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Darwin Initiative for the Survival of Species

Final Report

Darwin Project Information

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Project title	Capacity Building for Monitoring and Managing the Bushmeat Trade in Gabon
Country	Gabon
UK Contractor	Department of Biological and Environmental Sciences, University of Stirling
Partner Organisation (s)	Direction de la Faune et Chasse, Ministère de Eaux et Forêts ; CIRMF ; USTM ; ENEF
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Project Background/Rationale

The project is being undertaken in Gabon, Central Africa. It aims to help the government of Gabon to manage the trade in wild animal meat (bushmeat) in order to preserve wildlife populations and wild meat resources for rural people. Sustainable management will require prohibition of hunting of some species and quota harvesting of others, whether this be done through management of geographically defined hunting zones, closed and open seasons and/or protected species lists.

The Darwin project was built on research commissioned by the Gabonese Wildlife and Forestry department (*Direction de la Faune et Chasse, 'DFC'*) and carried out in Gabon, from 2000 to 2003, by a team of researchers from this Ministry, the *Station d'Etudes des Gorilles et Chimpanzés* (SEGC) and other NGO minor partners *(Aventures sans Frontières, Vétérinaires sans Frontières,* World Wildlife Fund). SEGC is a biological field research station staffed by the Gabonese research institute '*Centre International de Recherches Médicales de Franceville*' (CIRMF) with support from the NGO 'The Wildlife Conservation Society Gabon'. In addition to the project's primary partners; the *Direction de la Faune* and the Universities in Gabon, both CIRMF and WCS Gabon are partners of the University of Stirling on the current project.

The original research, and subsequent management guidance, was commissioned as part of a larger government review of all wildlife laws, initiated in 2001 and still in progress today. The laws pertaining to bushmeat management, together with a Strategy statement (*Stratégie Nationale sur la Viande de Brousse*), developed by the *Direction de la Faune*, we hope will form the basis for good governance of the bushmeat resource and wildlife populations in general, as Gabon moves to promote rural development through ecotourism. Between 2000 and 2003, prior to Darwin Initiative involvement, the project (referred to by national partners as **'*Projet Gibier*')** had a purely research focus, designed to elucidate the size of Gabon's bushmeat harvest and trade, the socio-economic status of hunters and consumers, the availability and cost of alternative proteins or sources of cash, the geographic location of trade venues and transport routes and the status of wildlife populations being harvested (the latter in collaboration with concurrent projects on wildlife population distribution and protected area evaluations in Gabon (WCS & DFC, 2002).

The results of this research phase, showed clearly that the current harvest and trade are unsustainable for most wildlife species. However, certain species, notably rodents and small antelopes may be candidates for sustainable harvest under strict controls. The socio-economic status of villagers in Gabon puts about 10% of the nation in a position of gaining some economic benefit from wildmeat, usually for its cash value rather than as a source of protein, though some families are still protein dependent on bush meat (Starkey, 2005). The vast majority of the population uses bushmeat as a luxury commodity, for which high prices may be paid, but which is eaten infrequently (Wilkie *et al*., 2005; Starkey, 2005). Wildlife populations in Gabon are generally declining (Walsh & White, 1999; Walsh *et al*., 2001, DFC 2002; Walsh *et al*., 2003; SOF, 2006) and measures to protect them are imperative if they are to persist, either for their intrinsic value or as a meat resource for the future.

Political will in Gabon is to curb the current harvest and trade to sustainable levels, rather than to eliminate use of bushmeat (DFC, 2002). The cultural significance of hunting to

now-urban families, combined with the current economic status of at least some villagers prohibits a ban on hunting at this point in time, however, the unsustainability of present practice and the ensuing imminent loss of the resource to families who are nutritionally dependent on it, is a serious issue that the government has shown willing to address (DFC, 2002).

The pressing problem in 2003 was that the government lacked the know-how to ensure sustainability of the harvest. They required advice on legal and economic levers that could be used to change practices and they lacked biological information on wildlife populations. They required a monitoring programme to evaluate the efficiency of their management strategy and practice, and they required increased capacity amongst their staff to design and implement effective adaptive management for the future. In addition, they needed public awareness of the issue to increase such that management actions could be accepted and understood (especially when these are likely to be repressive of current practice).

The research phase of *Projet Gibier* produced a first national database on the dynamics of both the national bushmeat trade and household consumption patterns, together with some research into the forces driving the trade and the plight of particularly vulnerable species (Walsh et al., 2003; Wilkie et al., 2005; Schenck et al., 2006) After both the research phase and the ratification of the *Stratégie Nationale Viande de Brousse* (included in **Appendix** VI) were completed in 2003, there was a consultation between *Projet Gibier* research staff (Drs Kate Abernethy and Malcolm Starkey), the *Directeur de la Faune* (M. Adrien Noungou) and the staff members directly responsible for hunting policy (*Chef de Service de la Chasse* and *Point Focale Viande de Brousse*, who were respectively M. Daniel Idiata and Mlle. Ernestine Ntsame Effa. A need was identified for *a)* a monitoring strategy for bushmeat trade in order to identify geographic regions or species in particular need of management adjustments, *b)* development of a legal framework and good management practices for a future sustainable harvest *c)* an evaluation process to ensure good governance of the resource for the long term. These global objectives formed the basis of the current project, for which it was agreed to apply for funding from the Darwin Initiative through Dr Abernethy's host institution the University of Stirling.

Project Summary

Purpose

The original project purpose was to enhance the capacity of the Gabonese government to manage the bushmeat trade to maximise long-term wildlife survival, as well as the sustainability of local traditional livelihoods. Four major outputs were intended:

- Nation-wide data on the volume, economics and geographic distribution of the bushmeat trade available to policy makers.
- Training module for undergraduate Biology students established
- Policy oriented training relevant to managing the bushmeat trade completed by ENEF students
- Research results communicated to policy makers and public.

Modifications

Neither the original purpose nor outputs have been significantly modified during the grant life, however, one aspect of the final output – communication of research results to a cross-institutional government forum on monitoring, management and law enforcement could not happen during the original grant dates.

Addressing of CBD articles
The project addressed CBD articles with all of its activities, in particular, articles **6** *(General Measures for Conservation & Sustainable Use)*, **7** (*Identification and Monitoring)*, **10** (*Sustainable Use of Components of Biological Diversity*), **12** (*Research and Training*) and **13** (*Public Education and Awareness*) were covered, thus working well within the remit of the Darwin Initiative.

Fulfilment of objectives

The project's objectives were largely fulfilled, and the overall purpose of the project was fulfilled, however, there were inevitably some slippages from the intended timetable of detailed activities and achievements that were planned in 2002. The only significant, and the most frustrating, slippage for the project team has been the continued delay in the cross-institutional meeting of national entities with responsibility for wildlife law enforcement and wildlife or environmental management. This meeting should have been a forum for presentation of the project research findings and monitoring success at the project's end, and the venue for the bushmeat consumption and trade monitoring committee to gain a broader mandate from national government than its primary existence within the *Direction de la Faune*. Though planned and agreed by the Ministry of Water and Forests for July 2006, the meeting has been pushed back on three successive occasions, due to unavailability of civil servants during national independence celebrations (August 2006) or campaigning for legislative elections (November 2006) or awaiting the announcement of a new government (proposed for January 2007). Although the project suffered some similar slippage in late 2005 during preparations for presidential elections, we managed to catch up most of the lost time on governance activities in the project during 2006. However, this final slippage has come at the end of the project life and cannot be recovered within the Darwin timeframe. The cross-institutional meeting will now take place in April 2007, with additional funds from other donors over and above the Darwin preparative funds (see Ministry letters, **Appendix VII**). We now hope to report the meeting results to Darwin, as an exceptional report in mid-2007, rather than yet further delay this final project report.

Staffing

Throughout the three years, project staff have been a mix of University of Stirling staff, Darwin funded local staff and trainees, and Gabonese government staff (both DFC and University). The project has remained collaborative between institutions throughout and the data and training provided through Darwin have in the majority been used directly in moving towards the new political and legal framework for sustainable harvesting. This new framework is not yet implemented, as it is part of a much larger legal reform for forestry and wildlife in Gabon, which is proving a lengthy process. However, the project has provided the data, expertise and training required to *a)* guide the hunting

management law reform towards sustainability *b)* provide staff within both government and NGO's capable of installing and monitoring the success of the new system *c)* provide direct training and training modules at University level, such that future management staff may be capable of managing and evaluating a sustainable harvest. Thus we have ensured, as best we could on a three-year platform, that once the new management system is implemented, it will be based on good principle and thus may be successful in the long term.

