant herds did not yield useful results because of the limited period earmarked for the activity. Future studies would cover a longer period to be successful. There was no interaction between cattle and elephants. Elephant presence was not observed in the same location as cattle sightings. However, the presence of cattle in the reserve still needs to be discouraged because they utilize resources that are meant for the reserve's wild fauna and there is a higher risk of poaching with the proximity of the cattle herders with the wild fauna in the protected area including elephants. Results from assessments of crop raiding activities outside the reserve based on the questionnaire survey showed an insignificant frequency of crop raids in the reserve. An estimated number of 3 million listeners were sensitized by means of a radio program, on the importance of elephants and the dangers of killing them for their ivory.

1.2 Introduction

Savannah elephant (*Loxodonta africana*) are listed under African elephants on the IUCN red data list as vulnerable. However, studies have shown savannah and forest elephants in West Africa to be genetically different from those in the eastern and southern parts of Africa and experience greater pressures than the latter. (Eggert et. al, 2002; Johnson et al. 2007) It is important to distinguish these species to avoid the danger of lumping them up, overlooking the unique pressures they face and concentrating on the more stable environment experienced by other elephant species grouped under the African elephant.

Over the past four decades, in West Africa, elephants have shown a decline in their population. (Bouche, et al., 2011) This decline is primarily due to the increasing rate of poaching caused by the presence of the growing illegal ivory trade market in West Africa and competition with humans and their domestic livestock for resources (citation needed). In Yankari Game Reserve, elephants face immense pressure from poaching. Damage of crops by elephants, aggravating the problem of

poverty might be affecting the attitude of natives towards elephants. In addition, the presence of cattle within and outside the reserve may be having an impact on the distribution of elephants.

1.3 Project Site and Conservation Significance

Yankari Game Reserve is a protected area managed by the state government. It covers an area of 2,240 km². Rain falls between May and November; the wettest month is August, with more than 300 mm rainfall. The average annual rainfall is between 1,000 mm and 1,100 mm. During rainy season, the reserve is usually characterized by a significant extent of vegetation cover. The reverse occurs during dry season with a decrease in vegetation cover. However, along the Gaji River – the main source of water in the reserve – vegetation remains fresh and green with a mosaic of flood plains, swamp forest, savannah woodland, and large areas of gallery forest. Yankari Game Reserve is a biodiversity hotspot that harbors the largest viable population of savannah elephants in Nigeria and a variety of species like Western hartebeests *Alcephalus busephalus*, roan antelopes *Hippotragus equines*, bushbucks *Tragelaphus scriptus*, warthogs *Phacochoerus africanus*, buffaloes *Syncerus caffer*, elephants *Loxodonta africana* and lions *Panthera leo*.

This project was funded by Conservation Leadership Programme. Logistics support was also received from the A.P. Leventis Ornithological Research Institute and Wildlife Conservation Society during the period of the project. Permission was granted by the Bauchi State Government to implement the project and to visit the surrounding communities of the reserve.

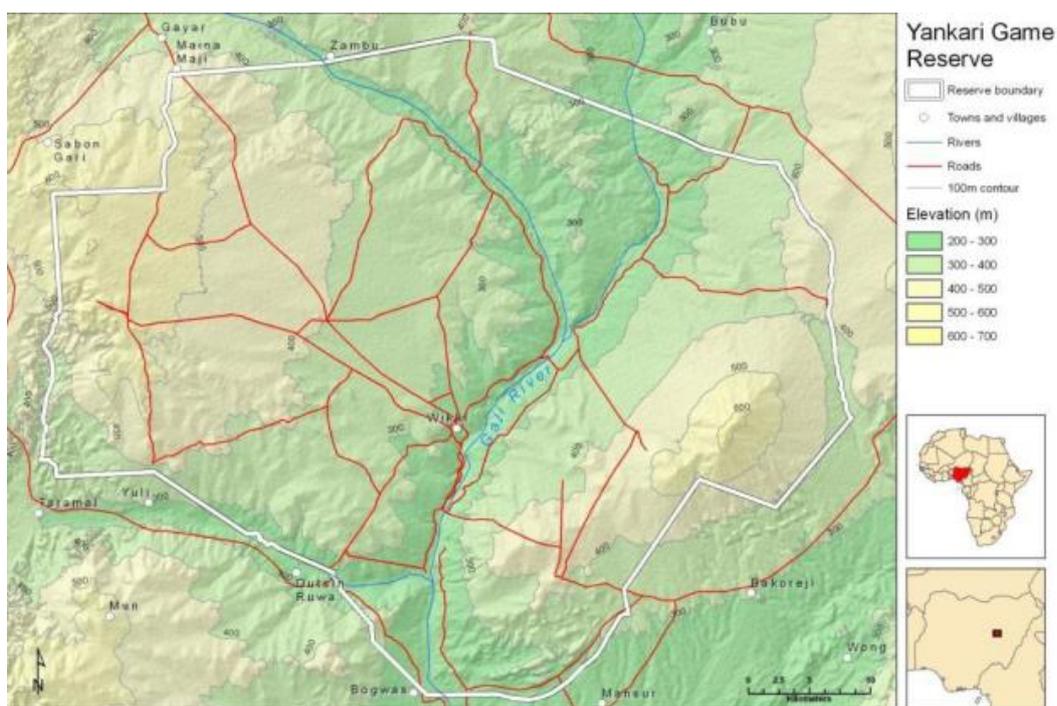


Fig. 1: Map of Yankari Game Reserve (Bergl et.al, 2011)

