Darwin Initiative Main Project Annual Report

Important note: *To be completed with reference to the Reporting Guidance Notes for Project Leaders:*

it is expected that this report will be no more than 10 pages in length, excluding annexes

Submission Deadline: 30 April

Darwin Project Information

Project Reference	23-018
Project Title	Alleviating rural poverty through conflict mitigation and improved crop yields
Host Country/ies	Zimbabwe & Botswana
Contract Holder Institution	University of Oxford, Wildlife Conservation Research Unit
Partner institutions	Victoria Falls Wildlife Trust
Darwin Grant Value	£318 827
Funder (DFID/Defra)	DFID
Start/end dates of project	Start date: 1 April 2016 / End date: 31 March 2019
Reporting period (e.g., Apr 2015 – Mar 2016) and number (e.g., Annual Report 1, 2, 3)	April 2016 – March 2017 Annual Report 1
Project Leader name	Andrew Loveridge
Project website/blog/Twitter	www.wildcru.org
Report author(s) and date	Andrew Loveridge, Roger Parry, David Macdonald, Kristina Kesch; April 2017

1.   Project Rationale

Western Zimbabwe and north-eastern Botswana are agriculturally marginal, with poor soils and rainfall (see "Map of project sites"). However, livelihoods in rural communities rely precariously on subsistence agriculture, especially crop growing and livestock ownership. Traditionally women bear the burden of land clearance and cultivation with limited access to inputs such as fertiliser or mechanisation. Crop failure in poor years often results in chronic malnutrition, particularly affecting households with no alternative incomes; frequently those headed by women. Poverty increases reliance on natural resources, leading to unsustainable, illegal or commercial utilisation of resources such as wood, wildlife products and bush-meat. Simple improvements to cropping methods greatly improve yields and food security, and reduce land and labour requirements and environmental damage.

Around protected areas, livestock predation by large predators, particularly lions, leads to significant loss for already impoverished people. The loss of draught animals further impacts the ability to prepare fields and livestock depredation routinely results in retaliatory killing of globally threatened predators causing population declines and measureable impacts to biodiversity and ecosystem function in protected areas. Aside from intrinsic value to natural systems, large predators are economically valuable and attract significant revenue to host countries through tourism, which is frequently the largest and most viable local revenue generator.

At a national and international scale the project trials and showcases the effectiveness of novel livestock protection techniques to mitigate impacts of biodiversity and reduce the need of lethal

control of globally threatened predators, while highlighting the economic and ecological value of viable predator populations, building capacity and improving food security for local communities.

## 2.	Project Partnerships

Mr R. Parry from the <u>Victoria Falls Wildlife Trust</u> (VFWT), Zimbabwe, has 30 years of experience in wildlife conservation and management and working with communities, NGOs and government institutions in Botswana and Zimbabwe. The VFWT is managing partner funds and allocates these to field teams in Botswana and Zimbabwe (via WildCAT and Botswana Lion Corridor Project). During the first year, VFWT has organised, co-ordinated and implemented field work, provided training, organised workshops and disseminated information about DI and the project (see www.vicfallswildlifetrust.org, Sections 3 & 13). VFWT is supported by the Jafuta Foundation and endorsed by the Hwange District Council (see "HRDC authorisation"). The VFWT is providing material for project reporting and is assisting in the preparation of reports. The VFWT has put together a remarkable team of Community Guardians (CGs), field managers and volunteer village communities and has developed a close relationship with local communities, local administrators and traditional leadership.

Both WildCRU and VFWT have a long standing relationship with the <u>Government of Zimbabwe's Parks and Wildlife Management Authority</u> (PWMA) and work closely with PWMA research officers and managers on predator management issues surrounding Hwange National Park (site of the pilot lion guardian programme) and in the Victoria Falls area. PWMA are very supportive of the project and have issued all necessary permissions (see "HLR permit 2017", "HLR permit research council 2017"). The project works closely with both PWMA regional field staff and national staff at the headquarters in Harare and PWMA have provided valuable ground support for the project. Furthermore, a Memorandum of Understanding has been signed with the <u>Hwange Rural District Council</u> to coordinate responses to human-wildlife conflict reports within the operational area (see "HRDC authorisation").

The <u>Government of Botswana's Department of Wildlife and National Parks</u> (DWNP) has been very enthusiastic and supportive about this project and have specifically requested our help in mitigating human-predator conflict. The process of issuance of research permits is currently under revision by the Ministry of Environment, Wildlife and Tourism (see "MEWT Press Release Suspension of Permits Jan 2017") however, we have been issued special permission to proceed with the introduction of the programme into communities in the Boteti and Chobe Enclave areas of Botswana. Due to concerns on the long-term sustainability of the project and acceptance of new livestock husbandry techniques every step of the project needs to be approved by the DWNP community outreach division before the implementation process may proceed. These concerns seem to stem from negative experiences with former conflict mitigation programmes in the country and little to no long-term commitment from previously implemented programmes. As a result of many stakeholder meetings with participating communities, governmental departments and our partner NGOs we currently have permission to set up two fully-functioning demonstration bomas in each area in order to showcase their functionality to stakeholders from participating communities and governmental departments (see "DWNP meeting 09.12.2016", "Email Mr. Mokandla 31.01.207"). Further step-wise permission to expand the project will depend on governmental approval and we are hoping to receive permission to introduce the Community Guardian concept within the next reporting period.

We are collaborating with <u>Elephants for Africa</u> and <u>Elephants Without Borders</u> to increase the overall effectiveness of human-wildlife conflict mitigation in the Boteti and Chobe Enclave areas respectively. During the first year, both NGOs have helped to plan the project in adaptation to the local requirements in the respective areas and have used their strong relationships with the local communities to introduce us to the communities. This approach has been highly successful and all meetings with traditional leaders and village elders have been very positive.

Sociologist Prof. Alice Hovorka from <u>Queen's University</u>, Canada, has designed a baseline survey on food security and local attitudes towards predators and conservation for the area. Due to the current review of research permit requirements, the research permit has not been approved yet however, we are hoping to achieve this within the next reporting period.

The Kavango-Zambezi Transfrontier Conservation Area Secretariat (KAZA Secretariat) has enthusiastically endorsed the project and continues to offer valuable support. Our team members lead the Hwange-Chobe-Makgadikgadi working group under the KAZA Carnivore Conservation Coalition (KCCC) and a substantial uptake of the project has been selected for Phase 1 of KCCC implementation (see "KCCC Hwange-Makgadikgadi Workshop Proceedings_June 2016") Potential funding being awarded to the KCCC would enable the concept to be continued after year 3 and spread further into other conflict hotspot areas.

Traditional leaders in the target communities continue to be supportive of the project and are especially grateful for being consulted before the implementation of the project. We believe it is of utmost importance to the success of this project for it to be community-driven however, the correct protocol needs to be followed and can lead to delays. We will continue to work closely with the community leaders, who will be highly engaged in planning of the project and decision making on its implementation.

WildlifeAct has collected baseline data on human-wildlife conflict and attitudes of local residents of the Chobe Enclave in Botswana towards predators, which will be analysed by a MSc student of the University of East Anglia under supervision of the project leader and serve as baseline data for this area (see "WildlifeACT Chobe Enclave Interview Questions", "WildlifeACT email interviews conducted").

3.   Project Progress

3.1   Progress in carrying out project activities

NOTE: Please see Appendix 1 for details and evidence for the below:

Activities 1.1-1.6 for Output 1: Showcasing benefits of the project to international development agencies

There is considerable interest in this model of community-based conservation, such that community officers from Zimbabwe and Namibia have been trained to implement the concept in their respective regions. It has been showcased to and refined with several governmental and non-governmental institutions, the public and affected communities in 2015-2017. Furthermore, Information on the project has been disseminated through video material on YouTube, the Trans-Kalahari Predator Programme's Annual Report 2016 and via the WildCRU homepage, the Trans-Kalahari Predator Programme's Facebook page and the Victoria Falls Wildlife Trust home- and Facebook pages. The project has been showcased to the European Commission. WWF Germany pledged 50,000 € and African Bush Camps Foundation has provided 14,218 USD in support of the project, and a substantial part of the community guardian and boma programme has been selected for Phase 1 of KAZA Carnivore Conservation Coalition implementation, which will be funded by KfW (German Development Bank). In 2016, challenges and successes of the project were further presented at three international conferences and meetings.