Scientific, Training, and Technical Assessment

Research

Background

Projet Gibier set out to establish a monitoring framework for the bushmeat trade on a national level. This was done in 3 phases. The first phase was largely accomplished prior to the onset of the Darwin funds. Staff from the SEGC research station and the DFC had been monitoring bushmeat markets in Gabon from 2000-2003 in order to determine the way trade took place. This initial database comprises a survey of all towns in the country to establish the location of fixed, regular market stalls, infrequent '*ad hoc*' trade and those towns or villages with a door-to-door trade. Most of the regular market stalls were then monitored full-time for 3 years, to establish daily and monthly patterns in trading hours and trade volume. Data were taken on the place, time, volume and price of each sale, together with the species, cut and state of the meat (fresh, ageing, frozen, smoked etc), and all biological data possible: age/sex of the animal and any other relevant notes. If possible, the method by which the animal had been killed was noted, but this was not always possible.

In parallel to the market studies, *Projet Gibier* was funded by the US National Science Foundation (NSF) to collect data on the socio-economic circumstances of family homes in Libreville and the rest of the country, spread between market towns and rural villages. These data were analysed in early 2004 (Wilkie *et al.*, 2005) to look at the socio-economic spread captured by the sample and the range of consumption patterns, in order to plan a resample that would allow analysis of trends in bushmeat consumption both over time and in the case of locally changing economic circumstances.

Aims of the Darwin Project research effort

The Darwin project aimed to continue monitoring the sale and consumption of bushmeat in Gabon, within local, socio-economic context, at a sufficient level of precision and accuracy to determine trends and eventual responses to management actions.

Methods

The team began by developing statistically robust sampling plans to allow monitoring of both market trade in and consumption of bushmeat, alongside the socio-economic circumstances that are the driving forces for commerce and consumption patterns. Within a particular socio-economic setting (i.e. 'small, rural towns'), communities whose access

to the bushmeat resource was likely to change over the next few years, in response to either direct management actions, or the effects of the continuing uncontrolled over-harvest, were particularly targeted.

We chose

a) The national capital, which houses 75% of the nation's human population and is thus the most important place to achieve management of market and consumption patterns. Here bushmeat accounts for only 1-3% of meals, on average. Trade and consumption monitored.

b) Four provincial capitals (large market towns), where fixed bushmeat markets operate under the surveillance of the town 'Mairie'. These are the places where management interventions will be both most easily introduced, and most public. Here bushmeat is consumed more often. Trade and consumption monitored.

c) Four small rural towns where markets are variable and bushmeat sales often occur door-to-door, or from hunting by family members as well as in some fixed places. Bushmeat forms a large part of the protein intake. Consumption only monitored as markets are too informal to follow (or eventually manage).

d) Four areas of villages, where markets are informal, impossible to monitor and bushmeat can be the major of source dietary protein. Consumption only monitored as markets are too informal to follow (or eventually manage).

The location of our monitoring sites is shown in Figure 1, below.

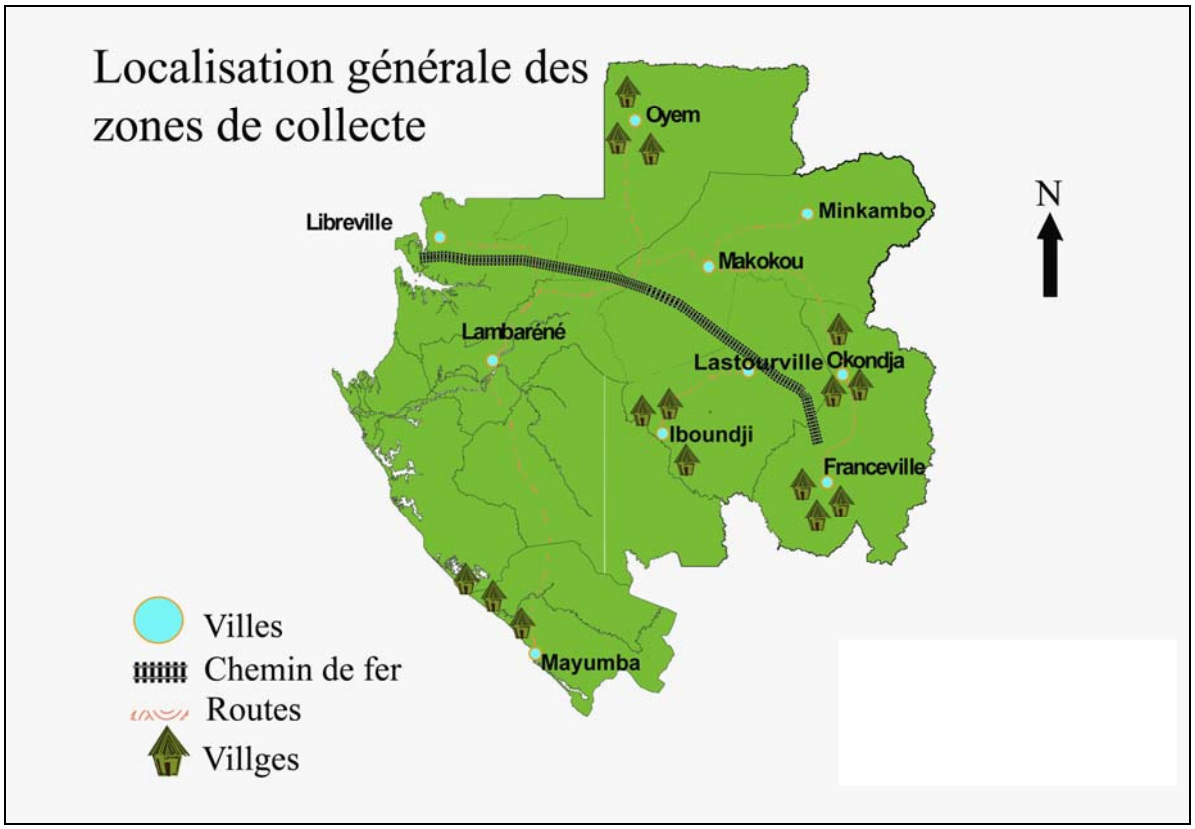

Figure 1: Research Localities

The existing 3-year market and socio-economic databases derived by the Ministry-supported research project (2000-2003) was used to empirically test various sampling strategies and optimise both the balance between accuracy and precision. The final plan was then optimised for cost-effectiveness, allowing us to monitor the widest possible geographic and socio-economic spread of markets and communities, with sufficient precision and accuracy to make defensible statements about trends over a 3-5 year time frame.

Market monitoring

For markets, we used a bootstrap re-sampling procedure (sampling with replacement of our original data) to model a variety of scenarios that were logistically realistic (*i.e.* weeks and blocks of weeks) and then estimated the probability of being able to detect a given percentage change from the real data using a basic parametric test (*e.g.* a t-test) to compare the two values. We did this for 1) daily biomass of all bushmeat traded, 2) average price, 3) daily biomass of individual species for a given market. We then set our parameters as a 90% probability of detecting a 20% change in volume or price, which estimated the necessary number of months to sample per market in the survey design. These parameters were decided as the minimum, statistically-acceptable probability (least number of days) and the maximum percentage change that we could allow to pass without reaction. i.e. changes of less than 20% would not necessarily de detected and therefore may not be 'managed'. Twenty percent is quite a large change, but smaller changes require very intensive sampling and are statistically still very difficult to prove, without trends over long time-frames, so we felt that our effort was optimized at 20% change detection. It was necessary/desirable to use a bootstrap method rather than an analytical parametric method to estimate required sampling intensity, since there were a large number of zero values *i.e.* data was not truly normally distributed, especially in smaller markets or for rare species (in fact it fitted a negative binomial model very well, as did the consumption data). The number of days required to detect the 20% change at 90% probability for most individual species (everything except *C. monticola* (Blue duiker) and *A. atherurus* (Brush-tailed porcupines) was so high in most markets that we decided management goals would better be served by sampling for overall volume, which would at least give us sufficient resolution to make decisions for species groups (eg 'red duikers', 'primates').