1.4 Project members

Adetutu holds a master's degree in Conservation Biology from the A.P. Leventis Ornithological Research Institute, Jos, Nigeria. Afterwards she worked with the same Research Institute as a Research Associate until she commenced the CLP project. She is currently receiving training in GIS concepts, tools and functionality using ArcGIS. She was team leader of the CLP team and was in charge of data analysis, administration and overall coordination of the team.

HImma Bakam is a lecturer at the department of Zoology in Kaduna State University, Kaduna. He completed his master's degree in Conservation Biology from the A.P. Leventis Ornithological Research Institute, Jos, Nigeria.

Rosemary Gbegbaje completed her master's degree in Conservation Biology also from the A.P. Leventis Ornithological Research Institute, Jos, Nigeria. She has currently begun her research work on manatees and a compilation of a bird list found in the Amunrun forest, Laminga, Jos.

Section 2:

2.1 Aim

To contribute to the conservation of elephants in West Africa, especially in Yankari, by providing data that would address mitigating factors that are unique to elephants in West Africa, thus in the long run influence a possible change in the IUCN status - which is currently for African elephants

2.2 Objectives

- Establish the current population size and distribution of the elephant population in Yankari Game Reserve
- Assess the extent of crop damage caused by elephants
- Study the interaction between nomadic herding and the distribution of elephants
- Address poverty-induced nonchalance to elephant poaching

2.3 Methodology

2.3.1 Elephant Distribution and Population status

Data was collected between the months of September and November, 2012. Permission was obtained from the Bauchi State Government to carry out the elephant project in Yankari Game Reserve.

To study the spatial distribution of elephants in the reserve, 62 transects were situated along existing tracks (Blom et.al., 2004). Each transect had an average length of 5km and a minimum distance of 200m apart from each other. Transects were surveyed with a Landrover Jeep at an average speed of 15km/hr. Each transect was visited once during the period of study. All evidences of elephant activities like footprints, dung piles were recorded and their exact GPS locations marked. The GPS locations were used to generate a GIS map showing the distribution of elephants, using Q GIS software.

For the population survey, elephant sightings were recorded. Photos of different individuals in the herd were taken with a Kodak Easy Share Z5010 Digital Camera. Pictures were analyzed to study unique features of individuals of a herd to identify and the different herds that are sighted. The herd size was recorded where possible.

2.3.2 Cattle Distribution

Sightings and activities of cattle herds observed were marked and recorded. The GPS locations were subsequently used to generate a GIS map showing the distribution of elephants and that of cattle herds sighted in the reserve, using Q GIS software.

2.3.3 Crop raiding assessment

Information about locations of crop raiding – prone villages was acquired from WCS who provided us with a GIS map showing the locations of villages situated close to the Gaji and Yuli Rivers (which meet in the reserve and are a main source of water for the animals). Seven villages were isolated for the study. Permission to visit the villages was granted by the district heads of the three districts located around the study site – Gwana, Fali and Duguri Districts.

Within the months of September and December 2012, a preliminary and questionnaire survey was undertaken concurrently with the elephant distribution exercise to determine the number of settlements around the reserve, how far they are and the average human population in each settlement. Questionnaires were printed in English but administered in Hausa, the local language. The questionnaire survey was carried out to assess the relationship between crop damage and elephant distribution and to assess the local perception of the reserve and the exploitation of the

reserves' resources. Farms reported to be ravaged by the elephants were visited, their GPS location was taken and photographed. Presence or absence of elephant activities were recorded and crops planted in the farms were identified and recorded. Further attempts to organize focus group discussions with rangers and the natives based on the results from the survey were discontinued due to security challenges.

Data collected during the questionnaire survey were analyzed using R statistical software (R Core Team 2013).

2.3.4 Radio Programme

A radio program was aired on the Bauchi Radio Corporation in Bauchi, Bauchi State to sensitize the people to the importance of conservation of elephants in the reserve. It was aired during the commercial break of a popular radio programme called 'Kunen Ka Nawa', in Hausa and Fulfude (Fulani) languages. This substituted the focus group discussions earlier planned.

Section 3

3.0 Outputs and Results

Objective 1: Establish the current population size and distribution of the elephant population in Yankari Game Reserve

3.1.1 Elephant distribution

A GIS map showing the distribution of elephants within the reserve was generated using the coordinates of elephant sightings obtained during the course of the project.

