



## Darwin Initiative 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 about 10 pages in length, excluding annexes*

**Submission Deadline: 30 April**

### Darwin Project Information

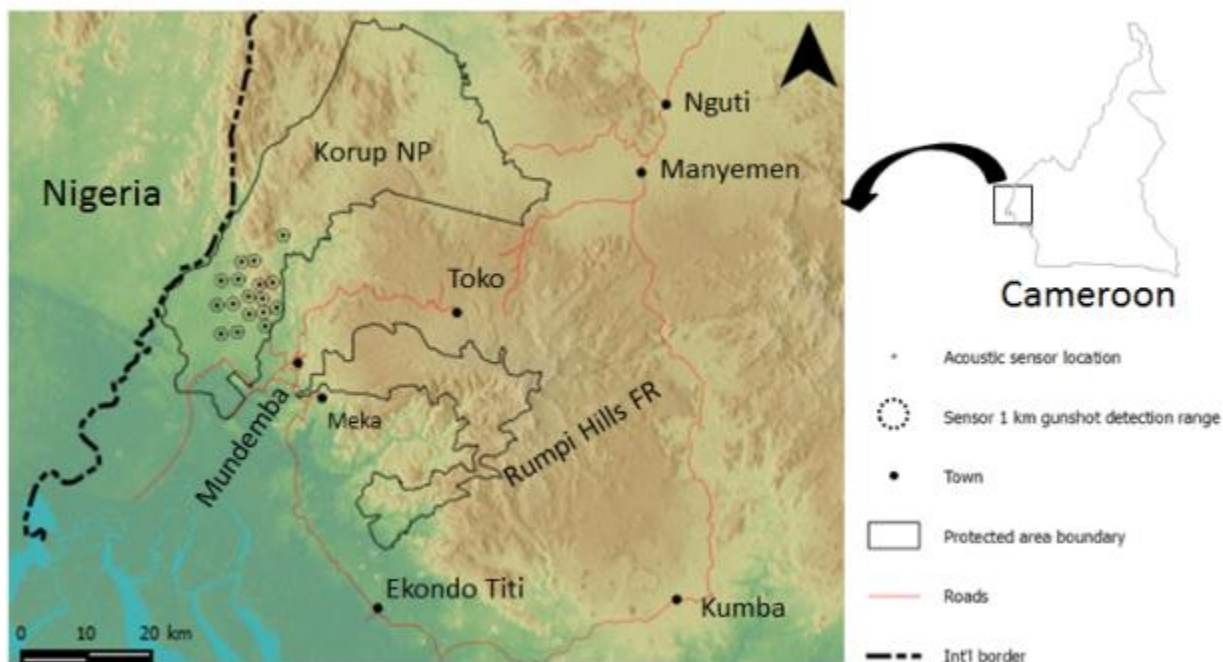
Project Reference	20-012
Project Title	Improving anti-poaching patrol evaluation and design in African rainforests
Host Country/ies	Cameroon
Contract Holder Institution	Wildlife Conservation Research Unit (WildCRU), University of Oxford
Partner institutions	Cornell University (CU), James Madison University (JMU), Korup Rainforest Conservation Society (KRCS), Coastal Forests Program of WWF-Cameroon (WWF-CFP), Programme for the Sustainable Management of Natural Resources – Southwest Region (PSMNR-SWR), Ministry of Forest and Wildlife (MINFOF)
Darwin Grant Value	£240,024
Start/end dates of project	April 2013 – March 2016
Reporting period (eg Apr 2013 – Mar 2014) and number (eg Annual Report 1, 2, 3)	April 2013 – March 2014 (Annual Report 1)
Project Leader name	Prof. David W. Macdonald
Project website	pending
Report author(s) and date	Christos Astaras, David W. Macdonald, Peter Wrege, Joshua Linder – April 30, 2014

### 1. Project Rationale

The importance of wild animal meat (“bushmeat”) for the livelihood of forest-dependent people in the Congo basin is well documented (e.g. DI-10004). Yet, in many parts of the African tropical forest zone, commercialized bushmeat hunting has dramatically increased harvest rates, reduced many game species populations, and altered forest structure and composition. Conservation efforts have largely been unable to curtail the intense, pervasive, and often illegal commercial bushmeat hunting even within the region’s most important tropical forest protected areas – the cornerstones of biodiversity conservation and critical strongholds for many threatened species. Importantly, these protected areas serve as critical “source” populations for species hunted in surrounding forest “sinks”, and therefore poaching undermines the sustainable and equitable sharing of wildlife benefits and threatens the food security of the rural poor who mostly depend on bushmeat protein. Moreover, poaching also cultivates contempt for wildlife laws in a way that undermines the PAs’ integration as part of the fabric of sustainable development.

Recognizing this, species action plans, protected management plans and Biodiversity Strategies and Action Plans in the region – the primary CBD implementation instrument at the national level – highlight the need for mechanisms to monitor wildlife populations and enforce wildlife legislation. Anti-poaching patrols are widely used as such mechanism, utilizing substantial conservation resources. However, few studies have systematically examined their efficacy in Afrotropical rainforests and none using experimental design. Lack of critical evaluation renders anti-poaching strategies – practically – blindfolded.

With this project, we are developing and providing training for a novel, evidence-based decision-support system to design and assess the efficacy of anti-poaching patrols using novel application of bioacoustic monitoring techniques. This system will improve the efficiency of PA biodiversity conservation, including of “source” populations for species that can be sustainably and legally exploited in adjacent non-protected areas. By adapting it for use beyond the Korup National Park area of Cameroon’s Southwest Region where it is being developed and tested (see map below), the project’s legacy will be multiplied.



**Figure 1:** Location of Korup National Park in Southwest Region of Cameroon, as well as the acoustic grid established in June 2013. [Coordinates of Mundemba town: N 4.9707° E 8.9101°]

## 2. Project Partnerships

Since its inception, our project has been a collaboration among Cameroonian government (MINFOF/Korup NP management) and conservation NGOs (WWF-CFP, KRCS), an international development programme (PSMNR-SWR) and international research institutions (JMU, CU, WildCRU). The partnerships were in place by the time the project started and were formalized with the signing of the collaboration agreement by all the partners in the first months of the project (prepared by the Research Services of the University of Oxford – the Lead institution) (Annex 4.1). An additional side letter was developed between WWF-CFP and the project to clarify the role of David Okon – the original transect survey field coordinator. Due to the increased assumed duties of David Okon in Korup NP in early 2013 (as part of a broader PSMNR-SWR – WWF-CFP collaboration for the management of Korup NP), the partnership agreed that his duties would be absorbed by KRCS. This change was successfully done without any effect on the work schedule. WWF-CFP played, as per the collaboration agreement, instrumental role in the custom clearance of batteries for the acoustic sensors (Annex 4.2) and the mechanism for clearance of future shipments (Year 2/3) has been developed.

The necessary research permits were issued by MINFOF – the government agency responsible for authorizing projects within protected areas (Annex 4.3). The project Leader (Prof. David W. Macdonald) visited together with the project coordinator (Christos Astaras) the

Cameroonian/Cameroonian-based partners to discuss details of the Year 2 project activities in Korup NP (Annex 4.4 – photos).