The most efficient sampling plan, allowing robust comparisons of market volume, proved to be a set of 16 random weeks spread through the period to be sampled. This performs almost as well as the best scenario of 120 random days, which is logistically unviable. Where markets show no seasonality, a set period of 6 months continuous sampling again provides an equivalent probability of replicating the results from a continuous year and is logistically more efficient than the 16 random weeks, so this strategy was used in the bigger markets where large catchments suppress any seasonality. The best strategy for each market differs, dependent also on the variability in market volume, which tends to be highest in smaller, rural markets than in the more stable urban areas with large geographic catchments and higher numbers of supply hunters and traders.

Dependent on the logistical difficulty of travelling to the market from a base (Libreville or Franceville), even random weeks proved unviable in terms of costs andtravel time. These markets were sampled in random month-long blocks instead of random individual weeks. Markets sampled in month-long blocks were sampled for a longer total period than those sampled in week-long blocks (20-24 weeks, as opposed to 16)

The data collection calendar was established for 2004-2005 in the markets of Libreville (Mont Bouet: MBT), Franceville (FCV), Okondja (OKJ), Lambarene (LMB), Makokou (MAK) and Oyem(OYM). At the end of each sampling period, a random number table was used to generate the next market to be sampled. Data entry periods were added as dictated by administrative load, public holidays and personal needs of staff. The data collection calendar is in Appendix VIII

This sampling plan represented a compromise between logistical reality and best statistical power from the sample (best independence of data points). We carried out the monitoring throughout the planned period. Although certain small changes were inevitably made in this sampling programme, the required sample was collected in each target market over the sampling period, with the exception of Mont Bouet. This Libreville market became too politically sensitive to work in toward the end of the sampling period, however, as it is also the largest market, the volume of data required to detect change over the sampled period should be sufficient.

Socio-economic research

For household consumption, the monitoring plan was a sample of 3000 homes covering a) the capital city (500), b) the provincial capitals in which market monitoring was taking place, c) rural, small towns in different areas and d) rural villages. The sample included a repeat sub-sample of 750 homes in 5 pre-stratified socio-economic classes (pre-chosen homes, based on location and house type) in each of urban (500:Libreville) and rural market town (250) settings. The sample size was chosen after analysis of the spread of socio-economic circumstances captured by an original sample of 1208 households surveyed in 2003 .The detailed methods of that original survey were used for the repeat, in order to ensure comparable datasets and can be found for reference published in Conservation Biology (Wilkie et al., 2005; Appendix IX). In addition, the training manuel "*Instructions for Socio-economic Surveys of Bushmeat Consumption Patterns, Gabon 2005*" is also included in **Appendix** IX of this report. It was estimated that a repeat every 2 years would suffice for comparisons of active trends in family consumption patterns related to wealth changes (if any were observed). This will be refuted or confirmed by analysis of the trends 2003-2005 and the second resample, currently scheduled for 2007, may be adjusted as appropriate.

The socio-economic surveys require about 3-4 months of work for a team of 8 surveyors (4 core team members and 4 short term staff) trained for the sampling period as an in-service training exercise. Each household requires 2 visits; an introductory and planning visit and a survey visit. Each visit requires 2 surveyors (ideally a man and a woman) and has a duration of about 20 minutes. With travel time included, as well as lost time for broken rendezvous, the two-man teams could complete about 4 preparatory calls and 4 interviews per day in towns (where travel times between houses were longer) and about 8-10 interviews per day in villages where preparatory explanations could often be given to several families at once.

Surveys were carried out using the core team members, trained in 2003 for socio-economic survey and recipients of in-service training within *Projet Gibier* in 2004 in various aspects of data-entry, analysis and other project activities. Each core team member was partnered with a newly recruited and trained team member. New surveyors were recruited from participants in the university teaching courses in the summer following their second year of a science degree (BAC+2 level of education). A sample report from a survey trainee is included in Appendix XVII.

Socio-economic surveys in 2005 were carried out thus:

Location type	Location	Data collection start	sample size
Capital city	Libreville	March 2005	504 (from 12 different quarters of the city)
Provincial capital	Franceville	April-May 2005	344
	Oyem	April-May 2005	250
	Lambaréné	April 2005	250
Rural small town	Iboundji	April 2005	178
	Mayumba	May-June 2005	161
	Okondja	May 2005	120
	Mékambo	April 2005	267
Rural villages	Villages around Oyem	May 2005	244
	Villages in Haut Ogooué	May 2005	157
	Villages around Iboundji	May 2005	56
	Villages around Mayumba	June 2005	94
	Villages around Okondja	May 2005	140

Standardisation of data

In two areas, the raw data was insufficient for analyses comparing activity in different time frames or geographic areas, as measures were non standard between markets and families. Two key areas required independently generated correction factors to be applied to standardise data. These were:

1) converting volumes of meat to standard weights i.e., where animals were sold as whole individuals, rather than by weight, to use an average weight for each age/sex class to standardise meat price both geographically and over time.
2) Converting consumption amounts by different family members to proportions of the consumption expected for an adult male (Adult Male Equivalent proportions).

Standard animal weights were taken wherever possible from field measures in Gabon – either from live captured animals, or from direct weighing of sample

animals in bushmeat seizures, or from work with marketers and hunters. Where no weight could be measured directly, average weights were taken from the literature – either from species descriptions, field guides or hunting records.

Standard Adult Male Equivalents were taken from James & Schofield (1990).

Database development

The raw data were entered into the *Microsoft Access* database template developed during the initial 3 year research project (see sample in **Appendix** IX). The data were usually entered by the survey team member who collected them, and verified by a different member. Although on occasion another member of the team from the person whom collected the data made the initial data entry, verification was never done by either the original data collector or the data typist, in order to avoid missing errors through familiarity with the data.

Once entered, raw data were linked to tables containing standardisation figures (average weights, AME's etc.) and to tables containing information on generalities of the data collection: (location, market opening times and size, etc, surveyors, and survey periods).

Analyses and write-up

Analyses of the data have then been undertaken by different people, depending on research or management aim. Essentially the project has not provided analysis itself, only at the request of third party managers. Of these, the most critical 'information demander' is hoped will be the Gabonese government in its various management guises – DFC, Ministry of Environment, Ministry of Interior, Min of Justice, local authorities or village hunter associations and thereafter NGO pressure groups, scientists, forestry companies, other private land managers and students.

The most consequential analyses that *Projet Gibier* has been asked for have been those leading to the scientific publications

- Walsh et al., 2003. Catastrophic ape decline in West Central Africa. *Nature* 422: 611-613
- Wilkie, D.S., Starkey, M.P., Abernethy, K.A., Ntsame Effa, E., Telfer, P & Godoy, R. 2005. Role of prices and wealth in consumer demand for bushmeat in Gabon. Conservation Biology (19)1-7.
- David S. Wilkie, Malcolm Starkey, Elizabeth L. Bennett, Kate Abernethy, Roger Fotso, Fiona Maisels, and Paul Elkan. 2006. Can taxation contribute to sustainable management of the bushmeat trade?: evidence from Gabon and Cameroon. *Journal of International Wildlife Law* and Policy (9) 1-15.
- Schenck, M. Ntsame Effa, E. Starkey, M.P., Wilkie D.S., Abernethy, K.A., Telfer, P.T., Godoy, R. & Treves, A. 2006. Why people eat bushmeat: results from two-choice taste tests in Gabon, Central Africa. *Journal of Human Ecology* (45) 1-13.

Of these, the Wilkie et al, 2006 paper was analysed in the Darwin Framework, the other papers used data collected prior to Darwin involvement, though they were published under the Darwin tenure of the project. These publications are included in Appendices III and XVIII.

Training activities:

Academic teaching opportunities offered by the project

The project was able to offer two taught courses to students as well as project supervision opportunities. The classroom/field courses were designed to introduce environmental management students to the concept of adaptive management and the database tools available to store and analyse data in a long-term management situation. Throughout the courses the bushmeat issue was used as a case study for discussion, to enable students to see first-hand application of the techniques to a current problem in their country. Other current, Gabonese environmental management issues were also raised (monitoring of wildlife populations for disease, control of forestry and mining operations, development of ecotourism opportunities etc.). The two academic training courses are outlined below, and teaching materials are available in Appendix XI.