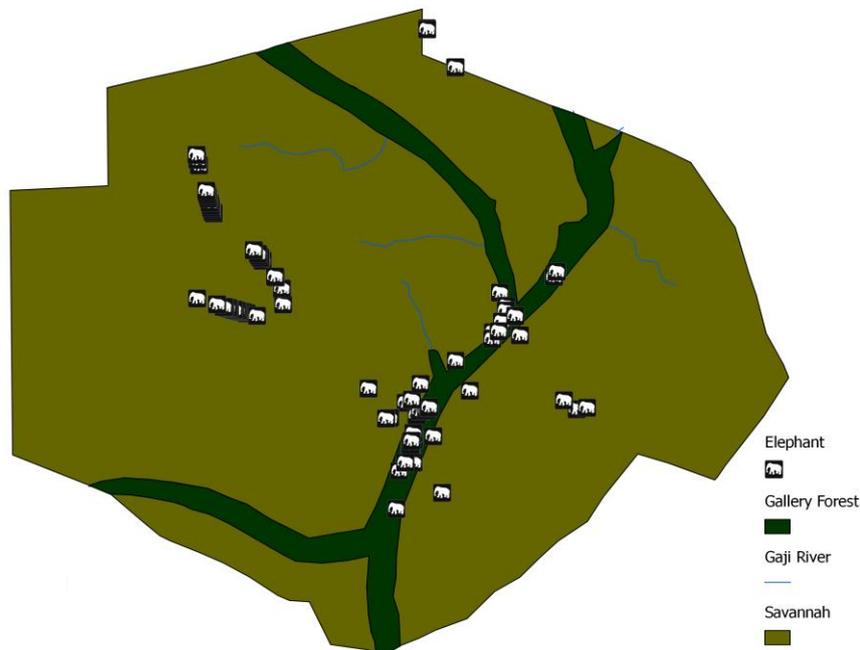


Fig. 2: GIS map showing distribution of elephants within the reserve.

Elephant sightings outside the reserve were recorded from visits to some of the settlements with crop raided farms. From the map it can be seen that a few number of elephant movements were found just outside the reserve. These locations were recorded from visits to some of the settlements after reports of crop raiding reached us. Elephant footprints and tracks, piles of their dung and scattered corn stalks were found at the farms we visited.

3.1.2 Photo Analysis

A total of 3 elephant sightings were recorded. The first sighting did not produce useful photos because the elephant herd was shy and took off as soon as they sighted us, raising dust, as a result reducing visibility. Two individuals were identified from the other two sightings. The first herd was made up of 80 elephants while the third herd had 50 elephants. The characteristic thick vegetation along the Gaji River (the main source of water in the reserve and where elephants concentrate) made sighting elephants during our survey very challenging. A reasonable number of sightings would have been in order to identify individuals to ensure herds were not counted more than once or that a fission-fusion pattern had not taken place, however, this did not happen. Elephant movement could not be monitored, so very little could be done to overcome this problem.

Table 1: showing individuals identified from two of the three sightings

No of Sighting	Elephant ID	Individual characteristics	Sex	Herd Size	Count Accuracy
1	No individual Identified	-	-	-	0
2	EP001	Area between eyes broad, sloping forehead,	Male	80	1
3	EP002	Smallish, sloping forehead	Male	50	1

The count accuracy of the herd and the sexing of the individuals identified were based on the *Studying Elephants, African Wildlife Technical Handbook Series* (AWF, 1996). Count accuracy ranging from 0 to 3, with 0 = no count; 1 = poor or partial, 2 = good estimate, 3 = exact.

(a)



(b)

Fig. 3(a-c): Photos of three elephant sightings taken during study



(c)

Objective 2: Assess the extent of crop damage caused by elephants

3.1.3 Crop Raiding Assessment

A total of 8 villages were visited. The questionnaire survey covered 6 of the 8 villages, chosen for their proximity to the main water source of the reserve. The other 2 villages (Fali/Mai Ari and Mainamaji) were visited after reports of crop raiding reached us. Below is a table showing a summary of the results from the survey:

Table 2: Results of questionnaire survey to assess crop raiding activities

Villages	RES	ELE	CRP	ELE/RES	CRP/ELE	DIST(km)
Rimi	22	18	5	0.81	0.27	3.11
Bogwas	31	28	14	0.90	0.50	1.46
Yuli	34	26	11	0.76	0.42	17.60
Yalo	29	25	7	0.51	0.46	37.88
Jada	29	9	6	0.31	0.66	10.20
Kuka	29	9	3	0.31	0.33	0.32
Fali/Mai Ari	Raided by elephants during period of study					
Mainamaji						
Total	203	115	46			

Keys: RES – Number of respondents/ village

ELE – Number of respondents who claimed to have sighted elephants

CRP – Number of respondents who complained of crop raiding

DIST – Distance of villages from the reserve

Questionnaires were not administered in the villages with crop raided farms because an obvious response would have been obtained from all the respondents. Below are pictures taken of raided farms:

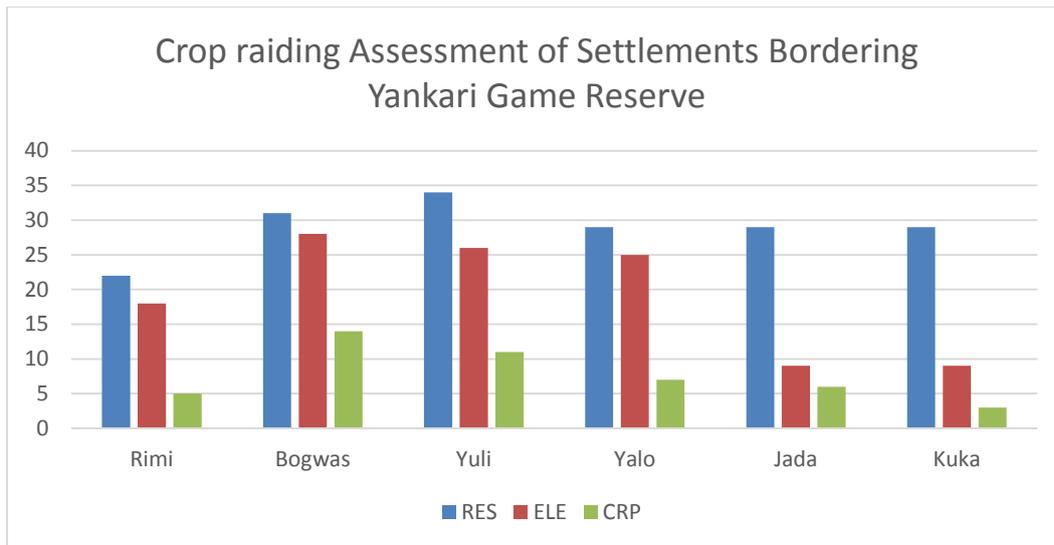


Fig. 4: Graph showing number of respondents that complained of crop raiding (in green)



Fig. 5: Maize farm raided by elephants and map showing the settlements visited

Objective 3: Study the interaction between nomadic herding and the distribution of elephants

3.1.4 Cattle Distribution

GPS locations of cattle were recorded and used to generate a GIS map showing their distribution. The GIS elephant distribution maps and the cattle distribution were further superimposed to determine the presence of an elephant-cattle interaction (Fig.6).

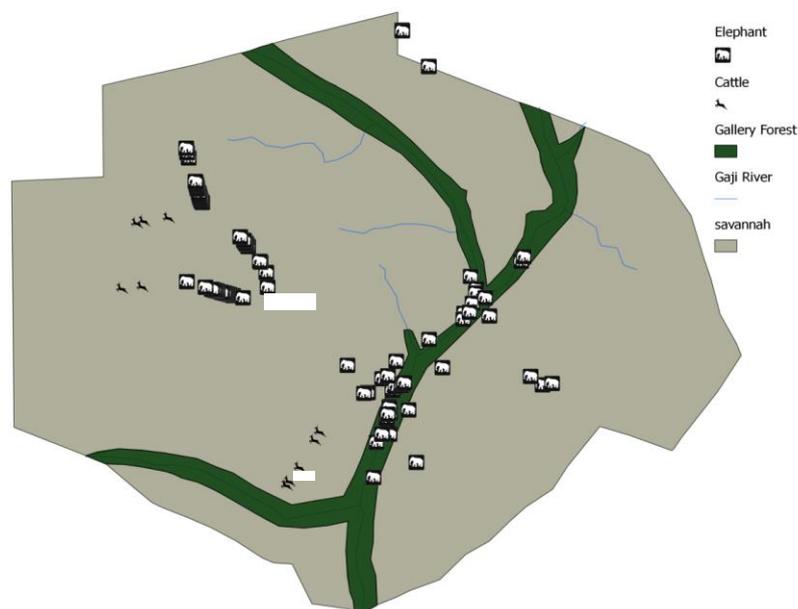


Fig. 6: GIS map showing distribution of elephants and cattle in the reserve.

No existing interaction was observed between elephants and cattle in the reserve. Pictures of actual cattle encountered in the reserve can be found in the appendix.

Objective 4: Address poverty-induced nonchalance to elephant poaching

3.1.5 Radio Programme

The radio program was aired during the commercial break of a popular radio programme called 'Kunen Ka Nawa', aired by Bauchi Radio Corporation in Bauchi State covered Bauchi State – where Yankari Game Reserve, the project site and the surrounding villages of the reserve are situated, Plateau State, Jigawa State, Gombe State with an estimated number of **3 million listeners**.

Broadcast schedules: FM (Hausa) - 2 slots/program 'Kunen ka nawa' which starts at 9:00pm, 3 times weekly; AM (Fulfude) – 2 slots each, between 6:30 - 8:00am, and 4:00 - 6:00pm; 3 times weekly including additional random slots within the day. This proved to be the substitute for the focus group discussions earlier planned which was to address the non-chalance of the natives in the vicinity of the reserve. A transcript of the radio jingle can be found in the appendix.