Activities 2.1-2.10 for Output 2: Decreasing levels of human-predator conflict

The "Lion Guardians" have been renamed "Community Guardians" (CGs) to emphasize the project's goal to protect predator populations by supporting local communities to coexist with wild predators. This also presents the opportunity to expand conflict mitigation efforts to other wildlife species in future. Since 2016, 14 fully-trained CGs (including 2 women) were active in village communities directly adjacent to Hwange National Park and in the Victoria Falls area of Zimbabwe. In 2017, we are hoping to employ and train an additional 8 CGs in Zimbabwe and Botswana, pending approval of the Botswana Government (see Section 2). A total of 16 mobile bomas have been deployed adjacent Hwange National Park (12), in the Victoria Falls area (3) and in the Boteti area (1), where 27 % of participating households are headed by women and 12 % do not include a working age male. All participating households were trained in boma management and implementation of boma rotation schedules in the year of deployment. An additional 5 bomas are planned to be deployed in the Victoria Falls, Chobe Enclave and Boteti areas in May 2017. Furthermore, we are providing veterinary care to avoid disease transmission between cattle in bomas, and offer general health check-ups, treatments and a veterinary kit for each boma.

Monitoring protocols are being implemented by the team to record conflict incidences, retaliatory killing of predators, predator numbers and trends in Zimbabwe. Available historical data has been collated in Zimbabwe and is currently being collated in Botswana and we are

hoping to receive permission to implement above protocols in Botswana in 2017 (see Section 2). Since beginning of the pilot project, we recorded a significant decrease of livestock predation by lions from 230 incidences around Hwange National Park in 2011 to 98 incidences in 2014, which represents a reduction of conflict of almost 60%. In 2016, 127 heads of livestock were killed by lions, representing an 18% increase to the previous year, however still representing a reduction of conflict by 45% compared to levels before the pilot project was initiated in 2012. As the DI project was only fully rolled-out in mid-2016, we are expecting conflict levels to decrease within the next year. Variation in levels of human-lion conflict are generally to be expected due to variable environmental conditions affecting ecosystem processes, such as dispersal of lions or replacements of pride males due to territorial takeovers or offtakes through trophy hunting. Moreover, varying herding practices might have a significant effect on livestock security outside the mobile bomas. As 60% of incidences occurred at night when livestock was kept outside a mobile boma and no livestock was killed inside mobile bomas, the enclosures seem to be highly effective in the protection of livestock if correctly used.

A sociological baseline survey has been conducted in all sites in Zimbabwe to be repeated in year 3 of the project to quantify change. Furthermore, the impact of conflict levels on happiness and life satisfaction measures are evaluated using economic valuation techniques while at the same time quantifying the value local people attach to the Community Guardian and Mobile Boma project. Baseline data from the Boteti area has been collated from surveys undertaken previously and has been collected by WildlifeAct in the Chobe Enclave of Botswana. The implementation of a specially designed baseline survey in Botswana is pending approval of the Botswana Government (see Section 2).

In 2016, 20 potential conflict lions have been satellite collared in the Hwange (12) and Victoria Falls (5) areas of Zimbabwe and the Chobe Enclave (3) area of Botswana. Further collaring is being scheduled in both countries for the dry season 2017. Area-specific Whatsapp groups have been established in Zimbabwe for daily conflict management and conflict reports have increased since the start of the project, showcasing the acceptance of the project in the communities. In 2016, a total of 311 warning alerts were sent. First analyses of lion GPS data from Zimbabwe give reason to believe that the interventions have a positive effect on the behaviour of certain demographic groups of lions.

In 2017, two articles have been published in peer-reviewed journals (see Annex 3).

Activities 3.1-3.5 for Output 3: Decreasing number of predators killed in retaliation for livestock predation

Data on destruction of predators has been recorded by project scientists in Zimbabwe since 2010 and is continuously being collected by the Botswana Department of Wildlife and National Parks (DWNP) which will serve as baseline to determine effectiveness of mitigation strategies. During the first year, a total of seven adult lions were destroyed in our project sites adjacent to Hwange National Park (5 destroyed as problem animals, 2 snared), and during the first quarter of 2017, 5 lions were destroyed in the Victoria Falls area. First detailed analyses of data on destruction of predators will only be conducted during the next reporting period as conflict mitigation measures have only been introduced in mid-2016. Similar to the variation in conflict levels (see Activities 2.1-2.10) we are expecting a variation in retaliatory killings as these go hand in hand with livestock losses experienced by farmers.

Baseline surveys on predator populations have been run in all project sites in Zimbabwe and existing survey data has been collated in Botswana. However, survey data from Botswana will be complemented by surveys in the dry season of 2017.

Activities 4.1-4.4 for Output 4: Increased crop yields and food security

In 2016, a total of 70 fields have been fertilised with mobile bomas in Zimbabwe. In preparation of the cropping season 56 local families participating in the boma project were provided with 150 kg of maize seed. Monitoring protocols to measure increases in crop yields through use of mobile bomas are in place, were implemented on 31 plots throughout the current rainy season (November 2016 - March/April 2017) and results will be available in the next reporting period. First results from our pilot project suggest that an increase in crop yields of around 30% is possible through the use of mobile bomas. Monitoring activities further encompass fields which had been treated in previous years in order to determine long-term treatment effect. Protocols will be implemented in Botswana as soon as first trial bomas have been deployed to fertilise fallow fields and crops will be planted in the cropping season 2017.

A baseline household survey to quantify yield and contribution to household food security has been carried out in participating village communities in Zimbabwe and the same survey will be carried out in participating village communities in Botswana as soon as governmental permission is granted.

3.2   Progress towards project outputs

NOTE: Please see Section 3.1 and Appendix 1 for details and evidence for the below:

<u>Indicators 1.1-1.5 for Output 1: Showcasing benefits of the project to international development agencies</u>

To ensure long-term and larger scale impact of this project the success of mitigation strategies is being showcased to national and international conservation bodies. Through workshops, presentations, newsletters, reports, online resources and peer-reviewed literature the project is disseminating information and ensures handover of know-how and technology to both local stakeholders and the wider public is achieved. Considering the considerable interest in the project, the showcasing and presentation of project results on an international and national level, the uptake of the concept in Namibia and Zimbabwe, the success of securing further funding for the project and the recording of first video material already in year 1 (please see Section 3.1 and Annex 1 for further details), we are confident the output indicators still hold adequate to measure success of the project and to achieve Output 1 by the end of year 3.

<u>Indicators 2.1-2.4 for Output 2: Decreasing levels of human-predator conflict</u>

In the first year, a total of 14 CGs and 16 mobile bomas in Zimbabwe and Botswana reduced livestock losses. Around Hwange National Park losses were reduced by 45% since the pilot project was initiated. The effectiveness of intervention measures in Victoria Falls will be quantified in 2017. Baseline surveys on local attitudes towards predators and conservation, the impact of conflict levels on life satisfaction measures and the value attached to the project have been collated and conducted, and are partly still being conducted in Zimbabwe and Botswana. GPS collar data further suggest that the interventions have a positive effect on the behaviour of certain demographic groups of lions. We are confident we will achieve Output 2 by year 3 in Zimbabwe. As the project sites in Botswana are both situated in high conflict areas, we are further confident that the interventions will have a significant positive effect and reduce conflict levels by 70% by year 3. The indicators are therefore still considered adequate to measure success of the project by year 3.

<u>Indicators 3.1-3.2 for Output 3: Decreasing number of predators killed in retaliation for livestock predation</u>

The available data on problem animal control incidents and predator populations will serve as a sufficient baseline level to compare changes to by year 3. In Botswana, the base line data set will be complemented by surveys conducted in 2017. First results of changes to levels of retaliatory killings of lions will be available in the next reporting period. Due to our experience with the pilot project since 2012 we are confident to achieve the project outputs by year 3.

<u>Indicators 4.1-4.3 for Output 4: Increased crop yields and food security</u>

Thirteen village communities in four human-wildlife conflict hotspots were introduced to and trained in the use of 16 mobile bomas, encompassing 93 households, of which 27% are headed by women and 12% do not include a working age male. First results on changes to crop yields will be available in the next reporting period however data from the pilot project suggests that an increase in crop yields by about 30% is possible. We are confident the output indicators hold adequate to measure success of the project and to achieve Output 4 by the end of year 3.

3.3   Progress towards the project Outcome

NOTE: Please see Sections 3.1, 3.2 and Appendix 1 for details and evidence for the below:

With the expansion of conflict interventions in Zimbabwe in year 1 livestock losses have been reduced by 45% around Hwange National Park since the pilot project was initiated in 2012. Data on retaliatory killings of lions and lion population sizes have been collated and recorded for most areas and will be complemented by surveys in Botswana in 2017 as a baseline to compare future mortality rates and population size changes to. Currently 93 households participate in the project, 27% of which are female-headed, 12% of which do not include a working age male. Crop yields are being monitored continuously and first results will be available for the next reporting period. We believe that all indicators are still highly adequate to

measure the outcome of the project and due to past experience with the concept, we are confident to reach our goal of a 30-50% increase in crop yields, self-sufficiency for 90% of "boma" households and zero households on less than 2 meals a day by the end of year 3.