Peter Wrege of CU trained six KRCS members in June 2013 on the deployment and maintenance of the acoustic monitoring grid in Korup NP as per the partnership's agreement and developed the deployment protocol (fulfilling two of milestones for the project's 1<sup>st</sup> outcome indicator; Annex 4.5).

The planned indicator of having incorporated acoustic monitoring as a both a wildlife monitoring and an anti-poaching evaluation/design mechanism in the Korup NP Management Plan by end of the project's year 1 was not fulfilled as the park's management plan has not been revised yet as originally foreseen. Such delays in management plan revisions have been observed in the past for Cameroonian protected areas and are not within the means of the project to affect their timing (but we are in close communication with PSMNR-SWR/MINFOF about this so that we fulfil this indicator milestone in Year 2 as the revision gets finalized).

The collaboration between KRCS and PSMNR-SWR was formalized with the signing of a Terms of Reference between the two, stating that the former is responsible for coordinating the project impact monitoring surveys (households / hunters / bushmeat prices / tourist satisfaction) co-funded by the Darwin Initiative project funds and PSMNR-SWR (Annex 4.6).

Finally, even from this first year of the project, we have managed to expand our collaboration network with a) the inclusion of a sociologist from University of Alberta (Courtney Hughes) who lead the training of village animators for the village surveys and will contribute to the analysis of the survey results, and b) the agreement with SAVE Wildlife (a German NGO) to add an extra acoustic sensor in farmland near to our Korup NP acoustic grid to monitor elephant movements in the area and serve as an additional control site for the impact of our park anti-poaching activities.

### **3. Project Progress**

#### **3.1 Progress in carrying out project activities**

The Year 1 timetable included activities for each of the three project outputs, with the emphasis being on the first two. The most critical activities scheduled towards Output 1 were the establishment of an acoustic monitoring grid (consisting of 12 autonomous recording units – ARUs) in the study area (Activity 1.1) and the collection of baseline data on the current hunting intensity and wildlife activity patterns in KNP from both the acoustic grid and monthly surveys of four 5km long transects (Activity 1.2). Both of these activities commenced as per the project schedule and have been continuing uninterrupted.

Specifically, the acoustic monitoring grid was established by CU's Peter Wrege and the 5-member KRCS team in early June 2013 and data have been successfully retrieved three times already at three month intervals (September 2013, December 2013, March 2014) and the sensor batteries replaced. Five additional sensors provided by CU were deployed for the first six months on a trial basis (to test a new CU-custom designed ARU model which would run using fewer batteries). They were removed in early 2014 as they did not record data for the anticipated duration, and are currently undergoing testing in Cameroon for possible reintegration in the ARU grid in Year 2. However, in early February 2014 two new sensors (of the same make/model as the 12 DI-acquired ones) were deployed in neighbouring Rumpi Hills Forest Reserve using additional funds secured by the Lead organization (WildCRU/OU). These two extra ARUs are a welcome addition as they expand our overall monitoring area. As they were placed in areas with reportedly similar hunting pressure and at a comparable distance from villages/local towns-bushmeat markets, they will provide additional control data to interpret the broader impact of the Year 2 anti-poaching patrol strategies in Korup NP's core area.

The monthly surveys of the four permanent 5-km transects have been continuing without any challenges. The data are collated and forwarded to JMU's Joshua Linder monthly and a preliminary analysis of the first nine months' data can be seen in Annex 4.7.

Activity 1.3 involved the development of species-specific detection algorithms and the calibration of the ARUs by calculating the effective detection range of ARUs for wildlife/gunshots. Progress on development of detection algorithms has been good but delayed because sufficient volume of acoustic data was not available until Q3. Although still being

evaluated, quite successful detectors have been designed for the red-capped managabey (*Cercocebus torquatus*), and the white-nosed (*Cercopithecus nictitans*), mona (*C. mona*), and crowned (*C. pogonias*) guenons. A detector for chimpanzee 'pant-hoot' calls has been designed using a call library based on recordings in Gabon, but has yet to be verified for Korup chimpanzees because of a scarcity of calls in the sound data analysed so far. Detectors for two other important conservation species, Preuss's red colobus (*Procolobus preussi*) and drill (*Mandrillus leucophaeus*), remain to be developed due to an absence of sufficient model calls to train the detectors. The table in Annex 4.8 summarizes the current progress towards this activity for each species. With the exception of Preuss's colobus, drill, and chimpanzee, working detectors for the Korup primates will be running on sound data in the first half of Year 2. We remain confident that with additional data collected in the field and from the sensors detection algorithms for the other three primates can be developed. Establishing the detection ranges for target primates depends on direct observation of calling individuals by the survey team at numerous distances from acoustic sensors. This dataset is slow to accumulate in part due to now resolved problems with GPS units in Q2 and relatively rare encounters with calling groups. Importantly, the detection algorithms for gunshots and elephants were already available from previous acoustic monitoring work of CU/Peter Wrege in Gabon, and were successfully tested and further improved using Korup NP acoustic data. Preliminary analysis of gunshot hunting intensity for the first 6 months of the acoustic data can be seen in Annex 4.9. In December 2013 control gunshots were made within the core of the study area by a Korup NP game guard (Annex 4.10) under the supervision of KRCS's Orume Robinson and the project coordinator Christos Astaras and with the permission of the park conservator. The effective detection range of the ARUs for gunshots is approximately 1 km but we will require the completion of all Year 1 data analysis (months 7-9 collected in March 2014 and 10-12 to be collected in early June 2014) in order to robustly determine the effective detection range for gunshots. Additional control gunshots are scheduled in the rainy season.

As explained earlier in Section 2, Activity 1.4 (inclusion of the project's anti-poaching design and assessment protocol in the KNP management plan) has been delayed as the Korup NP management plan has not yet been revised. We remain in contact with the project partners PSMNR-SWR/MINFOF so that this is achieved when the revision goes ahead (anticipated in 2014).

Since the Year 1 acoustic monitoring data will not be collected from the ARU grid and analysed until the end of Year2-Q1, the Activity 1.5 scoping analysis of Year 1 baseline gun hunting and wildlife activity will be completed by Year2-Q2 rather than Year2-Q1. Preliminary analysis of the gun hunting activity for the first six months has been undertaken (Annex 4.9) and the Year 1 game guard cybertracker anti-poaching patrol data secured via MINFOF/PSMNR-SWR. The quarterly delay in Activity 1.5 scoping analysis of Year 1 baseline activity patterns naturally affects the activity's second element as well – the development of optimal algorithms for deployment of game-guards in cooperation with Dr Niki Trigoni (OU).