1) Short Introductory course in data-basing and adaptive management principles.

This 2-day immersion course in *MSExcel and MSAccess,* with ancillary discussions around the bushmeat issue and environmental management in general, aimed to expose students to the concepts of adaptive management, to raise their awareness of environmental management situations to which the techniques could be applied and to demonstrate data-basing tools available to managers. Demonstration material for course work was taken from the national bushmeat database

At USTM this course was offered in late February or March each year and aimed to prepare and pre-select students to attend the second, week-long field course in adaptive management at Lopé CEDAMM. The course was offered as an extra-curricular weekend, thus non-obligatory, open to all second-year students in the *Biologie-Chimie* degree course at USTM. It was generally attended by 80% of the course students (40-60 people, depending on the year. Darwin teaching staff were Dr Malcolm Starkey, Mr Olivier Hymas, Mr Freddy Makiloutila and Mr Guy Roger Tesse (WCS Gabon). Two invited talks per year were also given by appropriate researchers and managers working in Gabon (Dr Kathryn Jeffery, M. Lauren Coad,

At ENEF the course was offered in the summer months and available to all students on the *Ingénieure des Techniques des Eaux et Forêts* course (equivalent to a BSc in Wildlife Management degree). The ENEF teaching programme did not allow for a residential follow-up course to be offered, however, student project supervision was possible and student projects on bushmeat management were mentored by the *Projet Gibier* teaching team during August-September each year (see example project report (DESS level) and talk (MSc level) in Appendix XII).

Photos of the course are included in Appendix XVI.

2. Residential one-week course in adaptive management for environmental conservation.

The second academic training opportunity was a week-long follow up course, held after the 2-day immersion course. This was offered over the Easter break in April as a residential course at the Lopé National Park *Centre Educatif Dr. Alphonse Mackanga Missandzou* (CEDAMM). This course was available to 12 students, selected through an evaluation of performance on the initial immersion course (both coursework quality and overall assessment by the teaching staff). All attendance was extra-curricular.

During the week, students received training in use of *MSExcel and MSAccess* to create databases, manage environmental information and perform simple analyses to guide management decisions or evaluate trends. In addition to technical computer training, students used the library and internet to research environmental topics. They read, evaluated and cited biological research papers to justify theoretical management decisions and presented their management strategies and justifications to the group as 15-minute *Powerpoint* presentations at the end of the course. A sample of the presentations is included in Appendix XIII. The week also included several field excursions to Lopé National Park (photos in Appendix XVI).

As the course was extra-curricular, it was not formally marked or passed/failed. Each student was given a written assessment of their performance on the course and their written report and *Powerpoint* presentation as a personal aid to improvement.

Both the academic training courses followed on from earlier Darwin Initiative-funded courses in Conservation Biology, offered through project 10—xxx-xxx where the University of Cardiff partnered with the USTM to offer teaching in conservation biology (see project report 08/044). This earlier association with Darwin had pre-identified USTM staff keen to initiate teaching in Conservation Biology, but as neither external teaching staff, nor course materials in the current project were the same as those for the 1999-2002 course, the obligatory 2-year extracurricular teaching rule was still required for the current teaching activities.

3. Student dissertation projects

Student projects were supervised at several levels through the three years of the project.

A) Master's level dissertations.: 3 students
B) DESS level dissertations: 3 students
C) BSc level dissertations: 3 students

Capacity building activities:

In our 2004 report (AR1), the project had already identified a need to change our approach to our first capacity building activity; the training of trainers :

"The project has achieved its objectives for the period, with the one exception of the 'training of trainers' workshops, proposed for late 2003, early 2004. These workshops have been in part replaced by integrating permanent University staff to the teaching team

on the student training courses and providing them with training materials for self-help later, however, we have found that in general, capacity within the existing institutional staff is not sufficient for them to benefit from technical training in database creation and use. The subject requires reasonably advanced levels of computer skills, which existing older staff simply do not have, due to lack of opportunity earlier in their careers. Very few of them are motivated to learn these skills late in their career, though they have been more than willing to support the specialist trainers provided by the project to come into their classrooms to teach. We are working with the institutions to identify ways of ensuring long term survival of database teaching within the biology curricula and we currently feel that investment in training students, followed by supporting specialist positions for new junior staff will be the best way forward. If successful, at the end of the 3 year project, we will have succeeded in training some junior staff during their student days, and supporting the institutions to provide them with posts (aid in grant getting, encouraging staff restructuring to encourage junior technical posts, and support to staff in reporting and budgeting to self-finance these positions), thus achieving the 'training of trainers' goal.

"At present the most serious threat to the project's success is the lack of capacity in the current Direction de la Faune to logically focus on, take and implement management decisions. They are vastly understaffed, and even the existing staff has poor training in the scientific and technical skills required to use the research that is undertaken. The highest academic qualification held by the staff of the current Direction de la Faune is lower than a Master's degree and most decision makers finished their technical training over 10 years ago."

- **In-service training in computing for the DFC senior staff**

  The *Directeur de la Faune*, M. Adrien Noungou, the *Chef de Service de la Chasse*, M. Daniel Idiata Mambounga, the *Chef de Service de Faune/Point Focale Grands Singes,* M. Joseph Maroga, *the Point Focale Viande de Brousse* (both Ernestine Effa Ntsame, 2003-2005, and Anne Marie Ndong Obiang, 2005+), and the senior *Secrétaire de la DFC.* were trained in general computer use, MSOffice programmes and Internet use, including set up of 'Yahoo' email addresses.

- **In-service training in use of MSAccess and the *Projet Gibier* database for the DFC staff and USTM staff.**

  Daniel Idiata Mambounga (Head of the Hunting Sservice), Ernestine Ntsame Effa and Anne-Marie Ndong Obiang (Bushmeat point persons), Adrien Noungou(Director of the Wildlife and Hunting Department), Jean Tondangoye (Head of the Mobile Anti-poaching Unit) and Dr Christiane Atteke (course organizer for USTM Biologie-Chemistry degree course)

  Were all given training in the information the database stores, appropriate use of the information, using the database to generate automatic reports and formulating queries such that the database manager can extract information for their use.

- **Production of teaching aids for USTM and ENEF staff to,enable future teaching of adaptive management course at Lope CEDAMM.**

The teaching staff of the USTM Biology degree courses participated in the two training courses (both the 2 day USTM course and the week-long residential course at Lopé CEDAMM). This enabled them to observe, participate in and discuss on-site, the teaching that was given. In years 1& 2 of the project, the courses were taught entirely by project staff, with assistance from USTM and CEDAMM staff. In Year 3, the CEDAMM staff was given a more major role, in the hope that future teaching can be provided by a mixture of CEDAMM and USTM staff. USTM staff will ensure student recruitment/selection and course organisation, CEDAMM and USTM staff will jointly ensure teaching. Funding is to be jointly sought, and in the first year post-Darwin, CIRMF and WCS Gabon staff (in country partners) will provide help with grant writing and financial management.

ENEF staff organised and assisted with teaching the module at ENEF.

Both the university level courses have a teaching pack, which is available to teaching staff on demand from the project staff, from the USTM participating staff. The teaching notes for both courses were revised annually after staff and student feedback and are included in Appendix XI.

Support for postgraduate level education in Conservation Biology for key DFC staff members

During the project lifetime, three key government staff from the *Direction de la Faune et Chasse* and two non-civil service project members were aided to follow postgraduate courses in wildlife management and use the *Projet Gibier* databases and adaptive management concepts in their dissertations. It is very hard to measure the impact of capacity building of this kind, and certainly impossible to do in a 3-year time frame, but we feel strongly that increased academic capacity in the filed of wildlife biology and conservation will have strong impacts on the country's course in the future. Spreading efforts and capacity between government and electorate will help to ensure balance in policy making in the future.