3.4 Monitoring of assumptions

All assumptions have proven to still hold true as a means for success of the project (see Section 3 and Annex 1) with following comments:

Assumption 0.3: Baseline data on predator populations are available for use.
Comments: For areas where baseline data is not available it will be recorded and made available by project scientists and therefore the assumption still holds true.

Assumption 2.1: Lion guardian programme successfully set up, lion guardians trained and facilitate improved livestock husbandry.
Comments: Due to the step-wise introduction of the programme (see Section 2), CGs are only planned to be recruited and trained in Botswana in 2017. Therefore the anticipated number of CGs has not been reached yet. We are hoping to reach this number by mid-2017 and the assumption will therefore continue to hold true.

3.5 Impact: achievement of positive impact on biodiversity and poverty alleviation

Globally, many large predators are facing endangerment and extinction while being critical keystone components of ecosystem biodiversity and function, and a major local revenue generator for the tourism industry. African lion population size decreased by 43% in only three lion generations within the past 21 years and lions are therefore classified as Threatened in their West African range and Vulnerable in East and southern Africa. One of the main reasons for this widespread decline is lethal control of lions in retaliation for livestock losses. Since the pilot project was started in 2012, livestock losses have been reduced by 45% and retaliatory killings of predators have declined markedly in project sites in Zimbabwe (see Section 3, Appendix 1, Indicators 0.1, 0.2). The project is expected to reduce levels of conflict with predators by up to 70% in its lifetime, and potentially by much more in the long term as local people see benefits to adopting more effective and locally appropriate livestock husbandry practices. Consequently the need for lethal control in retaliation for livestock losses will decrease and predator populations in protected areas will be stable or increasing (Indicator 0.3), providing essential ecosystem services to biodiversity conservation and representing valuable national assets that attract tourism and generate employment and sustainable income for developing countries.

Zimbabwe falls into the category of a 'low income' country (per capita GDP- $856, 72% of population below national poverty line; http://databank.worldbank.org) and Botswana, while wealthier (per capita GDP $6935), nevertheless has 19% of population below national poverty line - most in rural villages. In this context the financial impact of human-wildlife conflict is significant, particularly on vulnerable households. Baseline survey data show that affected households lose, on average, $473 per annum to livestock predation (i.e. 55% of per capita GDP in Zimbabwe), mostly by lions. By reducing predation incidents by 45% since 2012, and up to 70% in its lifetime (Indicator 0.1), the project can achieve a large positive impact on revenue streams within poor rural households. We aim to entirely eliminate livestock loss for households using mobile bomas, with early results suggesting this is feasible if bomas are correctly used. Additionally, the programme builds capacity by creating employment for rural villagers. Furthermore, fertilisation of fields using livestock in bomas reduces labour inputs (particularly by women), and is expected to reduce crop failure and increase crop yields by up to 30% and self-sufficiency by up to 90% for participating families during the project (Indicator 0.4).

4. Contribution to SDGs

As direct benefits, the project aims to alleviate poverty (SDG 1: no poverty) in rural communities of Zimbabwe and Botswana through reduced livestock losses and increased food security (SDG 2: no hunger, SDG 3: good health and well-being), with a particular focus on vulnerable female headed households (SDG 5: gender equality). We aim for 90% of participating households to be self-sustained by the end of year 3 (SDG 11: sustainable cities

and communities). In order to achieve these goals, we have engaged a total of 93 households in the mobile boma concept (see Section 3 and Annex 1) in 2016, a number which is anticipated to be expanded to a total of 250 households by year 3. Furthermore, we have started to monitor human-predator conflict levels and crop production in participating communities to quantify positive impacts over the course of the project. The project will further offer full-time employment and training to a total of 20 local villagers as Community Guardians (SDG 8: decent work and economic growth), to simultaneously reduce livestock losses while protecting globally threatened predator populations (SDG 15: life on land). The project is currently employing 14 fully-trained CGs in all project sites, including two female CGs (SDG 5: gender equality), however this number is anticipated to increase in 2017 (see Section 3 and Annex 1).

Whilst the number of people benefitting directly from the project is relatively modest in the context of widespread rural poverty in Africa, the real, although indirect, benefit of the project is demonstrate and publicise the tangible benefits of community guardian and conflict mitigation methods to, and build partnerships with, the international donor community and development agencies to spread the concept to benefit significantly more people (SDG 17: partnerships for the goals). Already in year 1 the concept has been implemented in additional areas through training of development agencies. Furthermore, we were able to secure further funding for the project from two international donors (see Section 3 and Annex 1).

5. Project support to the Conventions, Treaties or Agreements)

This project primarily supports the host countries to meet their objectives under the Convention on Biological Diversity (CBD). Through **scientific research** (CBD article 12) by experienced UK scientists in close collaboration with local practitioners, it addresses **in situ conservation** of key elements of biodiversity (CBD article 8) in rural Zimbabwe and Botswana (Indicator 0.3). The project focuses on predators (predominantly lions) which are valuable ecologically and economically (through revenues from tourism) but also causing significant damage to rural livelihoods. First results indicate that the programme seems to be effective in offering **solutions to human-wildlife conflict** (CBD article 7, Indicator 0.1) and alleviating rural poverty (Indicator 0.4) and should be widely implemented. Equally, reduced need to destroy damage causing wildlife (Indicator 0.2) encourages more **sustainable utilisation of biodiversity** (CBD article 10) and potentially more sustainable revenue from tourism. Finally, the project trains local field staff and target communities in implementation of effective conflict mitigation thereby **building capacity** (CBD article 12) and ensuring continuation of activities and legacy of the project (see Section 3 and Annex 1 for details).

The project leader is in permanent liaison with the Zimbabwe Parks and Wildlife Management Authority to discuss results, successes and pitfalls of the project and this work has further been discussed with Ms Olivia Mufute at the Conventions office at the ZPWMA Head Office. The Department of Wildlife and National Parks is the body responsible for implementation of international conventions in Botswana and is enthusiastic about the project. In 2016, the project leadership has continuously discussed and developed the project in close collaboration with national and regional DWNP staff and have been offered valuable support for its implementation.

6. Project support to poverty alleviation

The project is working to alleviate poverty at different levels. Direct benefits for impoverished rural communities in Zimbabwe and Botswana will be felt by households participating in testing mitigation methods (e.g. communal mobile bomas, CGs). We estimate that up to 1000 households (conservatively 5000 people) will participate by end of year 3, with materials, training, set-up and maintenance costs covered through the project. The use of mobile bomas is expected to reduce labour inputs (particularly by women) for the fertilisation of fields significantly, and increase crop yields by at least 30% for around 250 households (750 people) and therefore food security (particularly important in vulnerable households). To date, 93 households are participating in the project, a number to be increased in 2017. Furthermore, the employment and training of up to 20 CGs increases capacity and creates employment in rural communities. The combination of bomas and CGs will lead to a reduction of livestock predation incidents by up to 70% in the project lifetime, which will have a significant financial impact, particularly for vulnerable households. As a result, retaliatory killings of globally threatened

predators are anticipated to decrease by 60%. Since 2012, the project has led to a 45% decrease in livestock predation incidents and a marked decrease of retaliatory killings of lions in Zimbabwe, showcasing the effectiveness of the concept. Stable or increasing predator population sizes are not only a key component for ecosystem health and function but further represent a valuable national asset for the tourism industry, a major contributor to GDP in both project countries. To increase empowerment of rural communities the project seeks to be community-led, achieved through an inclusive process of planning and decision making.

Besides direct benefits to a limited number of villagers in Zimbabwe and Botswana, the real, although indirect, benefit of the project is to showcase methods of reducing livestock loss and increasing food security to the wider conservation and donor community. Already by year 1, we were able to secure further funding for the project from two international donors and the concept has been implemented in Namibia and Zimbabwe due to the training of development agencies by our project staff.