Year 1 activities towards the project's Output 2 involved the conduct of surveys of bushmeat prices (Activity 2.1), level of local hunters' involvement in hunting (Activity 2.2), bushmeat use by households in three different villages around the core study area (Activity 2.3) and the monitoring of tourist satisfaction from visiting Korup NP (Activity 2.4). As explained in the half-year report, there was an initial delay in the on start of the surveys as human resources were prioritized in Year 1-Q1 towards the essential for the project timely deployment of the acoustic monitoring grid in Korup NP (which proved to be more demanding in resources in April-May 2013 period than originally anticipated). This meant that the on start of the surveys was postponed until after the heaviest periods of the rainy season when travel of village animators and survey coordinators for the training sessions would be easier/safer. The twice-monthly collection of bushmeat prices in Mundemba town by KRCS members commenced in October 2013 after some initial testing (September) and negotiation period with bushmeat bulk-sellers in the town. Their collaboration has been since then secured and the data collected in a timely manner. Annex 4.11 contains the final data collection forms developed after the initial trial period. The training of the village animators was eventually undertaken in early December 2013 under the supervision of project coordinator Christos Astaras and the sociologist from University of Alberta Courtney Hughes. Household and Hunter survey protocols were developed in collaboration with the village animators and survey coordinators (Annex 4.12) and tested in the village of Ikondokondo before being finalized. The household survey forms were

designed to use primarily icons and to require minimal writing skills (as little as just drawing simple lines to count units of food instead of writing numbers) in order to account for the low levels of literacy among middle-aged women in the three rural surveyed villages. Moreover, following the advice of the project partner PSMNR-SWR, one of the villages (Erat) that was originally planned to be surveyed was replaced by the nearby village of Ekon I (same ethnic group and distance from core study area and Nigerian's border) as there are anticipated PSMNR-SWR development activities in Erat for Year 2/3 that would have confounded interpretation of the survey data and the impact on bushmeat use in the surveyed villages due to the project activities in the park. The first 2-month intensive survey of household meals (10 HHs in three villages) was held in the dry season (January-February 2014) with the first rainy season baseline data to be collected in June/July 2014. Monthly hunter surveys have been conducted for 10 hunters in the same three villages since January 2014. The total number of tourist satisfaction surveys is very small until now reflecting the low tourist levels in Korup NP in the rainy season (and overall low tourism levels in the area overall in recent years). The tourist satisfaction surveys developed by the project are the first ever to monitor expectations (pre-visit) and actual experience (post-visit) of visitors in the park and it will be adopted by KRCS beyond the completion of the project. In summary, the Output 2 activities are all ongoing smoothly and the survey protocols established, following the initial delay compared to the original schedule.

The only activity of Output 3 (Activity 3.1) scheduled for Year1 was the launch of the project website. The decision was made to host the website (at reduced cost and for improved visibility) within Oxford University's server. However, soon after the decision was made, the entire website of WildCRU (Lead organization) was transferred to a new service provider/host. The transfer has taken longer than anticipated during which period the Website pages of WildCRU could not be updated (and new pages could not be added). The IT team of WildCRU/Department of Zoology assure us that the hand over to the new service provider is almost complete, leading us to believe that the project's website could be up and accessible by the general public by the end of May or early June at the latest.

### **3.2 Progress towards project outputs**

We are currently at a relatively early stage in the project to have achieved the indicators of the project's three outputs (majority expected to be achieved in Year 2; see comments on the technical related delays on setting the project website in previous section – Indicator 3.1), but there has been significant progress towards all three of the outputs and we are confident that they will be achieved by the project close in 2016. We have all the elements of the acoustic monitoring grid in place and are currently analysing the year 1 data and developing the anti-poaching evaluation and design protocol as per schedule. In November/December of Year 2 we will be organizing a training workshop of Korup NP game guards and management staff as planned (Indicator 1.2). The preliminary analysis of the gun hunting pressure in Korup NP (Annex 4.9) is already giving us unprecedented insight on the intensity and spatiotemporal distribution of hunting activity in the core of the park, and all of planned socioeconomic surveys on the role of bushmeat in local livelihoods are ongoing (after an initial delay in starting them as described in section 3.1). Indicator 2.2 will probably be pushed towards the first half of year 3 in order to have two complete years of data from the surveys, but this will not affect the overall timing of achieving output 2. Towards output 3, there has been already significant progress in raising awareness about the potential of the project's anti-poaching protocol to improve evaluation and design of Central African rainforests among international donor organizations, which is an important step towards achieving output 3. Specifically, our partnership was successful in securing funds (informal confirmation to that effect received from USFWS in mid-April 2014) to expand the acoustic monitoring network and anti-poaching protocol in another protected area in Cameroon (Rumpi Hills Forest Reserve, in the broader Korup region), with the intend of generating the baseline information on hunting and wildlife activities needed to establish an anti-poaching strategy in this protected area. Moreover, the same organization is interested in introducing our project's anti-poaching protocol in a third protected area in Cameroon where the SMART system is already in place. We are in early stages of discussion, but feel that the interest on the new anti-poaching protocol will quickly increase following the anticipated release of the first year data analysis, as indeed it provides unprecedented level of unbiased field-based evidence on levels of hunting in the monitored areas.

Importantly, we remain confident that the three Output level assumptions of our project remain true. All the DI-funded ARUs worked without problems in Year 1. We did have to replace a weather-proof container for one sensor as a rodent had cut a small hole in it that could compromise the sensor, but that level of damage can be expected in any equipment left in the forest for months at a time. Moreover, this external damage – though sufficient to warrant replacement of the external container – was only the first level of defence against the elements (the sensor’s internal casing is also weatherproof). One of the CU sensors that were field tested in the study area – deployed in addition to the ones funded by DI – was destroyed by a hunter, which is a reminder that the risk of vandalism is a real one. It emphasizes for us the importance of placing the sensors away from known hunting trails (the damaged one was on an elephant trail which apparently was also used by hunters). We also remain careful as to who knows the exact location of the sensors. We anticipate the issue of vandalism to remain a low to moderate level risk. In terms of assumption 2, the development of species-specific detection algorithms, we are making good progress in that field and remain confident that all species will have a detection algorithm detected in the near future. Finally, the three surveyed villages (Ekon I, Ikondokondo and Ngenye) have been very receptive of the project’s work in their communities and the support extends not only to participating households, but also the traditional councils of these villages. We do not anticipate any problems as to their continued participation in the project.

### **3.3 Progress towards the project Purpose/Outcome**

We remain satisfied both that the indicators set during the project application phase remain relevant for monitoring progress towards achieving the project outcome and that we are on track with achieving the project outcome by end of year 3. As described in Section 3.1, the year 1 activities have progressed well and we have trained the KRCS team in the deployment and maintenance of the acoustic monitoring grid and are working on completing the species-specific detection algorithms and detection ranges as the final data from the year 1 baseline monitoring is to come in (early June 2014) – the first of the outcome indicator 1 milestones.

In terms of indicator 2 milestones, with the fourth quarterly collection of acoustic monitoring data in June, we will have collected – as per schedule – an entire year of baseline data prior to increasing anti-poaching patrol effort in the core of the study area. Similarly, another indicator milestone is the collection of baseline data on the price of livestock and wild meat prices in the region, which is as planned happening twice-monthly.

In terms of the third outcome indicator, we are equally progressing well with all the scheduled baseline data from household, hunter, and tourist surveys being collected regularly as per schedule (see section 3.1 for later than originally scheduled on start date of these surveys).

Finally, the outcome level assumptions of the project remain true. Tensions in the Nigeria-Cameroon border region remain limited to the far north of the country (where Boko Haram and other militant groups are active across the border) and does not affect at all the distant, culturally/ethnically/religiously different rainforest zone to the south. We have no evidence from MINFOF/Korup NP management that novel hunting technologies are used in the park, and the German-Cameroon collaboration programme (PSMNR-SWR – partner to the DI project) remains strong.