- Ernestine Ntsame Effa followed a DEA course in Environmental Management at University de la Sorbonne, Paris VI, 2004- 5. Dissertation title: '*Management of the Bushmeat Industry in Gabon'*
- Daniel Idiata Mambounga followed a Masters in Wildlife management at Laval University, Quebec, 2005-7. Dissertation: *Elephant conservation in Gabon*'
- Natacha Abiaga Ona followed a Diploma in Ecology and English at University of East Anglia, and then a Masters in Applied Ecology and Conservation, also at UEA. Dissertation title: *Development of a National Conservation Strategy for Mandrills in Gabon.*
- Freddy Makiloutila began an *Ingénieure de Conception* degree (Masters Equivalent) at ENEF in 2005 and will finish in 2008. His first year dissertation was '*Reduced impact logging in Gabon'*
- Edmond Gervais Peindi began a DESS course in Environmental Management and Environmental Impact assessment at ENEF in 2005. He will finish in 2007. Dissertation title: *Commercialisation of bushmeat in the markets of*

Franceville and Libreville'

***Projet Gibier* in-service training for NGO staff in socio-economic survey and market survey methods, environmental education techniques, database use, governance issues.**

- Training in socio-economic survey methods was provided to project staff for 2 full time weeks each year of the project. Courses were taught by staff from CIRMF, DFC, WCS and Boston College, USA.
- Five project staff (4 core members and DFC liaison officer) were invited, fully-funded participants on a Missouri Botanic Garden organised conference on preparing data and reports for government and techniques for lobbying for change, at Limbe Botanic gardens in Cameroon in November 2005.
- Kevin Ndong followed 6 months of part-time (2 days per week) training in Graphic programmes and creation of public awareness media during 2004. This training has enabled him to produce publicity materials for the project, and to go on to further employment in conservation beyond the project life.
- Stevens Touladjan was given supplementary training in mathematics to support his participation in the socio-economic training, data entry and in analysis demonstration sessions
- Ernestine Ntsame Effa received supplementary training in English to enable her to be more influential in her role as the country representative at CITES bushmeat working group meetings in the region. She also received supplementary training in statistics to be able to better assess information from the scientific literature, and to be able to appreciate the need for robust data collection techniques and to assess the validity of analysis of the national database.
- Freddy Makiloutila and Guy Roger Tesse received a month (*pro-rata*) of in-house training on Database creation (as opposed to the basic data-entry and database-use training given to all staff).
- The entire team received a 1-day training on *MS Powerpoint* use and presentation techniques in 2004, refreshed in 2005 and 2006.

4. Project Impacts

The overall purpose of the project was to enhance the government's capacity to manage the bushmeat trade. The achievements have undoubtedly brought the government of Gabon closer to their goal of long-term, sustainable management. Concrete evidence for this is in :

- The establishment and regular update of a national database on trade and consumption,
- The ability of most of the members of the Wildlife Department to consult this database
- The consultation of the database by non-government organisations and the willingness of the government to allow this.

- The existence of a group of appropriately trained staff and managers who can continue to update this database
- The existence of 2 University training modules that will identify and encourage junior staff apt for specialised training and allow the DFC to staff the project for the long term.
- The establishment of a monitoring committee within the Direction de la Faune, taking responsibility for the issue and reporting the government's progress on the issue internationally (naming of a 'Point focal' for Bushmeat) and payment for this person's attendance at CITES, BCTF,ZSL and other international meetings on the subject. Although this post was created prior to Projet Gibier, the ability of Projet Gibier to support this person's meeting attendances with data and presentation organisation has greatly encouraged the Department to support international dissemination of results.
- The organisation of a cross-institutional meeting on the subject that will establish accountability between government departments for performance on wildlife law enforcement.

- **To what extent has the project achieved its purpose, i.e. how has it helped the host country to meet its obligations under the Biodiversity Convention (CBD), or what indication is there that it is likely to do so in the future?**

Gabon has not yet ensured protection of the species endangered by the present bushmeat trade, yet it has made considerable progress toward that goal. In that, the project has achieved its goal.

As a result of the project, the host institution, the *Direction de la Faune et Chasse* holds a national database capable of providing correct information on the current state of bushmeat consumption and trade (Article 6 & 7), such that management policies can be correctly directed. It will be able to use this database to revise and improve the '*Strategie National Viande de Brousse'* – its national action plan for bushmeat harvest and trade. It has been able to lobby successfully, using these data, to bring other government institutional partners to the table to account for their role, and their success, in wildlife law enforcement (Article 10). It has been able to establish adaptive management courses in the two higher education institutions educating environmental managers (Article 12) and it has undertaken a first public awareness campaign (Article 13) vis-à-vis the general public, in preparation for reforms.

- **If there were training or capacity building elements to the project, to what extent has this improved local capacity to further biodiversity work in the host country and what is the evidence for this?**

There were two parts to the training element of this project. One involved highly practical, professional training for specific tasks related to researching, monitoring and managing the bushmeat trade in the short term. These were aimed at project staff and government professionals, both in the Wildlife Department Hunting department, and policy sector. The second string aimed to improve general capacity for the sort of adaptive management we are encouraging for the bushmeat trade, but which could be equally applicable to management of other areas of biodiversity conservation. This training was provided in two ways: firstly, through a classic classroom and field course format, uptaken by undergraduate students in the Université des Sciences et Techniques de Masuku (USTM) and the Ecole Nationale des Eaux et Forêts (ENEF); and secondly, through academic supervision of a small number of undergraduate and post graduate student projects.

In Gabon, higher education opportunities are few in Biology, Ecology or conservation and related areas. The Science University, USTM, a partner on the project, provides a 2 year course in Biology and Chemistry or Biology and Geology, but this course does not reach degree level. In the French academic system, each year of higher education has final exams and is recognised as an educational gain, even if it does not result in a qualification. Thus a student is recognised as having a "Baccalaureate, plus 2 years" (Bac+2) level, even if they have not reached the degree level. In Gabon, biology education is not available beyond Bac +2 at the university. The Forestry school provides a 3 year course: *Ingénieure de Techniques* (BAC +3), but this is of lower academic level than University study. The Forestry school also provides a further qualification equivalent to a Masters: *Ingénieure de Conception*, which is a (BAC+5) level degree.

The following table shows the fate of the 40 students who received the residential adaptive management training courses funded by the Darwin Initiative at Lopé and those who were mentored through dissertation projects, both postgraduate and undergraduate. One hundred and ninety-eight undergraduate students took up the short immersion course in MSAccess and data-basing at USTM and ENEF but we have not tracked the fate of all.

TABLE REMOVED

- Discuss the impact of the project in terms of collaboration to date between UK and local partner. What impact has the project made on local collaboration such as improved links between Governmental and civil society groups?

This project has paved the way for a closer future link between Stirling University and the government of Gabon. A member of the Ministry Direction de la Faune et Chasse has been encouraged to apply for a doctoral studentship at Stirling with support from the School of Biological and Environmental Sciences. We hope that this will seal a strong link between Stirling and the DFC, Gabon and facilitate future knowledge transfer.

Local collaboration between conservation NGO's and the DFC has been improved by having the project focus, although it is hard to see whether these links will survive the absence of the central independent funds provided by the project. We hope that the cross-institutional meeting in 2007 will increase accountability between local partners and that that will breed future collaborations.

- **In terms of social impact, who has benefited from the project?**

The four core staff and 8 part time staff members and the DFC staff who have received extra training have personally benefited from an improved pool of schools. The non-government core members of the project have all been able to find new employment within wildlife conservation and are all earning salaries that are higher than they were at the beginning of *Projet Giber*, in recognition of their improved skills (most started post-project jobs at over 150% of their starting wage with the project in 2003).

The wider community has benefited most from the project through the instigation of the two University teaching courses; such that would-be conservation biologists and environmental managers now have a path through tertiary education which will better prepare their future careers. The proof of this is in the 5 people who have gone into

employment in conservation (12%), and the14 people who were accepted for further study (35%), out of the 40 students who received University training through this project.

We hope the project will also lead to fairer reforms of the current bushmeat trade laws which will increase sustainability of the resource and thus benefit the nation, in particular poor village communities, over the long term. However the reality of this will not become apparent for several years.

5. Project Outputs

- Project outputs are detailed as required in Appendices II and III.