3.2 Achievements and Impacts

Collaboration with APLORI, WCS, Bauchi State government and the traditional rulers made it possible to implement most of the activities planned for the early stage of the project. Accommodation, transportation and scientific tools were provided by both APLORI and WCS. Most of the traditional rulers (district heads and village heads) gave us a warm reception influencing a similar response from the respondents too. Results from this project have been distributed to Wildlife Conservation Society (WCS) who is in charge of the Protection Department of the Reserve but will be submitted to the Bauchi State government represented by the manager of the Yankari Game Reserve.

We succeeded in generating GIS maps of elephant and cattle distribution from GPS coordinates collected within the reserve with help of some colleagues in APLORI informing us on areas mostly utilized by elephants and where conservation efforts should be concentrated. They were mostly found along the Gaji River. The abundant water supply and food made the banks of the Gaji River their preferred location. However, poachers target this area because of this and the elephants react by becoming very elusive and at times are found some distance from the river. It is also probable that the incidence of crop raiding in some settlements was due to this increased pressure on the elephants in the reserve. Elephants raided crops in Mainamaji, a settlement that had not sighted elephants for the past 30 years. It is worthy to note that experienced rangers in the reserve already have an

idea of where elephants can be located, the maps however would give directional advice to newly employed rangers or researchers that have no prior knowledge of the area. This will target their protection activities to locations where elephants are actually found ensuring an economic use of resources.

From the results, it was observed that there was no interaction between these elephants and illegal cattle rearing in the reserve. It is not known if elephants are absent in areas where cattle are found because they avoid them or it is just not part of their home range. Future studies will provide further insight into this. Nonetheless, it is clear that cattle are not native species of the reserve and are a potential risk to the balance of the ecosystem i.e. competing for limited resources in the reserve, possible introduction of diseases to the native species or even poachers disguising as cattle grazers. At the time the study was carried out, the reserve had a shoot-at-sight policy. Cattle grazers were caught by the reserve authorities, arrested and arraigned before the magistrate court. This did not deter the repetition of the offense as this is still an ongoing problem in the reserve.

Assessment of crop raiding activities by elephants showed, at the time of the study, that crop raiding was not a serious problem for the reserve. This was concluded because, of the 203 respondents that were interviewed, only 115 claimed to have seen elephants and of that number only 46 respondents complained of crop raiding activities by elephants in their settlements. The disturbing evidences we witnessed however were of 3 incidences of crop raiding by elephants within the period of study, especially towards the end of the study, one of the incidences in a settlement that had not been visited by elephants for the past 30 years. It is therefore important that crop raiding assessments be done more regularly, at least, once a year to know the severity of the problem and the appropriate actions to be taken.

The radio program reached an estimated number of 3 million listeners covering a total of four states including Bauchi State where the Yankari Game Reserve is situated. It was aired over a period of one month and repeated 3 times a week in both Hausa and Fulfude (the native Fulani language) making it available to the Fulani herdsmen, the farmers in the settlements bordering the reserve and also would-be poachers in the environs of the state.

It served to sensitize people in the surrounding settlements to the importance of elephants to tourism and posterity which they will eventually lose by their needless ivory exploitation. This will help them see the need to conserve elephants and protect them from poachers.

Section 4:

4.0 Conclusion

With a better knowledge of the distribution of elephants in the Yankari Game Reserve, conservation efforts can be concentrated to areas where elephants can be found. Elephants primarily utilize the banks of the Gaji River, the main source of water supply of the reserve, but evidence of their presence can also be found in other parts of the reserve.

Photo analysis of elephant herds did not yield useful results because of the limited period earmarked for the activity. Future studies would cover a longer period to be successful.

There was no interaction between cattle and elephants. Elephant presence was not observed in the same location as cattle sightings. However, the presence of cattle in the reserve still needs to be discouraged because they utilize resources that are meant for the reserve's wild fauna and there is a higher risk of poaching with the proximity of the cattle herders with the wild fauna in the protected area including elephants.

Results from assessments of crop raiding activities outside the reserve based on the questionnaire survey showed an insignificant frequency of crop raids in the reserve. This does not mean an absence of the problem for reports of crop raids continued after the project. Therefore, this is a study that must be continued in the future.

An estimated number of 3 million listeners were sensitized by means of radio program, on the importance of elephants and the dangers of killing them for their ivory.

Problems encountered and lessons learnt

- **Which project activities and outcomes went well and why?**

Study of elephant distribution: The duration of this project activity spanned between late rainy season and dry season that way abandoned tracks that could not be surveyed during rainy season were surveyed during the dry season when they were in better condition. This activity was achieved because of the support received from our stakeholders – the state government who granted permission for the study to be carried out in the reserve and the logistics support we received from the A.P. Leventis Ornithological Research Institute.

Crop Raiding Assessment: Prior information about the various districts we were to visit from the WCS and rangers in the reserve prepared us to present the purpose of study to the village heads and the respondents of the questionnaire survey effectively. We received immense cooperation from the district heads and the village heads despite the worsening security situation. The availability of a project vehicle made transportation to all the villages easy.