### **3.4 Goal/ Impact: achievement of positive impact on biodiversity and poverty alleviation**

The link between sustainable management of wildlife resources and rural poverty alleviation is well understood. The dramatic new insight and spatiotemporal resolution on gun hunting intensity in Korup NP afforded by even the preliminary analysis of year 1 baseline data is already empowering the national authorities for wildlife conservation to make better use of their anti-poaching patrol resources, helping mitigate the overall bushmeat crisis in our study area at first. As the year 1 data analysis is completed, it will inform the design of the final anti-poaching patrol design and evaluation protocol (Year 2-3), empowering national conservation and wildlife management authorities with a new powerful tool to combat the bushmeat trade which – having reached crisis levels – threatens entire ecosystems as well as the food security and livelihoods of forest dependent rural populations.

The project study area may be Korup NP in Cameroon, but the goal is to roll-out the anti-poaching design and evaluation protocol to other areas. We have already secured funds to do so in Rumpi Hills Forest Reserve which has not been afforded practically any conservation protection despite its recognized high levels of floral/faunal endemism and biodiversity. By applying the acoustic monitoring and patrol design protocol in Rumpi Hills, we will provide insight on current wildlife and hunting patterns – in a robust and affordable way – that reate the momentum needed to manage the communal natural resources of the reserve, safeguarding important source populations of species that can be hunted for food or income generation in adjacent communal forests.

Beyond fostering the sustainable use of legitimate resources in park periphery, our project also provides alternative to hunting training and employment opportunities to local communities. In year 1, the project has trained in new skills (e.g. acoustic monitoring, various survey techniques) 14 locals – mostly former hunters and two more than originally foreseen – and improved the project management and high-calibre research capacity of a local NGO (our project partner KRCS). As planned, it also increased international attention to Korup NP and the broader region as a site of conservation/research as it can be seen by the USFWS confidence in investing in the roll-out of our protocol in an until recently forgotten protected area. It may be still early stages, but we are optimistic that an increased protection of Korup (and eventually other regional protected areas) will multiply the research-related benefits in the region, valuing local knowledge of wildlife for something other than hunting. Finally, our project alone may not be able to drive tourist revenue for the region, but with time the improved conservation of charismatic species in the local protected areas (combined with the commitment of the government for infrastructural improvements via an international grant) can bring change in this economic sector as well.

#### **4. Project support to the Conventions (CBD, CMS and/or CITES)**

As stated in the proposal, both the CBD (Article 7a,b “Identification and Monitoring”; Article 8k,l “In-Situ Conservation”) and the National Biodiversity Strategy and Action Plans in the region – the primary CBD implementation instrument at the national level – highlight the need for mechanisms to monitor wildlife and enforce wildlife legislation. The project outcome – an evidence-based anti-poaching decision-support system – directly contributes to fulfilling Central African countries’ objectives under these articles. Moreover, the training to be provided to Korup NP (and eventually other regional protected area) personnel contributes towards CBD Article 12a,c “Research and Training” compliance; namely the establishment of training programmes for the identification and conservation of biological diversity in developing countries, and the promotion and cooperation “in the use of scientific advances in [...] developing methods for conservation...”.

Given that a large proportion of bushmeat poached within KNP is traded in large market towns across the border in Nigeria, the project also contributes to Cameroon’s compliance objectives under CITES Article III (“Regulation of Trade in Specimens of Species Included in Appendix I”) and Article VIII a,b “Measures to Be Taken by the Parties”. The latter states that signatories should “provide for the confiscation” of and take measures to “penalize trade in, or possession” of CITES species.

At the moment, liaising with national CBD or CITES focal points has been deemed premature, as all project activities (including all anti-poaching patrols, arrests and wildlife confiscations) will occur within a protected area under the authority and by permission of the responsible ministry (MINFOF – a partner to the project). Our stated intent to contact the focal points in the project’s third year prior to the final workshop in order to identify potential participants remains true.

#### **5. Project support to poverty alleviation**

The project is working towards reducing poaching in Korup NP, therefore protecting the “source” populations of economically important species that can be sustainably and legally exploited in surrounding forest “sinks”, indirectly improving the food security and income-generating opportunities of local communities (28 villages within KNP’s 3-km peripheral zone; >40,000 people in Korup region). In doing so, the project promotes the interests of the many rural poor over the short-term benefits of the few poachers (avoiding another “tragedy of the

commons”). The data obtained from the household surveys, hunter and bushmeat price surveys will provide insight into the scale of these benefits for local communities.

Though these economic benefits are anticipated in the medium and long term, as mentioned earlier in Section 3.4, the project has already directly benefited via employment 14 local people (part-time 6; full-time 8) and offered economic benefits via occasional employment (e.g. porters, drivers, rent) to a lot more. With the expansion of the monitoring scheme via the USFWS funding in Rumpi Hills Forest Reserve, an additional 3-4 people will be employed every three months to maintain the acoustic grid. Ultimately, our goal is to generate the information required in this new protected area for the Cameroonian government (probably via funding of PSMNR-SWR) to commence at least occasional patrolling in Rumpi Hills, thus creating new employment positions in the wildlife management sector. Traditionally, game guards (or eco-guards as they are locally known) are hired from within communities in the periphery of the protected areas. This is just the beginning however, as we anticipate that our anti-poaching protocol will be rolled out in several more protected areas in the medium to long term (2-5 years frame) and not just in Korup region or Cameroon.

## **6. Monitoring, evaluation and lessons**

We are satisfied with the progress outcome and output indicators set during the design phase of the project as well as the specific milestones set for each (see sections 3.1-3.3 for more details). The milestones are incremental and easily evaluated as having been achieved or not (e.g. baseline data collection and analysis is a very pragmatic milestone for instance to monitor progress, as is training provided to local people, detection algorithms developed etc.). One of the main lessons learned from the first year of the project is that due to the volume of the data generated and the seasonally significant transportation challenges between the Korup NP headquarter (and project base) town of Mundemba and the city of Limbe where courier services are available, there have been some delays in the delivery of the data to CU for the acoustic and survey data. In the case of the acoustic data, we relied on our project partners to find reliable ways of transportation even in the peak of the rainy season (PSMNR-SWR 4x4 vehicles can pass even when public transportation means are limited). We also acquired a fast, paper-fed flat-bed scanner to digitize all the survey forms so that heavy (and expensive) stacks of papers do not have to be posted for back-up record keeping and analysis. Overall, the monitoring indicators in place are working as they correctly “flagged” areas where our milestone achievement have been postponed by a month or two.

## **7. Actions taken in response to previous reviews (if applicable)**

This is the first annual report prepared for this project and therefore there are no actions that were taken in response to previous reviews.

## **8. Other comments on progress not covered elsewhere**

As described in earlier sections, the design of the project has been strengthened with the inclusion in early February 2014 of additional two acoustic sensors in the nearby Rumpi Hills Forest Reserve. They already provide additional data on levels of gun hunting pressure in the broader Korup NP area and will serve as extra control points for interpreting gun hunting intensity and pattern changes in the central study areas when we improve anti-poaching patrol effort there in Year 2. These benefits will increase further when the entire acoustic grid in Rumpi Hills is established over this coming summer (using funds secured by our project partners from USFWS and WildCRU/Oxford funds).