7.   Project support to Gender equity issues

Livelihoods in rural communities in western Zimbabwe and north-eastern Botswana rely precariously on subsistence agriculture, with a focus on subsistence crop growing followed by livestock ownership. The area is agriculturally marginal, with poor soils and rainfall, and traditionally women bear the burden of land clearance and cultivation with limited access to inputs such as fertiliser or mechanisation. Sociological research has shown that women are often unaware of governmental support programmes or benefits when compared to their male counterparts and crop failure in poor years often results in chronic malnutrition, particularly affecting households with no alternative incomes; frequently those headed by women. A particular focus of this project lies on vulnerable households, especially those headed by women and those without a working age male, contributing greatly to gender equality. In year 1, 27% of households participating in the mobile boma concept were headed by women, whereas 12% did not include a working age male (see Section 3, Appendix 1, Indicator 0.4). The project will continue to particularly focus on vulnerable households, for which simple improvements to cropping methods and livestock protection could greatly improve financial security, yields and food security, and reduce land and labour requirements. Furthermore, employment opportunities as CGs are not limited to men, whereby 2 out of 14 currently employed CGs are in fact women (see Section 3, Appendix 1).

8.   Monitoring and evaluation

Key areas of monitoring and evaluation hinge on demonstrating a reduction in conflict and associated reduction in financial loss, increases in crop production and both a reduction in the need to destroy predators and stable or increasing predator populations. Data is collected by field teams and reported monthly by Loveridge, Macdonald and Parry. We are monitoring the project's impact on provision of training, building capacity and disseminating information. Monitoring and evaluation of these key project components are undertaken in different categories: 1) Implementation of solutions to mitigate conflict, 2) Monitoring of crop yields and 3) Verification that methods of reducing HWC have biodiversity benefits.

In year 1 of the project, the internal monitoring and evaluation processes have proven to be suitable to determine the success of the project against the project log frame. Field staff are collecting data in both countries and regular reports are submitted to the project leadership. However, data collection for several of the above evaluation points will only be finalized at the end of the current rainy season in April 2017. Therefore, the suitability of monitoring and evaluation processes can only fully be determined during the next reporting period. Due to the expansion of the programme from previous years, minor shortcomings of the previous monitoring and evaluation processes have been revealed in year one, however we anticipate resolving these during the next reporting period.

9.   Lessons learnt

Due to our past experience in implementing the programme in local communities in Zimbabwe, the introduction of the concept to new communities has not caused any major problems so far. Communities are very appreciative to be included in the planning and decision making process from the start of this project. The inclusion of local stakeholders supports acceptance of the concept to a great extent and the project will continue to follow this approach. We have further

provided training to other organisations which are interested to implement the concept in their respective areas and will continue to do so.

Even though the Government of Botswana is highly supportive towards the programme its implementation has been delayed due to ministerial policy revisions and concerns about the long term sustainability of the project, which seem to stem from negative past experiences with other organisations. However, we are closely working with the research and community outreach divisions of the DWNP and have received special permission to implement the programme in a step-wise process (please see Section 2 for details). We will continue to work closely with the DWNP and local communities to fully introduce the programme into the two project sites in Botswana in 2017.

10. Actions taken in response to previous reviews (if applicable)

n/a

11. Other comments on progress not covered elsewhere

In March 2016, Mr. Brent Stapelkamp left the project and was replaced by Mr. Liomba Mathe Junior, who has proven to be more than an adequate replacement.

In January and February 2017, the Victoria Falls area has experienced the highest level of human-predator conflict to date, which resulted in 93 heads of livestock killed by predators and 5 lions killed in retaliation. With the implementation of the programme we are hoping to reduce this number significantly over the next reporting period.

12. Sustainability and legacy

The project is based on long term research collaboratively undertaken by VFWT and WildCRU in ecosystems and community areas in the two countries and we anticipate that this collaboration will be ongoing beyond the end of the Darwin Project. Sustainability of the project comes through core findings being implemented beyond the end of the project period by local stakeholders and communities and for communities to take ownership of the initiatives. This will be achieved through including local people in a stakeholder driven, consultative process since the start of the project. This process incorporates needs and priorities of local people into the mitigatory solutions tested to ensure relevance and uptake of the recommended solutions and training.

Through workshops, newsletters, online resources, reports and peer-reviewed literature information about the project is disseminated and handover of know-how and technology to both local stakeholders and the wider public is achieved. Finally, a core aim of this project is to showcase our successful approach to mitigation of HWC to international donors to encourage uptake of these concepts at a much wider scale, a process which has already proven successful in year one as the project has raised considerable interest from several international and national development agencies and government institutions. Training has been provided to institutions from Namibia and Zimbabwe, where parts of the programme have been implemented since. Furthermore, we were able to secure further funding for the project from international donors and a considerable uptake of the project has been selected for KAZA Carnivore Conservation Coalition implementation (see Section 3 and Annex 1).

13. Darwin Identity

The logo of the Darwin Initiative and a link to the DI homepage is being displayed on the WildCRU homepage (www.wildcru.org), the Trans-Kalahari Predator Programme Facebook page (www.facebook.com/BotswanaLionCorridorProject/), and the Victoria Falls Wildlife Trust homepage (www.vicfallswildlifetrust.org) and Facebook page (www.facebook.com/Victoria-Falls-Wildlife-Trust-292900368791/). The DI has further been acknowledged and the logo has been displayed in presentations, newsletters, reports, mobile bomas and project vehicles (see "Report Victoria Falls bomas_April 2017", VFWT Newsletter August 2016", "State of KAZA boma poster_final", "State of KAZA Long Shields poster_final", "Boma installation Khumaga 1_April 2017").

14. Project Expenditure

Table 1 Project expenditure <u>during the reporting period</u> (1 April 2016 – 31 March 2017)

Project spend (indicative) since last annual report	2016/17 Grant (£)	2016/17 Total Darwin Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs (see below)			<0.001	
Consultancy costs		-	-100	Budget used to cover overspend on necessary GPS collars and travel costs
Overhead Costs			0	
Travel and subsistence			+27.71	Additional spend on necessary travel costs, covered by consultant budget
Operating Costs			0	
Capital items (see below)			+10.91	Additional spend on necessary GPS collars, covered by consultant budget
Others (see below)			0	
TOTAL			**<0.001**	

Annex 1: Report of progress and achievements against Logical Framework for Financial Year 2015-2016

Project summary	Measurable Indicators	Progress and Achievements April 2015 - March 2016	Actions required/planned for next period
Impact Introduction of novel conflict mitigation measures demonstrates to donor community ways to reduce poverty and protect biodiversity by reducing livestock losses, improving food security and reducing necessity to kill predators		Human-wildlife conflict reduced through novel conflict mitigation measures and measures showcased to international and national donors. Concept adopted in two additional areas in Namibia and Zimbabwe and additional funding secured from international donors.	███████████████████████
Outcome Trial and showcase novel livestock protection strategies that reduce livestock loss, improve crop yields, and food security, increase community engagement in conservation and reduce retaliatory killing of large predators	0.1: Conflict incidents with large predators reduced by 70% from a baseline of 200 predation incidents on average per year in each study area (approx 1250 households in each of 4 sites) by year 3 of project 0.2: Number of predators killed in retaliation for livestock loss reduced by 60% by project end (baseline annual mortality rates of lions 0.07 (7%) and 0.10 (10%), reduced to mortality rates of 1-3%) 0.3: Predator populations are stable or increasing during project lifetime 0.4: Approx 250 households participating in boma project increase crop yield by 30% - 50% (increases of 25% in cob sizes, 25 to 30cm, and number of cobs per plant increased from 2-3 to 3-4 on boma treated sites). Number households on fewer than 2 meals a day (currently 48%) reduced by 80% and those on only 1 meal to zero (currently 6%) by year 3, especially in vulnerable female headed households. 90% of 'boma' households self-sufficient by year 3.	Livestock losses have been reduced by 45% around Hwange National Park since 2012, while results on levels of retaliation killing of predators will be available in the next reporting period. Baseline lion population sizes have been determined for most areas, however data collation and recording is partly still ongoing in Botswana in 2017. Data will be used to compare future mortality rates and population size changes to. Currently, 93 households are participating in the novel conflict mitigation measures, 27% of which are female-headed and 12% of which do not include a working age male. Crop yields are being monitored continuously and first results will be available for the next reporting period. We believe that all indicators are still highly adequate to measure the outcome of the project and due to past experience with the concept, we are confident to reach our goal of a 30-50% increase in crop yields, self-sufficiency for 90% of "boma" households and zero households on less than 2 meals a day by the end of year 3.	Deploy additional 5 mobile bomas to treat additional fields, with special attention to vulnerable households, in Victoria Falls area of Zimbabwe, and Chobe Enclave and Boteti areas in Botswana. Increase livestock protection and food security through increased crop yields for these households. Recruit and train 8 additional Community Guardians in Victoria Falls, Boteti area and Chobe Enclave to increase livestock protection for communities in these areas. Conduct sociological surveys on local attitudes towards predators and conservation and complement baseline predator surveys in Botswana. Continue to offer training to interested stakeholders and showcase success of the project to international funding bodies.