- **Please detail any problems that the project encountered or deviations from original project plans. Describe how these problems were addressed and what solutions were found to deal with these issues.**

One of our objectives was to study the population of elephants in the reserve using photo analysis of individuals in a herd. This was not successful because of the insufficient number of sightings we had. The duration allotted for the study and the number of other activities that needed to be carried out for the overall project made achieving satisfying results difficult.

Focus group discussions were planned for the project but the security challenges proved to be too immense to surmount as threats from some extreme groups reached the reserve.

- **Briefly assess the specific project methodologies and conservation tools used.**

The photo analysis method proposed to study elephant population would have proved more effective with longer duration of about 6 months to a year as compared to the 3 months duration allotted to it. All the other methodologies used for the elephant distribution and crop raiding assessment have been used in other works. (AWF, 1996; Blom et. al, 2004)

- **Please state important lessons which have been learnt through the course of the project and provide recommendations for future enhancement or modification to the project activities and outcomes.**

It is important to objectively consider the risk level of an area before considering carrying out any research work in it. The insecurity of the study area already existed but was underestimated and eventually adversely affected certain important activities.

The period we earmarked for population survey was too short for a detailed study. More time is required to carry out a survey of elephants in Yankari using photo analysis.

4.1 In the future

The photo analysis method of obtaining an accurate count of the elephants will be done with an increased duration of 1 year to enable careful and detailed study of elephants in the reserve.

Incidences of crop raids by elephants increased after completion of the field work of this project. This made us aware that a worrying trend of an increase in crop raiding activities began towards our field work and a need to develop and implement crop raiding prevention and management techniques. This would be definitely organized as soon as security challenges are dealt with in the region.

Previously planned activities like focus group discussions, fund raising activities and power empowerment programs – discarded due to insecurity – are still invaluable in improving the conservation status of elephants in the reserve.

Section 5:

Appendices

A.

A full account of income and expenditure can be found in the excel document attached with this word document

B.

Questionnaire Sample

DRAFT QUESTIONNAIRE FOR RESERVE PERCEPTION SURVEY OF THE SURROUNDING COMMUNITIES OF YANKARI GAME RESERVE, NIGERIA

Serial No.:

State:

Important Directions

Do not write your name on the questionnaire. Your responses will be completely confidential. All questionnaires will be returned to Conservation Leadership Programme for the purpose of the above mentioned.

If you run into a problem with a question, please seek the help of the person(s) administering. Filling out the questionnaire is entirely voluntary, but try to answer all questions because a good response is necessary for a valid study.

Important: Please do return this questionnaire to the person administering it. Never keep it with you because your response will be a great contribution to the success of this research.

A. General Information

- i. Local Government Area/Village: _____ Ethnic group:

- ii. GPS location: _____ Primary occupation: _____
Secondary occupation(s): _____
- iii. Gender: Male Female
- iv. Age of respondent: _____ (years)
- v. Marital status: Single Married Widowed Separated Divorce
- vi. Number of wives (For males): _____
- vii. Literacy Level: Primary Secondary Tertiary Vocational
Adult Education None

viii. How long have you been in this locality? _____

ix. Have you ever stayed away from this area? Yes No

If yes, for how long?

B. Wildlife Inventory

i. Do animals come around your locality? Yes No

If yes, where do you see them? Farms Village

ii. Which animal(s) do you frequently see around?

Animals seen	Number seen (Single/pairs/groups)	Attitude shown (Excitement/Aggressive/Surprise/Indifferent/Scared)	Reason(s) for Attitude shown	If crop(s) damaged/eaten, list crop type	Season animals are seen (Dry/Rainy/Both)	Time of day animals are seen (Mrn/Aft/Evn/Ngt/All times)

iii. Do you at some point observe any animal(s) activity without necessarily seeing it?

Yes No if yes, which animal(s) /what time of day are the activity carried out? :

iv. Do you do anything to prevent these animals from their activities? Yes

If yes, what do you do?:

- v. Do you grow any crops around? Yes No
- vi. What crops do you frequently grow/agricultural practice?

Crop grown (Rainy season)	Method (Mono/Mixed/ Others(Please specify))	Crop grown (Dry season)	Method (Mono/Mixed/ Others(Please specify))

PERCEPTION

- vii. Who initiated the establishment of this reserve? Government
 Community Individual (Please specify) _____
 Others (Please specify) _____
- viii. Do you know the reason/main objective of the reserve? Yes No
 If yes, mention it: _____

- ix. Do you agree with it? Yes No
- x. Why was the reserve created? Conservation Tourism No
 opinion
 Others (Please specify) _____
- xi. Are you happy with the existence of the reserve? Yes No
- xii. Do you/community play any role in the sustenance of this reserve? Yes
 No If yes, please specify:

- xiii. Do you work in the reserve? Yes No
- xiv. Does any of your relative work in YGR? Yes No

Father Mother Brother Cousin

Uncle

Others (please specify) _____

xv. What resources in the reserve do you utilise most? Non-Timber Forest Products

Ceremony site Fish Others (please specify)

xvi. Has the reserve benefited you/community in any way? Yes No

If yes, how? _____

xvii. What are your expectations about the park management? _____

xviii. Did you observe any change(s) in the forest reserve since when you have known it?