## **9. Sustainability**

The interest in the improved anti-poaching evaluation and design potential afforded to protected area managers by our project has already been generating a stir among conservation community members, especially when the first preliminary analysis findings were discussed via word of mouth with colleagues. Evidence of this is the additional funds secured for the Rumpi Hills and the current discussions of possibly either assisting in the expansion or directly being involved in the establishment of a third site in Cameroon with international funds. Once the first



formal reports of our year 1 baseline data are finalized, we will intensively promote them among wildlife managers in the broader region. As per our project proposal, the exit strategy is to set up the new anti-poaching design and assessment protocol in Korup NP so that it can be completely implemented locally. Moreover, we want the capacity training provided by the project to form the foundation stone for making Korup region the test-site/hub for future research on bioacoustics and anti-poaching strategy development, maintaining local capacity on top of future developments.

## **10. Darwin Identity**

The project has always been identified among all project partners as the “Darwin Initiative” project and not as the sole initiative of any partner’s institution or as part of a larger programme. All our application material to USFWS for instance identified current project activities in Korup NP as being funded by the UK government under the DI scheme. After all, the recognition of the scheme is such that it gives instant gravitas to the project among wildlife management and conservation professionals. Within Cameroon, familiarity with the Darwin Initiative mission is typically limited to university educated members of the conservation and development sector who have at one point or another in their career considered to or applied for a DI grant or worked for a DI project. Beyond these individuals, the recognition of DI among sector professionals is limited to that of a “funding scheme”.

## 11. Project Expenditure

**Table 1 project expenditure during the reporting period (1 April 2013 – 31 March 2014)**

Project spend since last annual report	2013/14 Grant (£)	2013/14 Total actual Darwin Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs (see below)				
David W. Macdonald Project Leader				
Christos Astaras Project coordinator				
Consultancy costs				
Overhead Costs				
Travel and subsistence				The trip of Project coordinator C. Astaras was extended in Nov/Dec 2013 so that he could assist in the training workshop of the village animators/survey coordinator (organized by Courtney Hughes)
Operating Costs				
Capital items (see below)				
Hard-drive space (storage/posting data)				
Two-pairs of 2-way radios / patrol coordination				Korup management team acquired 2-way radios from other sources; we used funds to cover equipment needs that arose during Yr1 (i.e. replace a damaged GPS unit essential for our data collection, acquisition of a paper-fed scanner to backup all survey forms - saving in postage/photocopies in the long term, a digital scale for measuring bushmeat carcasses, and a laminator to protect the village survey forms)

<b>Project spend since last annual report</b>	<b>2013/14 Grant (£)</b>	<b>2013/14 Total actual Darwin Costs (£)</b>	<b>Variance %</b>	<b>Comments (please explain significant variances)</b>
Tree climbing gear				
Others (see below)				
Field supplies (torches, boots, first aid kit etc.)				We had to order a few extra screws/bolts/ferruls for hanging more securely the acoustic sensors in the trees (steel wire).
Shipping of ARUs/batteries to Cameroon				
Raven sound analysis software (UK/Cameroon)				
Website development/hosting (Cameroon)				The website was eventually decided to be hosted in the UK using the servers of Oxford University.
<b>TOTAL</b>	<b>44,596</b>	<b>44,592</b>		

**12. OPTIONAL: Outstanding achievements of your project during the reporting period (300-400 words maximum). This section may be used for publicity purposes**

I agree for the Darwin Secretariat to publish the content of this section

The preliminary analysis of our acoustic monitoring data from Korup NP has provided unprecedented insight in the spatial and temporal distribution and overall intensity of gun hunting in the heart of Korup NP – a Central African protected area benefiting from an established anti-poaching patrol strategy and a small but committed game guard team. That illegal hunting (“poaching”) was taking place in the region and inside the park is not news – hunting is ubiquitous across Central Africa. What is an outstanding achievement however is that for the first time game guards in Korup NP can have timely, field-based, unbiased information to guide their next step – and access to quality information is paramount for the success of law enforcement activities around the world. Our project not only provides this information, but it does so in an affordable way that can be rolled-out to other protected areas in the region – effectively bringing in a game-changing “ace-in-the-sleeve” in the battle against the bushmeat crisis in the Central African rainforest zone. Acoustic monitoring data may not stop triggers from being pulled, but it empowers the people who do, helping them plan their patrols and – crucially – evaluate the impact of their efforts.

## Annex 1: Report of progress and achievements against Logical Framework for Financial Year 2013-2014

Project summary	Measurable Indicators	Progress and Achievements April 2013 - March 2014	Actions required/planned for next period
<p><b>Goal/Impact</b></p> <p>The extent of the African bushmeat trade has reached crisis levels, threatening entire ecosystems as well as the food security and livelihoods of forest dependent rural populations. Protected areas are a key component in the strategy to address the crisis, and enforcement of wildlife legislation is critical to protected areas' success. By developing an improved design and evaluation of anti-poaching patrols in Central Africa, the project contributes to the <i>mitigation</i> of the bushmeat crisis overall, protecting endangered biodiversity, fostering the sustainable use of legitimate resources in park periphery, and generating alternative training and employment opportunities to hunting.</p>		<p>Our project has provided unprecedented insight on the spatiotemporal gun hunting activity in one of the most biodiverse protected areas in Central Africa, paving the way for developing an evidence-based anti-poaching design and evaluation protocol that can realistically empower resource limited authorities to mitigate the impact of the bushmeat crisis.</p>	
<p><b>Purpose/Outcome</b></p> <p>Poaching in Central Africa imperils wildlife, is illegal and undermines the sustainability of local livelihoods while legitimising a corrupted attitude between people and protected areas. The project uses robust but innovative technology, centred on acoustic monitoring, to design, implement and evaluate anti-poaching strategies, leading to the development of a novel decision-support system to be rolled out across Central Africa. Developed first for Korup NP (Cameroon), this evidence-based anti-poaching protocol is intended to efficiently protect wildlife source populations within protected areas, while laying the foundation for sustainable forest uses, and thus increased food security, job opportunities, and – ultimately – poverty alleviation.</p>	<ul style="list-style-type: none"> <li>• By year 3, KNP management maintains an acoustic monitoring grid which it actively uses to collect and analyze data on spatiotemporal patterns of gun hunting and wildlife activity, in order to design adaptively its anti-poaching patrols.</li> <li>• Gun hunting pressure is significantly reduced in monitored areas within KNP during year 2 compared to baseline data collected in year 1. The reduction is higher in the core area of KNP (-30%) where the new anti-poaching regime will be tested, compared to monitored control-sites in the periphery of the core (-15%) and near farms (<math>\pm</math> no change).</li> <li>• Korup's charismatic and endangered species are better protected in the core of the park, increasing the region's potential to generate sustainable benefits for local stakeholders from their protection through research and tourism employment opportunities.</li> </ul>	<p>In this first year we have established the data collection grid that continuously monitors wildlife and gun hunting activity in the study area (and control locations) in Korup NP that will serve as the baseline information needed to design anti-poaching strategies in year 2 and to evaluate their effectiveness of the current status quo. We have also established the surveys (bushmeat prices, tourist satisfaction, household and hunter) that will permit us to gauge at the broader impact of our anti-poaching design and evaluation protocol. The success of our project will be judged in part by the "export" of our experiences from Korup NP to other protected areas and this is already happening, having secured funds to establish a new monitoring grid in the nearby forest reserve of Rumpi Hills.</p>	<p>The main activities for Year 2 is to finalize the analysis/reporting of the Year 1 baseline data (12<sup>th</sup> month of acoustic grid data to be obtained in early June), finalize the detection algorithms for wild primate calls in our data, to assist in the planning of increased anti-poaching patrols in our study area using Year 1 data, and to train members of the Korup NP management team in the maintenance and deployment of the acoustic monitoring grid in the park and the analysis of the collected data.</p>