Information relating to project activities has been disseminated differently. Four groups of people have received different information packages:

- 1) Students / Univeristies (database and training manual, training materials, papers)
- 2) General public (leaflets, radio and TV)
- 3) Market town populations (Earth Day stands, public presentations of data collection aims, radio broadcasts)
- 4) Government departments (posters, leaflets, meeting information pack, databases)
- We hope that dissemination of information on the topic will continue through the DFC. The government has a reasonable dissemination network through radio, TV, the one national newspaper (government controlled) its local administration buildings. This network can be accessed for little cost by the DFC. What is less clear is how printing costs can be borne. Project staff have collaborated with DFC staff to raise funds for 2007 (US FWS, private donors) and this experience we hope will enable key staff (*Point focal Bushmeat, Directeur de la Faune, Chef de service de la Chasse*) to raise funds for information campaigns in the future.

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6. Project Expenditure

UK£ (rounded to nearest £1)	***2003/2004***		***2004/2005***		***2005/2006***		Total			
	Budget	*Actual expenses*	Budget	*Actual expenses*	Budget	*Actual expenses*	Budget	***Actual expenses***	Over or under-spend	Brief note of discussions with DI secretariat.
Rents, rates, heating, lighting, cleaning, overheads										Year 3 difference balanced against increased travel costs.
Office costs e.g. postage, telephone, stationery										
Travel and subsistence										Year 3 difference balanced against lower office costs at end of project.
Printing										Printing costs for leaflets and final meeting covered by other funds due to delays in all years
Conferences, seminars etc										
Capital items:										
Insurances										Higher staff benefits due to legal changes in Gabon
Salaries										Printing savings used to cover increased staff costs in UK
TOTAL DARWIN COSTS										Project final balance is a £357 overspend (= 0.2% of total project budget)

7. Project Operation and Partnerships

- The project was worked on by all of the original national (Gabon) partners detailed in the proposal:
- *Direction de la Faune et Chasse* (DFC) – provided staff, host the database office, are hosting the cross-institutional meeting, provided logistical support
- *University Science Technique de Masuku* (USTM) – provided teaching staff, organised courses, provided teaching space and computers
- *Ecole National des Eaux et Forets* (ENEF) – provided teaching space and organised students, supported postgraduate student projects
- Only one other project was implementing activities in the field on bushmeat-related activities during the project lifetime – the project 'DABAC' of the EU. This project aimed to provide farmed cane-rats as an alternative 'bushmeat' to hunting/poaching. However, the project was not very successful as animals were only raised close to Libreville. The bushmeat market in Libreville is already a luxury market, thus relatively immune to the availability of other, cheaper proteins. Sales of raised animals were low and impacts on markets were undetectable.
- Discussions were held between project staff and the Bushmeat Crisis Task Force (Elizabeth Bennett, David Wilkie, Heather Eves), the US Fish and Wildlife Service (Richard Ruggiero), WWF Gabon (Paula Mekui), GRASP (Ian Redmond), FAO (Doug Redmond), DEFRA (David Brown), MIKE (Steve Blake) and ZSL (Lyndsay Gale) during the project life, but none of these groups instigated field activities, so collaboration was limited to discussion. Students from several universities in the US and UK also contacted the project. Most contacts revolved around requests from these groups for information and data held by the national databases. The country's biodiversity office was not collaborated with directly.
- The International partners directly involved in project activities were:
    - Wildlife Conservation Society Gabon – provided administrative and logistical support
    - *Centre International de Recherches Medicales de Franceville* – provided staff expertise, logistical support for teaching
    - University of Stirling – provided staff and administrative support
- Local partnerships, though not particularly strong, have remained active after the project's end. The cross-institutional meeting organised by the Darwin Project, but being held post-project in April 2007, will hopefully strengthen these local collaborations. The hope is that the meeting's outcome will be a network of government stakeholders in the issue, who will be much stronger in concertation than as individual actors. Private sector groups have also been approached for involvement (forestry companies, local industry) but thus far their participation is mainly dictated by their legal and political obligations. Again, the hope is that pressure on them will increase as an outcome of the April meeting.

8. Monitoring and Evaluation, Lesson learning

Monitoring and evaluation was to take place through the framework of measurable indicators and verifiable indicators outlined in the original Log frame (Appendix V). Looking at this, most indicators of success are there, and verifiable.

The only slippage has been in the governance elements of the project – the meetings of the monitoring committee that should have guided policy have not been able to take place, as the monitoring committee has remained internal to the DFC, thus influencing on ly its policy, rather than across all law enforcers. The reason for this is the series of legal reforms that have been taking place throughout the three years, which have essentially stopped most civil servants from feeling confident to make any policy changes. Our answer to this has been to continue to collect and make available the necessary data to guide policy change, to train DFC staff to use the data appropriately, to demonstrate to senior staff how the database can be used (power and limitations) and to help the DFC to bring partners to a tabled meeting and form a management network with cross institutional accountability. We hope that by putting in place this framework, the DFC will be able to a) appropriately influence the legal reform such that the new laws are well conceived 2) move swiftly ahead with policy reform, once the legal review is published.

The main problem suffered by the project was the inertia encountered in dealing with government reforms. A three-year project is just not long enough to see change, even when all is going in the right direction. Within this project, one important planned result is the change in governance we hope to bring about through the cross-institutional meeting at national government level. Though this meeting is planned and agreed, it has been delayed over nearly 8 months – beyond the life of the project. Whilst I fully believe that the project has been worthwhile and that the data collection, analysis and simple motivation it has given to the Direction de la Faune to take the matter in hand, the real change in management will not be seen (and is thus not reportable) within the timeframe.

The project has been subject to internal annual review through four international bodies. Firstly it has been defended orally at the *Conseil Scientifique* at CIRMF, where it was presented to a Scientific council by Dr Kate Abernethy and peer-reviewed annually. In written form it has been reveiwed through annual reports to CIRMF, the Wildlife Conservation Society, the Ministry of Water and Forests and Darwin Initiative.

External review has been sought from the Bushmeat Crisis Task Force, which has offered an external review process during 2007, probably conducted by Dr Heather Eves. We will send the results of this review to Darwin, when available. The external review will critique the whole of *'Projet Gibier'*, not simply the Darwin funded activities.

- **Lessons learned**

In-country operating

Darwin Initiative Administration

Financial reporting is too difficult esp. march/april claims. Bridging the gap between AR and letter of award is impossible (currently only works through project leaders' personal reputation within Uni dept). Government is too slow to respond. Failure to produce published science is due to staff overload once the project reached a policy making phase, which is very slow.

9. Actions taken in response to annual report reviews (if applicable)

- The second annual review on the project asked for certain clarifications. The reply to the review is included as sent in Appendix 17.

10. Darwin Identity

The Darwin logo was used wherever possible – a permanent fixture on the database office doors, computers and student materials (printed materials, powerpoint slides, website). The Darwin Initiative is not well known in Gabon, which has very few links with Britain, British culture or British government initiatives in general. The people familiar with the Darwin Initiative are to be found in the Universities, or the DFC. This is probably similar to the situation in the UK! Neither local administrators, nor general public members showed recognition of the Darwin logo or name when told of it during the socio-economic interview preparatory visit. We used teaching courses to explain Darwin Initiative aims to students, but cannot reach many people this way. In general, Gabonese people if they know the institution of the Darwin Initiative at all, regard the 'Darwin Initiative' as a conservation funder, similar to US Fish and wildlife Service, CARPE, *Agence France Development* or the EU and are more interested in the money available for activities in their country, than the UK's aims for its own fulfilment of the CBD.

In the case of *Projet Gibier*, the project existed before Darwin funds, thus the Darwin project has always been seen as part of a larger whole. The Darwin requirement for matching funds means that 'Darwin' projects will always be partnerships with other institutions, with the Darwin name carrying only 50% of the project. In this case, I think that position was reflected in the perception of Darwin by host country partners: a significant, but not dominant, partner.