Yes No

If yes, mention the changes _____

Thank you.

C. Radio Programme Transcript

(Elephants trumpeting, repeated gunshots fired, sound of elephant running, in commotion)

(Conversation between poachers after firing shots at elephants)

Poacher1: hmm, this one has a big tusk

Poacher2: how much will this cost

Poacher1: we could sell them 5000naira

Poacher2: ok, let's hurry before these people hear our gunshots and come looking

Commentator: Kai, you kill this huge animal for 5000 naira....the people you sell it to will sell them for millions of naira and get rich with it and you remain in poverty here, feeding on crumbs. Stop killing elephants in Yankari, they are the only ones of their kind remaining in Nigeria. When they finish in the bush, no money from tourism will come in, because people won't see any reason to visit anymore. Don't allow yourself to be exploited; you are destroying your heritage, your children won't know what elephants look like when they are all finished.

**PROTECT THE ELEPHANTS IN YANKARI!! THE ONLY REMAINING POPULATION
IN NIGERIA!! THEY ARE YOUR PRIDE!!**

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E. Distribution list

Wildlife Conservation Society
 A.P. Leventis Ornithological Research Institute
 Bauchi State Government

F. Elephant GPS points

Name	Description	Position	Altitude
116	11/2/2012 18:22	N9 45.483 E10 30.495	416 m
117	11/2/2012 18:22	N9 45.483 E10 30.495	415 m
118	11/6/2012 16:21	N10 01.471 E10 32.846	367 m
119	11/6/2012 16:24	N10 01.464 E10 32.842	362 m
120	11/6/2012 16:25	N10 01.479 E10 32.853	363 m
121	12/1/2012 12:38	N10 03.334 E10 31.502	393 m
122	12/1/2012 12:40	N10 03.331 E10 31.507	396 m
123	12/1/2012 12:44	N10 03.293 E10 31.510	396 m
124	12/10/2012 11:20	N9 45.165 E10 38.602	427 m
125	12/10/2012 11:24	N9 45.243 E10 39.082	440 m
EI100	10/24/2012 10:15	N9 43.744 E10 30.878	231 m
EI101	10/30/2012 10:15	N9 50.729 E10 34.971	243 m
EI102	10/31/2012 10:51	N9 45.046 E10 31.166	232 m
EI103	10/31/2012 10:52	N9 45.074 E10 31.176	232 m
EI104	10/31/2012 10:55	N9 45.090 E10 31.263	231 m
EI105	10/31/2012 11:07	N9 44.991 E10 31.054	235 m
EI34	9/29/2012 2:13	N9 45.479 E10 30.501	210 m
EI35	10/2/2012 10:13	N9 50.174 E10 24.706	389 m
EI45	10/24/2012 10:29	N9 42.225 E10 30.206	229 m

El46	10/24/2012 11:12	N9 44.892 E10 31.011	233 m
El47	10/24/2012 11:16	N9 45.073 E10 31.172	234 m
El48	10/24/2012 11:20	N9 45.131 E10 31.469	231 m
El49	10/24/2012 11:22	N9 45.210 E10 31.557	233 m
El50	10/24/2012 11:23	N9 45.273 E10 31.616	234 m
Ep1	9/17/2012 9:44	N9 44.771 E10 29.778	280 m
Ep10	9/19/2012 10:50	N9 52.247 E10 23.725	416 m
Ep107	11/30/2012 7:43	N9 50.094 E10 35.268	227 m
Ep108	11/30/2012 7:47	N9 49.870 E10 35.231	229 m
Ep109	11/30/2012 7:53	N9 49.343 E10 35.058	224 m
Ep11	9/19/2012 10:51	N9 52.373 E10 23.640	421 m
Ep12	9/19/2012 10:53	N9 52.410 E10 23.615	421 m
Ep120	11/30/2012 8:01	N9 48.836 E10 34.630	225 m
Ep121	11/30/2012 8:04	N9 48.544 E10 34.616	226 m
Ep122	11/30/2012 8:05	N9 48.519 E10 34.599	227 m
Ep123	12/1/2012 8:05	N9 51.490 E10 37.516	237 m
Ep124	12/1/2012 8:08	N9 51.741 E10 37.657	244 m
Ep13	9/19/2012 10:54	N9 52.508 E10 23.547	424 m
Ep14	9/19/2012 10:55	N9 52.572 E10 23.506	425 m
Ep15	9/19/2012 10:56	N9 52.749 E10 23.319	429 m
Ep16	9/19/2012 11:05	N9 54.503 E10 21.407	453 m