Output 1. The benefits of lion guardian programme and mobile bomas showcased to international development agencies to encourage uptake of the concept at a large scale	1.1: Report published highlighting benefits used by 2-3 development agencies to inform their funding allocations to this and similar concepts by year 3 1.2: Short video showcasing project seen by 2-3 international development donors and influences their policy choices by end of year 3 1.3: Contact made and meetings held with 3-4 international development NGOs and governments by year 3 1.4: Awareness raised of project results (through local workshop in year 3) and uptake of the project findings by government agricultural departments. 1.5: Findings of the project are reflected in National predator management plans in Zimbabwe and Botswana	Considering the wide-spread interest in the project, the early commencement of showcasing and presenting project results on an international and national level, the uptake of the concept in Namibia and elsewhere in Zimbabwe, the success of securing further funding for the project and the recording of first video material already in year one (see Section 3.1, Activities 1.1-1.6 in Annex 1 for details and evidence), we are confident the output indicators still hold adequate to measure success of the project and to achieve Output 1 by the end of year 3.
Activity 1.1 Workshops organised yearly in years 1-3		In 2015, 12 Namibian government officials and members of the Kwando Carnivore Project were trained in the concept (see "Letter Kwando Carnivore Project_Feb 2017"). In 2016, it was presented to 32 national parks and rural district council scouts and 21 State University second year students in Zimbabwe. Further, the project was showcased to members of the Chobe Enclave Conservation Trust, Land board, Chobe District Council and Botswana Tourism Organization (see "ABCF bomas and training Hwange_2016", "Itinerary Botswana delegation visit_Nov 2016") three community liaison officers from Save Valley Conservancy were trained in the concept (see "HWC workshop for Save Valley officers_Nov 2016"). The concept has since been implemented in Namibia and Save Valley in Zimbabwe.
Activity 1.2 Workshop interim reports written in years 1 and 2 and disseminated to stakeholders and via websites		Training efforts have been detailed in workshop reports, summarized in the Trans-Kalahari Predator Programme's Annual Report 2016 and disseminated to the Botswana and Zimbabwe Governments (see "HWC workshop for SAVE Valley officers_Nov 2016"; "ABCF bomas and training Hwange_2016", "Training report CGs VF August 2016", "TKPP Annual Report 2016"). Information on the project is further available to the public via the WildCRU homepage (www.wildcru.org/research/tkpp-mitigating-conflict/), the Trans-Kalahari Predator Programme's Facebook page (www.facebook.com/BotswanaLionCorridorProject/), the Victoria Falls Wildlife Trust homepage (www.vicfallswildlifetrust.org) and the Victoria Falls Wildlife Trust Facebook page (www.facebook.com/Victoria-Falls-Wildlife-Trust-292900368791/?ref=br_rs).

Activity 1.3 Final report written end of year 3 and used to solicit further donor support to roll out concept		Final report will be written in year 3 after all workshops have been organised.
Activity 1.4 Video material collected throughout project and short video made of project to publicise work to future donors		First video material has been recorded and broadcasted on YouTube ("WildCRU A personal message from Professor David Macdonald March 2016", "WildCRU A personal message from Professor David Macdonald").
Activity 1.5 Meetings requested in year 3 with key conservation and development donor agencies (e.g. FAO, development banks etc) to publicise the work and solicit further funding.		In 2015 and 2016 respectively, the concept has been showcased to the European Commission and presented to WWF Germany (see "WWF Germany presentation"). WWF Germany has pledged 50,000 € and African Bush Camps Foundation has provided 14,218 USD in support (see "WWF funding pledge email", "ABCF letter on funding, bomas and training"). A substantial component of the project has further been selected for Phase 1 of KAZA Carnivore Conservation Coalition implementation funded by KfW- German Development Bank (see "KCCC Hwange-Makgadikgadi Workshop Proceedings_June 2016").
Activity 1.6 Awareness of project raised in national wildlife management departments and conservation NGOs to engage support and incorporate findings into national policy in year 3 and throughout project where possible		The project has been continuously discussed and developed with national wildlife management departments and participating communities, who continue to offer valuable support (see "DWNP meeting 18.08.2016", "Boteti meeting 07.12.2017", "DWNP meeting 09.12.2016", "Boteti meeting 16.01.2017", "DWNP meeting 18.01.2017", "DWNP meeting 02.02.2017", "Kavimba meeting 11.04.2017"). It was presented at the international Cecil Lion Summit in Oxford (see "Cecil Summit Programme"), including public outreach and scientific engagement sessions broadcasted live on YouTube ("WildCRU – Cecil Summit Live Public Outreach", "WildCRU - Engagement with the Scientific Community") and in a talk as well as two poster presentations at the State of KAZA Symposium in Zimbabwe (see "State of KAZA Symposium Programme", "State of KAZA boma poster", "State of KAZA Long Shields poster"). The concept was further presented to interested NGOs and the public at the Maun Research Talks in March 2017 (see "Poster Maun Research Talks_March 2017", "Presentation Maun Research Talks_March 2017").
Output 2. Decrease in the levels of human-predator conflict in the study areas implemented through lion guardian programme	2.1: 12 LGs recruited, trained and active in community by end of year 1 2.2: Conflict levels decline by 50% by end year 1 and 70% by year 3, from a baseline of around 200 per year in each area, through interventions of LGP and use of mobile bomas. 2.3: Data show attitudes of men and women in community to predators and conservation improves against existing baseline attitudinal data by year 3. 2.4: Analysis of GPS collar data from 15 lions show that potential problem lions avoid agro-	By the end of the first year, a total of 14 CGs had been recruited and trained to be active in their respective communities. The intervention measures of 10 CGs and the use of 12 mobile bomas contributed to a reduction of livestock losses by 45% since the pilot project was initiated in 2012 around Hwange National Park, Zimbabwe. The effectiveness of additional 4 CGs and 3 mobile bomas in Victoria Falls will be determined in 2017. Baseline surveys on local attitudes towards predators and conservation, the impact of conflict levels on life satisfaction measures and the value attached to the project have been collated and conducted and are partly still being conducted in Zimbabwe and Botswana. GPS collar data further suggest that the interventions have a positive effect on the behaviour of certain demographic groups of lions (see Activities 2.1-2.10 for details and evidence). Two articles have been published in peer-reviewed journals. As the CGs were not active throughout the first year of the project a 50% decline in livestock predation throughout year 1 was not realistic. However due to our long term

pastoral lands due to LG interventions, starting year 1 with final analysis by year 3.	experience with this programme, we are still confident to achieve Output 2 by year 3 in Zimbabwe. As the project sites in Botswana are both situated in high conflict areas, we are further still confident that the CGs and mobile bomas will have a significant positive effect and reduce conflict levels by 70% by year 3 once permission has been given to fully introduce the programme. The indicators are therefore still considered adequate to measure success of the project by year 3.
Activity 2.1 Recruit men and women as 'lion guardians' in 4 community areas (Zimbabwe: Hwange Communities, Mvuthu Community (Vic Falls), Botswana: Chobe Enclave and Boteti River, year 1	A total of 14 CGs have been recruited in Hwange (10 in Tsholotsho and Mabale) and Victoria Falls communities, including 2 women (4 in Chidobe, Kachechete, Chikandakubi and Jambezi) (see "Training report CGs VF Aug 2016", "VF Predator Conflict 2009 to 2016 & Guardian Placement"). A further 8 CGs are planned to be recruited in the Victoria Falls area of Zimbabwe, and the Chobe Enclave and Boteti areas of Botswana in the next period, pending approval of the Botswana Government (see Section 2).
Activity 2.2 Provide training in data collection , HWC mitigation methods, etc to 'Lion guardians' in year 1	All 14 currently employed CGs are fully trained and active in their respective communities (see "Training report CGs VF Aug 2016", "VF Predator Conflict 2009 to 2016 & Guardian Placement"). A further 8 CGs will be trained in Zimbabwe and Botswana in the next reporting period, pending approval of the Botswana Government (see Section 2).
Activity 2.3 Select communities that will receive mobile bomas (paying special attention to inclusion of vulnerable communities and vulnerable households, ensure the female livestock owner are included).	In 2016 and 2017, six new mobile bomas were deployed in 9 village communities adjacent to Hwange NP (see "ABCF bomas and training Hwange_2016", "Boma installation Mansuma 2, Janiza & Mtshayeli 2016"), 3 new bomas were deployed in 3 village communities in the Victoria Falls area (see "Report Victoria Falls bomas_April 2017") and 1 fully functioning demonstration boma was deployed in the Boteti area (see "Boma installation Khumaga 1_April 2017"), adding up to a total of 16 bomas (housing 1105 cattle). The bomas include livestock from 93 households, of which 25 are headed by women (27 %) and 11 do not have a working age male (12 %). A total of 282 cattle have been examined for general health, nutritional status and disease around Hwange National Park, of which 140 individuals were treated for disease. Furthermore, 897 cattle have been dewormed and a veterinary kit (tick grease, antibiotics, eye and wound powder etc.) was provided for each boma (see "TKPP_Annual Report 2016", "ABCF letter on funding, bomas and training"). The same protocol will be introduced in the remainder project sites during the next reporting period. In May 2017, we are planning to deploy an additional boma in the Boteti area, a further 2 bomas in the Chobe Enclave area and increase capacity in the Victoria Falls area by another 2 bomas.
Activity 2.4 Provide training in boma management and implement boma rotation schedules for movement of bomas between community crop fields in dry season	For all participating households in Zimbabwe and Botswana, training in boma management and implementation of boma rotation schedules was conducted in the year of deployment (see "Report Victoria Falls bomas_April 2017", "Boma installations Mansuma 2, Janiza & Mtshayeli 2016", "Boma installation Khumaga 1_April 2017").