Project summary	Measurable Indicators	Progress and Achievements April 2013 - March 2014	Actions required/planned for next period
<p><b>Output 1.</b></p> <p>KNP staff are trained and able to implement the new anti-poaching evaluation and design protocol (year 2/3).</p>	<ol style="list-style-type: none"> <li>1. The new anti-poaching protocol is approved by MINFOF and included in the new KNP management plan (year 2).</li> <li>2. A group of 8 KNP game guards is trained in setting and maintaining the ARU grid in the field, while 4 KNP management staff are trained in analysing the acoustic monitoring data (year 2).</li> <li>3. First anti-poaching report using acoustic monitoring data collected and analyzed by KNP staff is submitted to PSMNR-SWR/MINFOF (year 3).</li> </ol>	<ol style="list-style-type: none"> <li>1. This remains an appropriate indicator. The review of the KNP management plan has been delayed but is anticipated to be completed in Y2. We are in touch with our partners MINFOF/PSMNR-SWR to ensure that the inclusion of the new anti-poaching protocol is considered for inclusion in the new plan.</li> <li>2. In year 1 we trained the KRCS members than have been running the acoustic grid. By the end of Year 2 we anticipate to have trained a number of Korup NP team members so that the park can adopt the acoustic grid in Year 3. Given that the goal of this project is for the Korup NP management team to be able to run this monitoring scheme on its own after the completion of the DI project, this indicator remains an important one.</li> <li>3. This indicator will follow the successful achievement of indicators 1 and 2.</li> </ol>	
<p>Activity 1.1 Acoustic monitoring grid (12 ARUs) and line transect network established in KNP; KRCS members trained</p>		<p>This activity has been completed. The acoustic monitoring grid was set by CU's Peter Wrege in early June 2014 and it was been running without problems since then. In year 2 the grid will continue to collect field data on gun hunting and wildlife activity data.</p>	
<p>Activity 1.2 Collection of ARU and line transect data on gun hunting intensity and wildlife activity patterns in KNP</p>		<p>The collection of ARU (acoustic) and line transect data (monthly) started as per the original schedule and is continuing to do so smoothly. The monitoring grid will continue in year 2 as planned.</p>	
<p>Activity 1.3 Species-specific detection algorithms developed; detection range of ARUs for wildlife calls/gunshots determined</p>		<p>We have improved the automatic detection algorithms for gun shots and elephant rumbles, and developed new ones for three of the most vocal primate species in Korup (<i>Cercocebus torquatus</i>, <i>Cercopithecus mona</i>, <i>C. pogonias</i> and <i>C. nictitans</i>). As we collect additional data from the acoustic sensors, we will have additional training calls from our field site to develop detection algorithms for all species. We anticipate this effort, along with the estimation of their effective detection range, to continue for the better half of year 2.</p>	
<p>Activity 1.4 Inclusion of novel anti-poaching protocol in the KNP Management Plan</p>		<p>The KNP management plan has not been revised in 2013 as originally planned, so this activity has not been completed. We are in touch with the responsible authorities via our partners and will be pursuing this in year 2.</p>	
<p>Activity 1.5 Scoping analysis of year 1 baseline gun hunting/wildlife activity data completed; development of optimal algorithms for deployment of game guards (cooperation with Dr Niki Trigoni)</p>		<p>As the completion of 12 months' worth of baseline data will be completed with the 4<sup>th</sup> maintenance trip in early June 2014, we have not yet collected all year 1 data and consequently not finished the scoping analysis. We have however completed preliminary analysis of the first 6 months and month 6-9 data are being analysed now. We have secured the cybertracker data of the year 1 anti-poaching patrols and together with our acoustic data analysis we will be developing the optimal algorithms for patrolling with the cooperation of Dr Niki Trigoni in year 2.</p>	

Project summary	Measurable Indicators	Progress and Achievements April 2013 - March 2014	Actions required/planned for next period
Activity 1.6 Development of anti-poaching patrol design and evaluation protocol; posted on project website		The completion of this activity is dependent on 1.5 being completed. So there has been no progress in this one in year 1. It is anticipated near the end of year 2.	
Activity 1.7 Acoustic monitoring data analysis centre established in Mundemba		In year 2 we will be training members of the Korup NP management team in the analysis of the acoustic data. During this time a data analysis lab will be set up most likely in the Korup NP headquarters.	
Activity 1.8 Train 8 KNP staff in maintaining the ARU grid and 4 on analysing and interpreting the acoustic data (end year 2).		Now that the acoustic monitoring grid is set up and running, it is a year 2 planned activity to train members of the Korup NP management team in its maintenance and analysis of its data to inform anti-poaching patrol design (and evaluation!).	
Activity 1.9 KNP staff fully absorb maintenance, data collection and data analysis tasks from project staff		This is an activity that will be undertaken following 1.8 and in year 3.	
<p><b>Output 2.</b> Poaching patterns within KNP are understood so as to be effectively combated with available resources, affording wildlife in the park's core area (at least) a markedly higher level of protection (year2/3).</p>	<ol style="list-style-type: none"> <li>1. Report submitted to MINFOF presenting gun hunting and wildlife activity pattern changes between year 1 and year 2 (24 months; 12 ARUs + 4 line transects + hunter interviews) (year 3).</li> <li>2. Report submitted to MINFOF presenting the findings of the socioeconomic surveys on the role of bushmeat in the livelihoods (food/income) of local communities (year 1-2 data; 3 villages) (year2).</li> <li>3. Peer-reviewed manuscript on the efficacy of anti-poaching patrols to combat hunting pressure within protected area is accepted for publication (year 3).</li> </ol>	<ol style="list-style-type: none"> <li>1. This remains an appropriate indicator for this output and it can only be achieved once the year 2 data have been collected and analysed (so beginning of Y3). In the meantime, however, we will have completed and prepared a report for the findings on gun hunting patterns in Korup NP in year 1.</li> <li>2. As above, this indicator is relevant but requires completing the analysis if year 2 data.</li> <li>3. We are already working with our partners on preparing a peer-reviewed manuscript on the use of acoustic sensors to monitor the level of gun hunting pressure within a PA. We will prepare a second manuscript as per the indicator's description near the end of the project once the year1-2 data have been both analysed.</li> </ol>	
Activity 2.1 Bushmeat price surveys undertaken		As with all the surveys, there was an original delay in the on start of the data collection face, but since October 2013 twice-monthly data are collected from bushmeat bulk sellers, local eateries and markets on the price of bushmeat and regular meat. These surveys will continue throughout the duration of the project.	
Activity 2.2 Hunter surveys undertaken (level of involvement in hunting)		The surveys have started and are taking place monthly in three villages. They will continue throughout the remaining period of the project.	
Activity 2.3 Household socioeconomic surveys undertaken (bushmeat use/value)		The dry season 2-month intensive household surveys were conducted in Jan-Feb 2014 in three villages. In June-July the 2-month intensive rainy season surveys will be conducted.	
Activity 2.4 Tourist satisfaction surveys undertaken		The tourist satisfaction surveys are and will continue to be collected. Their data has not been analysed yet as the number of tourist visitors has been small.	