Ep17	9/19/2012 11:07	N9 54.586 E10 21.347	453 m
Ep18	9/19/2012 11:08	N9 54.709 E10 21.307	454 m
Ep19	9/19/2012 11:08	N9 54.793 E10 21.281	455 m
Ep2	9/17/2012 9:48	N9 44.762 E10 29.736	283 m
Ep20	9/19/2012 11:09	N9 54.881 E10 21.255	457 m
Ep200	12/8/2012 14:51	N9 48.884 E10 34.910	237 m
Ep201	12/8/2012 15:13	N9 49.626 E10 35.700	234 m
Ep202	12/8/2012 15:49	N9 48.702 E10 35.913	280 m
Ep203	12/8/2012 16:27	N9 46.049 E10 33.534	285 m
Ep204	12/8/2012 16:45	N9 43.882 E10 31.819	278 m
Ep205	12/8/2012 16:54	N9 42.635 E10 30.866	241 m
EP206	12/8/2012 17:15	N9 40.421 E10 30.051	252 m
Ep208	12/9/2012 9:29	N9 45.600 E10 37.999	393 m
Ep209	12/9/2012 10:59	N9 41.189 E10 32.222	376 m
Ep21	9/19/2012 11:11	N9 55.011 E10 21.218	459 m
Ep210	12/9/2012 16:21	N9 44.043 E10 30.847	219 m
Ep211	12/9/2012 16:22	N9 43.974 E10 30.873	218 m
Ep212	12/9/2012 16:25	N9 43.740 E10 30.882	218 m
Ep213	12/9/2012 16:27	N9 43.507 E10 30.780	219 m
Ep214	12/9/2012 16:28	N9 43.472 E10 30.728	220 m
Ep215	12/9/2012 16:29	N9 43.367 E10 30.704	222 m

Ep216	12/9/2012 16:29	N9 43.336 E10 30.752	221 m
Ep217	12/9/2012 17:57	N9 42.635 E10 30.482	231 m
Ep218	12/9/2012 18:03	N9 43.467 E10 30.719	227 m
Ep219	12/9/2012 18:06	N9 43.719 E10 30.887	224 m
Ep22	9/19/2012 11:15	N9 55.211 E10 21.161	462 m
Ep220	12/9/2012 18:08	N9 44.011 E10 30.865	226 m
Ep222	12/10/2012 10:04	N9 45.626 E10 30.787	272 m
Ep23	9/19/2012 11:17	N9 55.297 E10 21.137	463 m
Ep24	9/19/2012 11:18	N9 55.394 E10 21.108	465 m
Ep25	9/19/2012 11:18	N9 55.489 E10 21.080	466 m
Ep26	9/19/2012 11:19	N9 55.590 E10 21.054	468 m
Ep27	9/19/2012 11:23	N9 56.795 E10 20.711	471 m
Ep28	9/19/2012 11:25	N9 57.055 E10 20.639	463 m
Ep29	9/19/2012 11:26	N9 57.293 E10 20.597	463 m
Ep3	9/17/2012 9:50	N9 44.730 E10 29.571	288 m
Ep30	9/20/2012 9:56	N9 46.163 E10 28.745	326 m
Ep31	10/2/2012 10:29	N9 49.742 E10 22.972	409 m
Ep32	10/2/2012 10:32	N9 49.797 E10 22.789	412 m
Ep33	10/2/2012 10:33	N9 49.829 E10 22.675	415 m
Ep34	10/2/2012 10:34	N9 49.838 E10 22.644	415 m
Ep35	10/2/2012 10:35	N9 49.851 E10 22.594	417 m

Ep36	10/2/2012 10:36	N9 49.866 E10 22.543	419 m
Ep37	10/2/2012 10:37	N9 49.879 E10 22.498	419 m
Ep38	10/2/2012 10:38	N9 49.904 E10 22.409	422 m
Ep39	10/2/2012 10:39	N9 49.917 E10 22.357	425 m
Ep4	9/17/2012 16:23	N9 43.664 E10 30.782	225 m
Ep40	10/2/2012 10:41	N9 49.968 E10 22.181	428 m
Ep41	10/2/2012 10:42	N9 49.988 E10 22.107	432 m
Ep42	10/2/2012 10:42	N9 50.004 E10 22.052	433 m
Ep43	10/2/2012 10:44	N9 50.035 E10 21.959	437 m
Ep44	10/2/2012 10:45	N9 50.059 E10 21.884	439 m
Ep45	10/2/2012 10:53	N9 50.164 E10 21.566	446 m
Ep46	10/2/2012 11:01	N9 50.448 E10 20.624	462 m
Ep47?	10/2/2012 10:13	N9 50.174 E10 24.706	389 m
Ep5	9/18/2012 16:55	N9 46.372 E10 31.213	282 m
Ep6	9/18/2012 17:18	N9 47.492 E10 32.867	265 m
Ep7	9/19/2012 10:42	N9 50.924 E10 24.638	398 m
Ep8	9/19/2012 10:46	N9 51.451 E10 24.345	401 m
Ep9	9/19/2012 10:47	N9 51.494 E10 24.313	403 m
Ept	10/2/2012 10:23	N9 49.627 E10 23.459	401 m