Activity 2.5 Set up monitoring protocols to record conflict incidents, retaliatory killing of predators, predator numbers and trends and collate historical data on these, data recorded throughout.	Monitoring protocols have been continued from previous years and are being implemented to record conflict incidents, retaliatory killing of predators, predator numbers and trends in Zimbabwe. Historical data has been collated in Zimbabwe and is currently being collated in Botswana. The implementation of above protocols in Botswana is pending approval by the Botswana Government (see Section 2 and "TKPP_Annual Report 2016", "VFWT Report HWC Hwange West 2016", "CG data base"). In 2016, the CGs tracked 740 km of transect, completed 1163 herd sightings, recovered and safely returned 134 head of livestock and conducted 6 lion chases. In the same year, 31 cattle, 24 donkeys and 72 goats were killed by lions in our project sites adjacent to Hwange National Park. More than 60% of livestock depredation incidences occurred outside protective bomas at night, while no livestock was killed inside mobile bomas, showcasing the effectiveness of the enclosures (see "CG data base").
Activity 2.6 Sociologist designs and implements survey to quantify baseline attitudes to predators and conservation, year 1, follow up survey in year 3 to quantify change	A baseline survey on attitudes to predators and conservation has been conducted in all project sites in Zimbabwe to be repeated in year 3 of the project to quantify change (see "Questionnaire HWC"). Furthermore, we are using economic valuation techniques to quantify total costs perceived by people living alongside Hwange National Park including the impact of conflict levels on happiness and life satisfaction measures, while at the same time evaluating the value they attach to the Community Guardian and Mobile Boma project (see "Jacobson_Survey script"). Baseline data has been collated from interviews previously conducted in the Boteti area in 2012 (see "Ngaka 2015.Dynamics of human-lion conflict in MPNP"). Furthermore, the sociologist has designed a questionnaire survey to be implemented in the Boteti area of Botswana, pending approval by the Botswana Government (see Section 2). In the Chobe Enclave, baseline data has been collected by WildlifeAct (see "WildlifeACT Chobe Enclave Interview Questions", "WildlifeACT email interviews conducted") and will be analysed by a MSc student of the University of East Anglia under the supervision of the project leader. In total, 274 households have been surveyed in Victoria Falls, 358 households in Hwange (since 2012), 99 households in the Boteti area (in 2012) and 102 households in the Chobe Enclave.
Activity 2.7 Capture and radio collar 15 lions in the study sites	Twenty potential conflict lions have been satellite collared in the Hwange and Victoria Falls areas of Zimbabwe and the Chobe Enclave area of Botswana in 2016 (see "TKPP_Annual Report 2016"). Further collaring of potential problem lions in Zimbabwe and Botswana is scheduled for the dry season 2017.
Activity 2.8 GPS satellite collars monitored by field managers and communities alerted (via mobile phone app- 'whatsapp') when lions approach their area (throughout)	GPS satellite data is being collected continuously and lion movements are being monitored by field managers. A total of 311 warning alerts were sent via "Whatsapp" in 2016 (~1110 warning alerts since we started in 2012).
Activity 2.9 Collect, collate and analyse lion GPS data to quantify changes in behaviours due to lion guardian activity (years 1-3)	In Zimbabwe, GPS data has been collected, collated and partly analysed. Subadult male lions seem to be more likely to not return after being chased by CGs compared to adult females and adult males, suggesting that subadult male lions are opportunistic stock raiders rather than habitual ones, which might help to reduce

		conflict levels with this demographic group substantially through appropriate intervention strategies. First results further suggest that the CG programme might lead to a reduction in selection of land within 1 km of villages (see "TKPP Annual Report 2016", "Petracca 2016.Update on Hwange Lion Guardians analysis"). In Botswana, GPS data is continuously being collected and will be analysed in year 3.
Activity 2.10 Prepare report (1) and publications for peer review (1- 2) showcasing reductions in HWC (year 3)		Progress reports have been submitted to the Zimbabwe and Botswana Governments, 2 peer-reviewed publications have been published (see Annex 3)
Output 3. Decrease in the numbers of predators killed in retaliation for livestock predation contributes to goals of Convention on Biodiversity	3.1: The number of predators killed in retaliation for livestock predation declines by 60% by year 3 of project (mortality rates decline from 7-10% to 1-3% of predator population, approx 25-30 lions to 3-10 lions and similar for spotted hyaena. 3.2: Predator population size in protected areas adjacent to study sites stable or increasing, with current population densities of 3.5 lions/ 100km^2)	Baseline data on problem animal control incidents and predator populations have been collated and recorded in Zimbabwe. In Botswana, data on problem animal control incidents are available from the DWNP. Due to the step-wise introduction of the programme in Botswana (see Section 2), existing and complementing survey data from 2017 will still be serving as a baseline level to compare changes to by year 3. First results on changes in retaliatory killings of lions will be available for the next reporting period. However, variations are to be expected due to variable environmental conditions (see Section 3.1) and we are therefore still confident the output indicators hold adequate to measure success of the project and to achieve Output 3 by the end of year 3.
Activity 3.1 Collate baseline data on predators destroyed as problem animals against which to measure change over the project (year 1)		Baseline data has been recorded by project scientists in Zimbabwe since 2010 and is continuously being collected by the Botswana DWNP.
Activity 3.2 Record problem animal control incidents at each site throughout project and use this to compare to baseline levels of retaliatory killing of predators (by year3)		Incidents are being recorded continuously in Zimbabwe (see "CG data base") and through the DWNP in Botswana.
Activity 3.3 Collate existing survey data where possible (from WildCRU, PWMA, DWNP, conservation NGOs) or run baseline surveys to obtain data on predator populations in year 1		Survey data has been collated for Hwange and Victoria Falls (see "TKPP Annual Report 2016"). Existing survey data has been collated in Botswana and will be complemented by surveys in the dry season of 2017.
Activity 3.4 Survey predator populations (using a spoor transect method) in year 2 and 3 to compare to baseline to show trends		Surveys to be conducted and analysed in year 2 and 3.
Activity 3.5 Analysis of data on trends in problem animal control and predator populations for peer review and publication (quantity 1, year 3).		Data to be analysed in year 3.
Output 4. Increased crop yields and food security through use of mobile bomas to fertilise fields highlighted	4.1: Fifteen volunteer village communities (approx 300 households average of 25 households per village, 6.9 people per household, 10% female headed, 15% with no working age male) in four conflict hotspots introduced to the mobile communal boma concept and receive bomas and training by end of year 1.	By the end of year one, fourteen village communities in four human-wildlife conflict hotspots were introduced to and trained in the use of 16 mobile bomas, encompassing 93 households (27% headed by women, 12% without working age male). Changes to crop yields and food security are being monitored continuously and first results will be available in the next reporting period. First results from our pilot project suggest a possible increase in crop yields of around 30%. We are still aiming at reducing the number of households on only one meal a day to zero, self-sufficiency for 90% of 'boma' households by year 3 and are confident the output