Project summary	Measurable Indicators	Progress and Achievements April 2013 - March 2014	Actions required/planned for next period
Activity 2.5 Project report on the scoping analysis of year 1 survey data (household/hunter/tourist) on the baseline local use/value of important conservation and bushmeat species and poaching patterns			Once the second 2-month intensive survey of households is completed, we will complete the analysis of the baseline data and prepare the project report.
Activity 2.6 Analysis of year 1-2 data; project report on the effect of increased KNP anti-poaching initiatives on gun hunting pressure, wildlife activity, and local use/benefits from hunted species (submitted to MINFOF).			This activity can only be undertaken in Year 2 once the analysis of year1-2 data has been completed.
Activity 2.7 Peer reviewed paper submitted			We are currently working on the preparation of a first peer-reviewed publication that will focus on the insight into bushmeat hunting that the use of acoustic monitoring afford (and what that insight is). We anticipate to submit the paper by Y2-Q2. A second peer-reviewed manuscript is anticipated in year 3 once the anti-poaching patrol design and evaluation protocol has been developed.
<p><b>Output 3.</b></p> <p>The need to critically examine current anti-poaching design and evaluation strategies in Central African rainforests is recognized by key government agencies and conservationists in Cameroon, Gabon, Equatorial Guinea, Central African Republic, Congo-Brazzaville, DR Congo.</p>	<ol style="list-style-type: none"> <li>1. Project website is developed and used as a communication forum for sharing the project findings with conservation practitioners (field protocols, data analysis protocols, project reports and publications). Material posted in English and French (year 1-3).</li> <li>2. A workshop providing theoretical introduction to and practical training on acoustic monitoring and anti-poaching patrol design and evaluation techniques is held in Mundemba for 20 Central African conservationists (year 3).</li> <li>3. Project partners are invited to advise management teams of protected areas wishing to incorporate the new anti-poaching protocol/acoustic monitoring in their area (2 PAs; year 3).</li> </ol>		<ol style="list-style-type: none"> <li>1. In the beginning of the project we made the decision to host the project website within WildCRU's (OU) server. A late 2013 migration of Website content to a new provider meant that content could not be updated during the transition period. The transition is finalized soon and anticipate that the website will eb up by end of May 2014 or early June.</li> <li>2. The workshop will be organized in year 3.</li> <li>3. We have already secured funds from USFWS (informed unofficially about this in mid-April) to roll-out the acoustic monitoring (and eventually the anti-poaching patrol design and evaluation protocol) in the currently poorly managed Rumpi Hills Forest Reserve in the broader Korup region. We have been also involved in discussions about assisting with the establishment of the acoustic monitoring scheme in a third protected area in Cameroon where the SMART management mechanism is in place, to examine how the two can be integrated. So, there is already significant progress towards this indicator.</li> </ol>
Activity 3.1 Launch project website			As mentioned above, the project website is expected to be publicly available by May/June 2014.
Activity 3.2 Upload year 1/year 2 summary reports to website / translated			The preliminary analysis of the year 1 baseline data (acoustic, lien transects, surveys) have not yet been completed. They will be put in the project website in the following months.



Project summary	Measurable Indicators	Progress and Achievements April 2013 - March 2014	Actions required/planned for next period
Activity 3.3 Decide on dates/content of final workshop; circulate flyer among C. African conservation community		We are too early of a stage in the project to have decided on actual dates for the year 3 final workshop.	
Activity 3.4 Select workshop members; make necessary travel arrangements for international participants		As mentioned above, the final workshop will be held in year 3 so these activities will be scheduled for the final months of year 2.	
Activity 3.5 Hold workshop in Mundemba		This is a year 3 activity.	
Activity 3.6 Select most promising sites for exporting the anti-poaching protocol; formalize cooperation with project partners involved		We have already secured funds to roll-out the acoustic monitoring element of our work in Rumpi Hills Forest Reserve and will be always looking for additional sites where the final anti-poaching patrol and evaluation protocol can be established.	
Activity 3.7 Provide follow up support for the establishment of pilot studies in at least two new protected areas.		An acoustic grid will be established in 2014 summer in Rumpi Hills Forest Reserve and we are in discussions of assisting with its establishment in a second site beyond Korup NP. The long-term legacy of the project depends on the adoption of our anti-poaching protocol throughout Central Africa, so this is an important activity (outcome indicator).	

## Annex 2 Project's full current logframe

Project summary	Measurable Indicators
<p><b>Goal/Impact</b></p> <p>The extent of the African bushmeat trade has reached crisis levels, threatening entire ecosystems as well as the food security and livelihoods of forest dependent rural populations. Protected areas are a key component in the strategy to address the crisis, and enforcement of wildlife legislation is critical to protected areas' success. By developing an improved design and evaluation of anti-poaching patrols in Central Africa, the project contributes to the <i>mitigation</i> of the bushmeat crisis overall, protecting endangered biodiversity, fostering the sustainable use of legitimate resources in park periphery, and generating alternative training and employment opportunities to hunting.</p>	
<p><b>Purpose/Outcome</b></p> <p>Poaching in Central Africa imperils wildlife, is illegal and undermines the sustainability of local livelihoods while legitimising a corrupted attitude between people and protected areas. The project uses robust but innovative technology, centred on acoustic monitoring, to design, implement and evaluate anti-poaching strategies, leading to the development of a novel decision-support system to be rolled out across Central Africa. Developed first for Korup NP (Cameroon), this evidence-based anti-poaching protocol is intended to efficiently protect wildlife source populations within protected areas, while laying the foundation for sustainable forest uses, and thus increased food security, job opportunities, and – ultimately – poverty alleviation.</p>	<ul style="list-style-type: none"> <li>• By year 3, KNP management maintains an acoustic monitoring grid which it actively uses to collect and analyze data on spatiotemporal patterns of gun hunting and wildlife activity, in order to design adaptively its anti-poaching patrols.</li> <li>• Gun hunting pressure is significantly reduced in monitored areas within KNP during year 2 compared to baseline data collected in year 1. The reduction is higher in the core area of KNP (-30%) where the new anti-poaching regime will be tested, compared to monitored control-sites in the periphery of the core (-15%) and near farms (± no change).</li> <li>• Korup's charismatic and endangered species are better protected in the core of the park, increasing the region's potential to generate sustainable benefits for local stakeholders from their protection through research and tourism employment opportunities.</li> </ul>
<p><b>Output 1.</b></p> <p>KNP staff are trained and able to implement the new anti-poaching evaluation and design protocol (year 2/3).</p>	<ol style="list-style-type: none"> <li>1. The new anti-poaching protocol is approved by MINFOF and included in the new KNP management plan (year 2).</li> <li>2. A group of 8 KNP game guards is trained in setting and maintaining the ARU grid in the field, while 4 KNP management staff are trained in analysing the acoustic monitoring data (year 2).</li> <li>3. First anti-poaching report using acoustic monitoring data collected and analyzed by KNP staff is submitted to PSMNR-SWR/MINFOF (year 3).</li> </ol>
<p>Activity 1.1 Acoustic monitoring grid (12 ARUs) and line transect network established in KNP; KRCS members trained</p>	
<p>Activity 1.2 Collection of ARU and line transect data on gun hunting intensity and wildlife activity patterns in KNP</p>	
<p>Activity 1.3 Species-specific detection algorithms developed; detection range of ARUs for wildlife calls/gunshots determined</p>	
<p>Activity 1.4 Inclusion of novel anti-poaching protocol in the KNP Management Plan</p>	
<p>Activity 1.5 Scoping analysis of year 1 baseline gun hunting/wildlife activity data completed; development of optimal algorithms for deployment of game guards (cooperation with Dr Niki Trigoni)</p>	