11. Leverage

- During the Darwin project lifetime, the total *Projet Gibier* budget was about £207,000. Exact financial reporting of matched funds is complex, as funders work to different financial year closures and most complicatedly, at different exchange rates dependent on the date of funds transfer and the currency of reporting, but this is the approximate total for the Darwin Project time 1 September 2003 – 31 Aug 2006.
- During the project lifetime, additional to the Darwin Initiative, funds were secured from CIRMF, the Helaine Lerner Foundation (US), BCTF, US Fish and Wildlife Service and the Wildlife Conservation Society International. All grants were written by the project leader, with consultation with the 'Point focal bushmeat' in the DFC and other project staff. Of these grants, the money from The Lerner Foundation, USFWS and CIRMF are renewable grants and ex-project Stirling University staff will be on hand to help host institution staff to prepare renewal applications, as well as new applications to other institutions, during at least 2007 and probably into 2008. The DFC has the financial administration structures appropriate to receiving funds if successful.

12. Sustainability and Legacy

The most durable legacy is the existence of the national databases, and the staff capacity within the DFC to manage and update these databases. From this base, technical assistance can quite easily be sought to answer particular management dilemmas.

The second consequential legacy will, we hope, be the establishment of a permanent national government committee on bushmeat management and wildlife law enforcement, through the cross institutional meeting in April 2007. If successful, this will result in a permanent committee, with a chair in the DFC which will creat accountability between government institutions for performance on wildlife law enforcement and bushmeat trade management.

The legacy could have been improved by a faster reaction of government to project impetus to hold the meeting, such that the dissemintation of product from the meeting could have been ensured. However, if the project has been truly successful, the host institution should be able to disseminate information by itself.

Additional funds have already been secured in-country for the meeting production and post-meeting printing costs from the Agence France Development (AFD), BCTF, the European Union delegation and the projet FORAFRI, thus the DFC are showing themselves potentially capable of perpetuating the project outputs.

13. Value for money

The only comparisons we have for 'value' of the project come from the level of funds known to the DFC to have come into Gabon for similar work. The EU supported DABAC project spent around €500,000 over 3 years and had no discernable impact on poaching levels or legacy.

The 2001-3 NSF project to look at potential effect of economic drivers for bushmeat consumption in Gabon spent $140,000 in 30 months and produced a first socio-economic database, 6 people trained in socio-economic data collection and some very good science showing that economic levers could be successful for bushmeat consumption management in Gabon (Wilkie et al., 2005).

Our project spent a total of about £207,000 in three years and produced two national databases, many trained staff at different levels, 2 University teaching modules and potentially a governance network for the issue.

I think it is probably medium to good value for money. Impacts could have been higher if political inertia had not be so high and the cross-institutional meeting had been held earlier, but government processes are notoriously long anywhere and we may not have saved much money on this.

14. Appendix I: Project Contribution to Articles under the Convention on Biological Diversity (CBD)

Please complete the table below to show the extent of project contribution to the different measures for biodiversity conservation defined in the CBD Articles. This will enable us to tie Darwin projects more directly into CBD areas and to see if the underlying objective of the Darwin Initiative has been met. We have focused on CBD Articles that are most relevant to biodiversity conservation initiatives by small projects in developing countries. However, certain Articles have been omitted where they apply across the board. Where there is overlap between measures described by two different Articles, allocate the % to the most appropriate one.

Project Contribution to Articles under the Convention on Biological Diversity		
Article No./Title	**Project %**	**Article Description**
6. General Measures for Conservation & Sustainable Use	15	Develop national strategies that integrate conservation and sustainable use.
7. Identification and Monitoring	40	Identify and monitor components of biological diversity, particularly those requiring urgent conservation; identify processes and activities that have adverse effects; maintain and organise relevant data.
8. In-situ Conservation		Establish systems of protected areas with guidelines for selection and management; regulate biological resources, promote protection of habitats; manage areas adjacent to protected areas; restore degraded ecosystems and recovery of threatened species; control risks associated with organisms modified by biotechnology; control spread of alien species; ensure compatibility between sustainable use of resources and their conservation; protect traditional lifestyles and knowledge on biological resources.
9. Ex-situ Conservation		Adopt ex-situ measures to conserve and research components of biological diversity, preferably in country of origin; facilitate recovery of threatened species; regulate and manage collection of biological resources.
10. Sustainable Use of Components of Biological Diversity	15	Integrate conservation and sustainable use in national decisions; protect sustainable customary uses; support local populations to implement remedial actions; encourage co-operation between governments and the private sector.
11. Incentive Measures		Establish economically and socially sound incentives to conserve and promote sustainable use of biological diversity.

12. Research and Training	25	Establish programmes for scientific and technical education in identification, conservation and sustainable use of biodiversity components; promote research contributing to the conservation and sustainable use of biological diversity, particularly in developing countries (in accordance with SBSTTA recommendations).
13. Public Education and Awareness	5	Promote understanding of the importance of measures to conserve biological diversity and propagate these measures through the media; cooperate with other states and organisations in developing awareness programmes.
14. Impact Assessment and Minimizing Adverse Impacts		Introduce EIAs of appropriate projects and allow public participation; take into account environmental consequences of policies; exchange information on impacts beyond State boundaries and work to reduce hazards; promote emergency responses to hazards; examine mechanisms for re-dress of international damage.
15. Access to Genetic Resources		Whilst governments control access to their genetic resources they should also facilitate access of environmentally sound uses on mutually agreed terms; scientific research based on a country's genetic resources should ensure sharing in a fair and equitable way of results and benefits.
16. Access to and Transfer of Technology		Countries shall ensure access to technologies relevant to conservation and sustainable use of biodiversity under fair and most favourable terms to the source countries (subject to patents and intellectual property rights) and ensure the private sector facilitates such assess and joint development of technologies.
17. Exchange of Information		Countries shall facilitate information exchange and repatriation including technical scientific and socio-economic research, information on training and surveying programmes and local knowledge
19. Bio-safety Protocol		Countries shall take legislative, administrative or policy measures to provide for the effective participation in biotechnological research activities and to ensure all practicable measures to promote and advance priority access on a fair and equitable basis, especially where they provide the genetic resources for such research.
Total %	**100%**	**Check % = total 100**

15. Appendix II Outputs

Please quantify and briefly describe all project outputs using the coding and format of the Darwin Initiative Standard Output Measures.

Code	Total to date (reduce box)	Detail (←expand box)	
Training Outputs			
1a	Number of people to submit PhD thesis		
1b	Number of PhD qualifications obtained		
2	Number of Masters qualifications obtained	1	Natacha Ona Abiaga (née Bengone N'ssi, gabonese) gained her Masters in Applied Ecology and Conservation at UEA using the project database on Mandrill offtake for her dissertation.
3	Number of other qualifications obtained	6	3 Degree level qualifications from the Forestry school (1 in 2005, 2 in 2006).
4a	Number of undergraduate students receiving training	198	
4b	Number of training weeks provided to undergraduate students	12	3 residential weeks at Lopé training centre 3 short immersion courses at USTM and ENEF 6 weeks of dissertation supervision (*pro rata*) for undergraduate student projects
4c	Number of postgraduate students receiving training (not 1-3 above)	3	Ernestine Ntsame Effa (Gabonese) completed her DEA course at Paris VI (Sorbonne) using the project data on market diversity for her dissertation Edmond Peindi undertook project work during his DESS course in Environmental Impact Assessments at ENEF Freddy Makiloutila completed his dissertation work for his first year of an *Ingénieure de Conception* postgraduate degree at ENEF
4d	Number of training weeks for postgraduate students	18	
5	Number of people receiving other forms of **long-term** (>1yr) training not leading to formal qualification(i.e not categories 1-4 above)	8	4 core staff members received 3 full years of professional training in socio-economic surveys, market surveys, data entry and analysis and organising events to disseminate information. 4 ministry liaision staff received long term training in data analysis, data analysis (Excel/Access and statistics, database use