	4.2: Crop yields in 'boma treated' fields increases by at least 30% in crop seasons from project year 1 to 3.	indicators hold adequate to measure success of the project and to achieve Output 4 by the end of year 3.
	4.3: Food security, particularly in vulnerable households measurably increased in the approximately 300 households participating in boma project, by project end. Increased crop yield by 30% - 50% (see baselines above) and number households on 2 meals or less a day (currently 48% of households) reduced by more than 80% and reduce to zero number of households on only 1 meal a day (currently 6% households) by year 3, especially in vulnerable female headed households. 90% of 'boma' households self-sufficient by year 3.	
Activity 4.1 Monitoring protocols put in place for crop growing season to measure increases in crop yields through use of mobile bomas to fertilise fields. Randomised, case controlled experiments using standardised seed to compare treated (fertilised via boma) and untreated field sites (wet season of yr 1- 3)		Protocols in place in Zimbabwe. Protocols will be implemented in Botswana as soon as first trial bomas have been deployed and crops will be planted in the cropping season 2017.
Activity 4.2 Throughout growing season of yr 1 – yr 3 crops monitored and growth and yields measured (according to above protocol).		Crops are being monitored and growth and yields measured in Zimbabwe and preliminary results from our pilot project showed an increase in crop yields of 30% (see "Liomba_Diploma report 2016"). In the 2016/2017 season the team monitored height, stem diameter, number of leaves, length and number of cobs per plant at a total of 31 plots, which had been treated by 8 mobile bomas. Monitoring included fields which had been treated in previous years in order to determine long-term treatment effect (see "boma maize from chezhou village", "Mr Ndlovu shows some of his boma produce"). Results will be available in the next reporting period. In Botswana, protocols will be implemented as soon as first bomas are deployed in the next period.
Activity 4.3 Survey of households by sociologist to determine change in food security in households in participating village communities at outset and yearly to show increases in food security (with particular attention paid to female headed and vulnerable households).		Survey conducted in Zimbabwe in 2016 (see "Questionnaire HWC"). Botswana to follow in 2017 with first baseline surveys, pending approval from the DWNP (see Section 2).
Activity 4.4 Analysis of data on crop yields and improved food security and report written (1) to high these changes for donor community and for peer reviewed publications (1) in year 3.		Data to be analysed and report and publication to be written in year 3.

Annex 2 Project's full current logframe as presented in the application form (unless changes have been agreed)

Project summary	Measurable Indicators	Means of verification	Important Assumptions
Impact: (Max 30 words) Introduction of novel conflict mitigation measures demonstrates to donor community ways to reduce poverty and protect biodiversity by reducing livestock losses, improving food security and reducing necessity to kill predators			
Outcome: (Max 30 words) Trial and showcase novel livestock protection strategies that reduce livestock loss, improve crop yields, and food security, increase community engagement in conservation and reduce retaliatory killing of large predators	0.1: Conflict incidents with large predators reduced by 70% from a baseline of 200 predation incidents on average per year in each study area (approx 1250 households in each of 4 sites) by year 3 of project 0.2: Number of predators killed in retaliation for livestock loss reduced by 60% by project end (baseline annual mortality rates of lions 0.07 (7%) and 0.10 (10%), reduced to mortality rates of 1-3%) 0.3: Predator populations are stable or increasing during project lifetime 0.4: Approx 250 households participating in boma project increase crop yield by 30% - 50% (increases of 25% in cob sizes, 25 to 30cm, and number of cobs per plant increased from 2-3 to 3-4 on boma treated sites). Number households on fewer than 2 meals a day (currently 48%) reduced by 80% and those on only 1 meal to zero (currently 6%) by year 3, especially in vulnerable female headed households. 90% of 'boma' households self sufficient by year 3.	0.1: Project conflict incident reports collected over project duration, official predation reports database, analysis of livestock survivorship data published in peer reviewed paper and reports. Perception surveys of men and women in community 0.2: Project and management authority records on retaliatory killing (historical and current). 0.3: Project surveys of predators show an increase against baseline data on populations 0.4: experimental data collected on crop yields published in peer reviewed papers and reports. Comparative photographs in reports to illustrate yield difference. Household surveys of female and male headed households.	Communities are willing to participate in novel livestock husbandry techniques and herd livestock communally. Bomas and field rotation schemes are used correctly. Baseline data on predator populations are available for use. Baseline data on food security made available by local government or can be collated by project.
Outputs: 1. The benefits of lion guardian programme and mobile bomas showcased to international development agencies to encourage	1.1: Report published highlighting benefits used by 2-3 development agencies to inform their funding allocations to this and similar concepts by year 3	1.1: Published report and information available on WildCRU project website, number downloads logged and analysed by country as part of ME. 1.2: Project highlighted in local and	The project leaders are able to develop contacts in international development and donor agencies in order to effectively present the concept.

uptake of the concept at a large scale	1.2: Short video showcasing project seen by 2-3 international development donors and influences their policy choices by end of year 3 1.3: Contact made and meetings held with 3-4 international development NGOs and governments by year 3 1.4: Awareness raised of project results (through local workshop in year 3) and uptake of the project findings by government agricultural departments. 1.5: Findings of the project are reflected in National predator management plans in Zimbabwe and Botswana	international press (2 articles per year) 1.3: Video available online and sent to donors (downloads logged and analysed as part of ME) 1.4: Records of discussions, meetings and contact with donor agencies 1.5: Donor agencies approached adopt or fund this and similar concepts 1.6: Workshop report and attendance list. 1.7: National Predator Management plans and strategies.	
2. Decrease in the levels of human-predator conflict in the study areas implemented through lion guardian programme	2.1: 12 LGs recruited, trained and active in community by end of year 1 2.2: Conflict levels decline by 50% by end year 1 and 70% by year 3, from a baseline of around 200 per year in each area, through interventions of LGP and use of mobile bomas. 2.3: Data show attitudes of men and women in community to predators and conservation improves against existing baseline attitudinal data by year 3. 2.4: Analysis of GPS collar data from 15 lions show that potential problem lions avoid agro-pastoral lands due to LG interventions, starting year 1 with final analysis by year 3.	2.1: Reports on recruitment, Records of training sessions attended by LGs in mitigation techniques. 2.2: Conflict incident records database, Wildlife management agency records, monthly lion guardian field reports 2.3: questionnaire surveys, project reports and publications. 2.4: 'Problem' lions collared and records of interventions kept GPS database on lions analysed to verify avoidance behaviour at short and long term time scales.	Lion guardian programme successfully set up, lion guardians trained and facilitate improved livestock husbandry. Permissions remain in place to collar lions in host countries, ethics committees approve animal handling protocols.
3. Decrease in the numbers of predators killed in retaliation for livestock predation contributes to goals of Convention on Biodiversity	3.1: The number of predators killed in retaliation for livestock predation declines by 60% by year 3 of project (mortality rates decline from 7-10% to 1-3% of predator population, approx 25-30 lions to 3-10 lions and similar for	3.1: Project and wildlife management records of legal and illegal retaliatory killing. 3.2: Project reports to management agencies and publications 3.3: Ongoing predator population	Project continues to have access to data on predator populations to add to existing data on historical trends and surveys continue to be undertaken.

	spotted hyaena. 3.2: Predator population size in protected areas adjacent to study sites stable or increasing, with current population densities of 3.5 lions/ 100km^2)	surveys by linked NGOs and WildCRU projects 3.4: Analysis and publication by project scientists of predator population trends using existing baseline data	
4. Increased crop yields and food security through use of mobile bomas to fertilise fields highlighted	4.1: Fifteen volunteer village communities (approx 300 households average of 25 households per village, 6.9 people per household, 10% female headed, 15% with no working age male) in four conflict hotspots introduced to the mobile communal boma concept and receive bomas and training by end of year 1. 4.2: Crop yields in 'boma treated' fields increases by at least 30% in crop seasons from project year 1 to 3. 4.3: Food security, particularly in vulnerable households measurably increased in the approximately 300 households participating in boma project, by project end. Increased crop yield by 30% - 50% (see baselines above) and number households on 2 meals or less a day (currently 48% of households) reduced by more than 80% and reduce to zero number of households on only 1 meal a day (currently 6% households) by year 3, especially in vulnerable female headed households. 90% of 'boma' households self sufficient by year 3.	4.1: Reports of training sessions, logs of community training and meetings kept. LG monthly reports 4.2: Crop monitoring data in database for analysis. Data on crop yield experiment (standardised seed and planting in randomised treated and untreated plots) published in reports and peer reviewed literature. 4.3: Community survey data quantify savings in time and labour input and benefits in food security felt by households headed by men and women in boma project villages. A particular focus of the survey to be benefits to women in their traditional role in crop husbandry.	Village communities are willing to function as a collective and take part in the mobile boma trial and use the boma correctly and consistently. Care is taken to ensure inclusion of vulnerable households (e.g. female headed households) in village communal boma collective so uptake of scheme is not just by community elites. Crop growing is not adversely affected by external factors (drought, disease etc).