Activity 1.6 Development of anti-poaching patrol design and evaluation protocol; posted on project website	
Activity 1.7 Acoustic monitoring data analysis centre established in Mundemba	
Activity 1.8 Train 8 KNP staff in maintaining the ARU grid and 4 on analysing and interpreting the acoustic data (end year 2).	
Activity 1.9 KNP staff fully absorb maintenance, data collection and data analysis tasks from project staff	
<p><b>Output 2.</b> Poaching patterns within KNP are understood so as to be effectively combated with available resources, affording wildlife in the park's core area (at least) a markedly higher level of protection (year2/3).</p>	<ol style="list-style-type: none"> <li>1. Report submitted to MINFOF presenting gun hunting and wildlife activity pattern changes between year 1 and year 2 (24 months; 12 ARUs + 4 line transects + hunter interviews) (year 3).</li> <li>2. Report submitted to MINFOF presenting the findings of the socioeconomic surveys on the role of bushmeat in the livelihoods (food/income) of local communities (year 1-2 data; 3 villages) (year2).</li> <li>3. Peer-reviewed manuscript on the efficacy of anti-poaching patrols to combat hunting pressure within protected area is accepted for publication (year 3).</li> </ol>
Activity 2.1 Bushmeat price surveys undertaken	
Activity 2.2 Hunter surveys undertaken (level of involvement in hunting)	
Activity 2.3 Household socioeconomic surveys undertaken (bushmeat use/value)	
Activity 2.4 Tourist satisfaction surveys undertaken	
Activity 2.5 Project report on the scoping analysis of year 1 survey data (household/hunter/tourist) on the baseline local use/value of important conservation and bushmeat species and poaching patterns	
Activity 2.6 Analysis of year 1-2 data; project report on the effect of increased KNP anti-poaching initiatives on gun hunting pressure, wildlife activity, and local use/benefits from hunted species (submitted to MINFOF).	
Activity 2.7 Peer reviewed paper submitted	
<p><b>Output 3.</b> The need to critically examine current anti-poaching design and evaluation strategies in Central African rainforests is recognized by key government agencies and conservationists in Cameroon, Gabon, Equatorial Guinea, Central African Republic, Congo-Brazzaville, DR Congo.</p>	<p>Project website is developed and used as a communication forum for sharing the project findings with conservation practitioners (field protocols, data analysis protocols, project reports and publications). Material posted in English and French (year 1-3).</p> <p>A workshop providing theoretical introduction to and practical training on acoustic monitoring and anti-poaching patrol design and evaluation techniques is held in Mundemba for 20 Central African conservationists (year 3).</p> <p>Project partners are invited to advise management teams of protected areas wishing to incorporate the new anti-poaching protocol/acoustic monitoring in their area (2 PAs; year 3).</p>
Activity 3.1 Launch project website	

Activity 3.2 Upload year 1/year 2 summary reports to website / translated
Activity 3.3 Decide on dates/content of final workshop; circulate flyer among C. African conservation community
Activity 3.4 Select workshop members; make necessary travel arrangements for international participants
Activity 3.5 Hold workshop in Mundemba
Activity 3.6 Select most promising sites for exporting the anti-poaching protocol; formalize cooperation with project partners involved
Activity 3.7 Provide follow up support for the establishment of pilot studies in at least two new protected areas.

## Annex 3 Standard Measures

**Table 1 Project Standard Output Measures**

Code No.	Description	Year 1 Total	Year 2 Total	Year 3 Total	Year 4 Total	Total to date	Number planned for reporting period	Total planned during the project
6A	Training of KRCS and Korup NP staff in the deployment and maintenance of acoustic monitoring grid (6 in 1 week/Y1 + 8 in 1 week in Y2); training of KRCS members as survey coordinators and animators (4 in 1 week/Y1); training of KRCS and Korup NP staff in acoustic data analysis (4 in 1 week/Y2); training of workshop attendants in acoustic grid design and use of ensuing data (15 in 1/2 week/Y3).	10						37
6B	See comment above – most training per person is for a week	10						30
7	Manual detailing the field protocol for setting, maintaining and extracting data from the ARU grid (created by CU); Manual detailing the data analysis protocol for ARU grid data (created by CU); Anti-poaching design and evaluation protocol (to be presented to Y3 workshop participants).	1						3
8	Project leader (Prof. David Macdonald) and project coordinator (Christos Astaras)	5						15
11A	One paper presenting the research and conservation potential of the new protocol (Y2) and one reporting on the overall findings of the project (Y30)							2
11B	as above							2
12A	Acoustic monitoring data collected from Korup NP (Y2/3)							1
14A	Year 3 final workshop for 20 Central African protected area management professionals							1
15C	Darwin Initiative newsletter article							1
17A	Network of people interested in the use of our anti-poaching design and evaluation protocol for use in PA management (based on the project website)							1

<b>Code No.</b>	<b>Description</b>	<b>Year 1 Total</b>	<b>Year 2 Total</b>	<b>Year 3 Total</b>	<b>Year 4 Total</b>	<b>Total to date</b>	<b>Number planned for reporting period</b>	<b>Total planned during the project</b>
20	Acoustic grid sensors for Korup NP (including SD cards), computer for data analysis at Korup NP HQ in Mundemba, laptops (2), tree climbing gear, software for acoustic analysis, flatbed paper-fed scanner, GPS units	£7,790						£8,570
23	Acoustic data analysis lab at Korup NP HQ in Mundemba							1

**Table 2 Publications**

<b>Type</b> (eg journals, manual, CDs)	<b>Detail</b> (title, author, year)	<b>Publishers</b> (name, city)	<b>Available from</b> (eg contact address, website)	<b>Cost £</b>
Manual	"Acoustic Monitoring Project – Korup N.P. SM2/UHP Co-deployment Instructions", Wrege P.H., Griffiths E.T., Powers M.E., Kingensmith A., Allen P.E., Ross J.C., 2013	The Cornell Lab of Ornithology		free

## Checklist for submission

	Check
<b>Is the report less than 10MB?</b> If so, please email to <a href="mailto:Darwin-Projects@ltsi.co.uk">Darwin-Projects@ltsi.co.uk</a> putting the project number in the Subject line.	✓
<b>Is your report more than 10MB?</b> If so, please discuss with <a href="mailto:Darwin-Projects@ltsi.co.uk">Darwin-Projects@ltsi.co.uk</a> about the best way to deliver the report, putting the project number in the Subject line.	n/a
<b>Have you included means of verification?</b> You need not submit every project document, but the main outputs and a selection of the others would strengthen the report.	✓
<b>Do you have hard copies of material you want to submit with the report?</b> If so, please make this clear in the covering email and ensure all material is marked with the project number.	n/a
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.	