Code	Total to date (reduce box)	Detail (←expand box)	
6a	Number of people receiving other forms of **short-term** education/training (i.e not categories 1-5 above)	34	4 people went on a policy-making course for 1 week 3 people (DFC staff) received 2 weeks intensive statistics and data analysis training. 5 DFC senior staff received short courses in computing and database use. 16 people received 1 month's training and 3 months in-service mentoring as socio-economic data collectors. 6 people received training as market surveyors and data entry typists.
6b	Number of training weeks not leading to formal qualification	24	
7	Number of types of training materials produced for use by host country(s)	4	1. Database user manual 2. Short course in databasing teachers notes 3. Adaptive management course teaching materials and examples 4. Bushmeat identification cards
Research Outputs			
8	Number of weeks spent by UK project staff on project work in host country(s)	227	Yr 1, KA = 16 weeks, MPS = 27, OH = 33 Yr 2, KA = 16 weeks, MPS = 23, OH = 45 Yr 3, KA = 16 weeks, MPS = 6, OH = 45
9	Number of species/habitat management plans (or action plans) produced for Governments, public authorities or other implementing agencies in the host country (s)	(1)	The national cross-institutional meeting on managing the bushmeat trade (April 2007) will produce an updated version of the 'Strategie National Viande de Brousse' as a management workplan for bushmeat management for the DFC and its national partner institutions.
10	Number of formal documents produced to assist work related to species identification, classification and recording.	0	
11a	Number of papers published or accepted for publication in peer reviewed journals	1	J. Int. Wildl. Law.
11b	Number of papers published or accepted for publication elsewhere	3	3 Chapters invited for publication in a book on the current state of the world's wildmeat harvest and trade. Edited by Elizabeth Bennett, James Deutsch and Kirstin Siex.
12a	Number of computer-based databases established (containing species/generic information) and handed over to host country	2	Database of national bushmeat trade 2003-2006 Database of national household consumption of bushmeat 2005
12b	Number of computer-based databases enhanced (containing species/genetic information) and handed over to host country	2	Database of national bushmeat trade 2000-2003 Database of national socio-economic status and household consumption of bushmeat, 2001-2003

Code	Total to date (reduce box)	Detail (←expand box)	
13a	Number of species reference collections established and handed over to host country(s)		
13b	Number of species reference collections enhanced and handed over to host country(s)		

Dissemination Outputs			
14a	Number of conferences/seminars/workshops organised to present/disseminate findings from Darwin project work	1	Cross-institutional national meeting, April 2007
14b	Number of conferences/seminars/ workshops **attended** at which findings from Darwin project work will be presented/ disseminated.	6	ZSL conference on bushemat and forests, Sept 2004; Missouri Botanical Garden governance workshop, Nov 2005;ZSL bushmeat and poverty alleviation meeting, Dec 2006; SCB (USA) meetings 2004, 2005, 2006.
15a	Number of national press releases or publicity articles in host country(s)	6	
15b	Number of local press releases or publicity articles in host country(s)		No local press exists
15c	Number of national press releases or publicity articles in UK	1	
15d	Number of local press releases or publicity articles in UK	2	
16a	Number of issues of newsletters produced in the host country(s)		
16b	Estimated circulation of each newsletter in the host country(s)		
16c	Estimated circulation of each newsletter in the UK		
17a	Number of dissemination networks established		
17b	Number of dissemination networks enhanced or extended	1	DFC working paper dissemination
18a	Number of national TV programmes/features in host country(s)	1	RTG documentary on bushmeat for their national news
18b	Number of national TV programme/features in the UK		
18c	Number of local TV programme/features in host country		
18d	Number of local TV programme features in the UK		
19a	Number of national radio interviews/features in host country(s)	2	
19b	Number of national radio interviews/features in the UK		
19c	Number of local radio interviews/features in host country (s)		
19d	Number of local radio interviews/features in the UK		
Physical Outputs			

20	Estimated value (£s) of physical assets handed over to host country(s)	£2,000	Desktop computer, software and databases
21	Number of permanent educational/training/research facilities or organisation established	2	Database offices in WCS Gabon and in DFC
22	Number of permanent field plots established		
23	Value of additional resources raised for project	£153,000	Total match over 3 years

16. Appendix III: Publications

Provide full details of all publications and material that can be publicly accessed, e.g. title, name of publisher, contact details, cost. Details will be recorded on the Darwin Monitoring Website Publications Database that is currently being compiled.

Mark (*) all publications and other material that you have included with this report

Type * (e.g. journals, manual, CDs)	**Detail** (title, author, year)	**Publishers** (name, city)	**Available from** (e.g. contact address, website)	**Cost £**
***Journal**	Can taxation contribute to sustainable management of the bushmeat trade?: evidence from Gabon and Cameroon. David S. Wilkie, Malcolm Starkey, Elizabeth L. Bennett Kate Abernethy, Roger Fotso, Fiona Maisels, and Paul Elkan.	**Journal of International Wildlife Law**		
Journal				

17. Appendix IV: Darwin Contacts

To assist us with future evaluation work and feedback on your report, please provide contact details below.

Project Title	Capacity Building for Monitoring and Managing the Bushmeat trade in Gabon
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UK Leader Details	
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Partner 1	
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Partner 2 (if relevant)	
Name	Dr Christiane Atteke
Organisation	Université des Sciences et Techniques de Masuku (USTM)
Role within Darwin Project	Liaison between project and government partners for teaching issues
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Project summary	*Measurable Indicators*	*Progress and Achievements*	*Actions required/planned for next period*
Goal*:* To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but poor in resources to achieve The conservation of biological diversity, The sustainable use of its components, and The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources			
Purpose To enhance the capacity of the Gabonese government to manage the bushmeat trade to maximise long-term wildlife survival as well as the sustainability of local traditional livelihoods	Network of monitors in bushmeat markets established and data used iteratively in adaptive policy development via regular evaluation workshops. Module in 'Research for Natural Resources Management' for ENEF, and USTM developed. Policy-oriented research on bushmeat issues carried out by the government, results publicly available in a user-friendly format.	This output has only been achieved within the DFC, we hope to expand database use to other institutions and encourage a wider constituency for the reforms suggested with the cross-institutional meeting in April 2007. This meeting should have been held in July 2006 as the culmination of the Darwin project, but was delayed by legislative elections, as detailed in the government letter in **Appendix** VII. This has been achieved. A Final trainers package is available to teachers (**Appendix** VIII) This has been done, through 4 Wildlife Dept staff using the database for master's level research on policy. Students have also carried out research, but this is not gov't mandated. Research dissertations are available at the WCS Gabon office and at the DFC.	Cross institutional cooperation is essential to this issue, which requires law enforcement with no loopholes. The road to such cooperation is long and barely within the scope of a 3-year project.
Outputs			
Nation-wide data on the volume, economics and geographic distribution of the bushmeat trade available to	Database of trade and socio-economic monitoring data established and managed within the DFC. Regular	Database is established and widely used. Workshops have been held. Data has been presented at	

policy makers	workshops held to interpret results.	national and international meetings and is starting to be used for management decisions.	
Training module for ENEF established	One module taught in academic years 2003/04, 2004/05 and 2005/06.	Students and staff have received training increasing general capacity in the subject.	
Policy oriented training relevant to managing the bushmeat trade completed by ENEF students	At least 12 students undertake bushmeat-relevant research projects and give both written and oral presentations of policy implications of research results to policy makers	Overall, 6 external students, 36 USTM students and 6 ENEF students have completed student projects using the database and working with project staff	
Research results communicated to policy makers and public	*Research results have been communicated through scientific publications, internal reports and public leaflets and posters. However, the major communications event is the cross-institutional policy makers meeting and subsequent establishment of a national law enforcement network for wildlife issues. This meeting has been delayed nearly a year due to the political upheavals of presidential and legislative elections. It will now be held in April 2007 and the Minister has circulated a letter to that effect.*	Public communication of results has been lower than we hoped – in Gabon, 1 national TV news feature, 2 national radio broadcasts, 2 newspaper articles, an Earth Day stand each year in one of the Market sites and circulation of leaflets on project activities. 6 international meetings.	Need more media contacts. The lack of publicity has been mostly to do with our inability to find an entry to the media and interest journalists in taking the story, rather than that we have nothing noteworthy to mediatise. The sensitivity of the bushmeat issue means that journalist contacts must be well vetted and trustworthy, which further reduces the breadth of publicity. This is one area where the project has not been able to meet the intended outputs.
Posters, leaflets and videos produced nationally and internationally that report research results and contemporary policy	Posters displayed in prominent locations. Leaflets distributed in major cities. Videos shown on national television	Posters on the Project have been printed and displayed in the towns where market surveys have been carried out, in Libreville`	Need to finalise publicity. Translation is a very slow component, requiring more time than we initially budgeted.