Activities (each activity is numbered according to the output that it will contribute towards, for example 1.1, 1.2 and 1.3 are contributing to Output 1)

1.1 Workshops organised yearly in year s 1-3

1.2 Workshop interim reports written in years 1 and 2 and disseminated to stakeholders and via websites

1.3 Final report written end of year 3 and used to solicit further donor support to roll out concept

1.4 Video material collected throughout project and short video made of project to publicise work to future donors

1.5 Meetings requested in year 3with key conservation and development donor agencies (e.g. FAO, development banks etc) to publicise the work and solicit further funding.

1.6 Awareness of project raised in national wildlife management departments and conservation NGOs to engage support and incorporate findings into national policy in year 3 and throughout project where possible

2.1 Recruit men and women as 'lion guardians' in 4 community areas (Zimbabwe: Hwange Communities, Mvuthu Community (Vic Falls), Botswana: Chobe Enclave and Boteti River, year 1

2.2 Provide training in data collection , HWC mitigation methods, etc to 'Lion guardians' in year 1

2.3 Select communities that will receive mobile bomas (paying special attention to inclusion of vulnerable communities and vulnerable households, ensure the female livestock owner are included).

2.4 Provide training in boma management and implement boma rotation schedules for movement of bomas between community crop fields in dry season

2.5 Set up monitoring protocols to record conflict incidents, retaliatory killing of predators, predator numbers and trends and collate historical data on these, data recorded throughout.

2.6 Sociologist designs and implements survey to quantify baseline attitudes to predators and conservation, year 1, follow up survey in year 3 to quantify change

2.7 Capture and radio collar 15 lions in the study sites

2.8 GPS satellite collars monitored by field managers and communities alerted (via mobile phone app- 'whatsapp') when lions approach their area (throughout)

2.9 Collect, collate and analyse lion GPS data to quantify changes in behaviours due to lion guardian activity (years 1-3)

2.10 Prepare report (1) and publications for peer review (1- 2) showcasing reductions in HWC (year 3)

3.1 Collate baseline data on predators destroyed as problem animals against which to measure change over the project (year 1)

3.2 Record problem animal control incidents at each site throughout project and use this to compare to baseline levels of retaliatory killing of predators (by year3)

3.3 Collate existing survey data where possible (from WildCRU, PWMA, DWNP, conservation NGOs) or run baseline surveys to obtain data on predator populations in year 1

3.4 Survey predator populations (using a spoor transect method) in year 2 and 3 to compare to baseline to show trends

3.5 Analysis of data on trends in problem animal control and predator populations for peer review and publication (quantity 1, year 3).

4.1 Monitoring protocols put in place for crop growing season to measure increases in crop yields through use of mobile bomas to fertilise fields. Randomised, case controlled experiments using standardised seed to compare treated (fertilised via boma) and untreated field sites (wet season of yr 1- 3)

4.2 Throughout growing season of yr 1 – yr 3 crops monitored and growth and yields measured (according to above protocol).

4.3 Survey of households by sociologist to determine change in food security in households in participating village communities at outset and yearly to show increases in food security (with particular attention paid to female headed and vulnerable households).

4.4 Analysis of data on crop yields and improved food security and report written (1) to high these changes for donor community and for peer reviewed publications (1) in year 3.

Annex 3 Standard Measures

Table 1   Project Standard Output Measures

Code No.	Description	Gender of people (if relevant)	Nationality of people (if relevant)	Year 1 Total	Y2	Y3	Total to date	Total planned during the project
1A	No. people to submit thesis for PhD qualification	1 male, 1 female	1 Zimbabwean, 1 Canadian	0			0	2
1B	No. people to attain PhD qualification	1 female, 1 male	1 Zimbabwean, 1 Canadian	0			0	2
4C	Postgraduate Diploma in International Wildlife Conservation Practice	1 male	1 Zimbabwean	1			1	1, number expandable if students apply
4D	No. training weeks			35			35	35, number expandable if students apply
6A	Community Guardian training	12 male, 2 female	14 Zimbabwean	14			14	26
6B	No. training weeks			2			2	6
6A	Field-coordinator	1 male	1 Zimbabwean	1			1	2
6B	No. training weeks			2			2	6
6A	Interviewer training in social science surveys	5 male, 1 female	Zimbabwean	6			6	6
6B	No. training weeks			9			9	9
6A	Children educational programme on human-wildlife conflict and conservation		1000 Zimbabwean	1000			1000	3000
6B	No. training weeks			6			6	18
7	No. training materials			3 comic books			3	3
11A	No. papers published			2			2	7
11B	No. papers submitted			1			1	
14A	Cecil Summit			1 talk			1 talk	
14B	State of KAZA Symposium			2 posters			2 posters	
20	No. of bomas to be handed over to	16		16 (24,000£)			16 (24,000£)	21 (31,500£)

	host country						
22	No. permanent field plots and sites to be established and continued			16		16	21
23	WWF funding, ABCF funding			50,000 €, 14,218 USD		50,000 €, 14,218 USD	

Table 2   Publications

Title	Type (e.g. journals, manual, CDs)	Detail (authors, year)	Gender of Lead Author	Nationality of Lead Author	Publishers (name, city)	Available from (e.g.weblink or publisher if not available online)
Bells, bomas and beefsteak: complex patterns of human-predator conflict at the wildlife-agropastoral interface in Zimbabwe*	Peer-reviewed journal	Loveridge, A.J., Kuiper, T., Parry, R.H., Sibanda, L., Hunt, J., Stapelkamp, B., Sebele, L., Macdonald, D.W. (2017)	male	Zimbabwe/ British	PeerJ	https://peerj.com/articles/2898/
Drivers of Foot and Mouth Disease in cattle at wild/domestic interface: insights from farmers, buffalo and lions*	Peer-reviewed journal	Miguel, E., Grosbois, V., Fritz, H., Caron, A., De Garine-Wichatitsky, M., Nicod. F., Loveridge. A.J., Stapelkamp, B., Macdonald, D., Valeix, M. (2017)	female	French	Diversity and Distributions	https://www.researchgate.net/publication/315750900_Drivers_of_Foot_and_Mouth_Disease_in_cattle_at_wilddomestic_interface_insights_from_farmers_buffalo_and_lions

Annex 4 Onwards – supplementary material (optional but encouraged as evidence of project achievement)

ABCF bomas and training Hwange_2016
ABCF letter on funding, bomas and training
Boma installation Khumaga 1_April 2017
Boma installation Mansuma 2, Janiza & Mtshayeli 2016
Boma maize from chezhou village
Boteti meeting 07.12.2016
Boteti meeting 16.01.2017
Cecil Summit Programme
DWNP meeting 09.12.2016
DWNP meeting 18.08.2016
DWNP meeting 18.01.2017
DWNP meeting 02.02.2017
Email Mr. Mokandla 31.01.207
HLR permit 2017
HLR permit research council 2017
HRDC authorization
HWC workshop for Save Valley officers_Nov 2016
Itinerary Botswana delegation visit_Nov 2016
Jacobson_Survey script
Kavimba meeting 11.04.2017
KCCC Hwange-Makgadikgadi Workshop Proceedings_June 2016
Letter Kwando Carnivore Project_Feb 2017
Liomba_Diploma report 2016
Loveridge et al 2017. Bells, bomas and beefsteak
Map of project sites
MEWT Press Release Suspension of Permits Jan 2017
Miguel et al 2017. FMD in cattle at wild/domestic interface
Mr Ndlove shows some of his boma produce
Ngaka 2015.Dynamics of human-lion conflict in MPNP
Petracca 2016.Update on Hwange Lion Guardians analysis
Poster Maun Research Talks_March 2017
Presentation Maun Research Talks_March 2017
Questionnaire HWC
Report Victoria Falls bomas_April 2017
State of KAZA boma poster_final
State of KAZA Long Shields poster_final
State of KAZA Symposium Programme
TKPP Annual Report 2016
Training report CGs VF August 2016
VF Predator Conflict 2009 to 2016 & Guardian Placement
VFWT Newsletter August 2016
VFWT Report HWC Hwange West 2016
WildlifeACT Chobe Enclave Interview Questions
WildlifeACT email interviews conducted
WWF funding pledge email
WWF Germany presentation

Checklist for submission

	Check
Is the report less than 10MB? If so, please email to Darwin-Projects@ltsi.co.uk putting the project number in the Subject line.	
Is your report more than 10MB? If so, please discuss with Darwin-Projects@ltsi.co.uk about the best way to deliver the report, putting the project number in the Subject line.	
Have you included means of verification? You need not submit every project document, but the main outputs and a selection of the others would strengthen the report.	
Do you have hard copies of material you want to submit with the report? If so, please make this clear in the covering email and ensure all material is marked with the project number.	
Have you involved your partners in preparation of the report and named the main contributors	
Have you completed the Project Expenditure table fully?	
Do not include claim forms or other communications with this report.	