



Submit by 5 January 2007

DARWIN INITIATIVE APPLICATION FOR GRANT ROUND 15 COMPETITION:STAGE 2

Please read the Guidance Notes before completing this form. Applications will be considered on the basis of information submitted on this form and you should give a full answer to **each** question. Please do not cross-refer to information in separate documents except where invited on this form. The space provided indicates the level of detail required. Please do not reduce the font size below 11pt or alter the paragraph spacing. Keep within word limits.

1. Name and address of organisation (NB: Notification of results will be by post)

Name: University of East Anglia	Address: School of Environmental Sciences, University of East Anglia, University Plains, Norwich NR4 7TJ, UK
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2. Project title (not exceeding 10 words)

Community-based sustainable management of forest resources in Amazonian extractive reserves

3. Project dates, duration and total Darwin Initiative Grant requested

Proposed start date: 1 September 2007		Duration of project: 3 yrs			End date: 30 August 2010	
Darwin funding requested	2007/08	2008/09	2009/10	2010/11	Total	
	£64018	£52270	£103582	£25994	£ 245864	

4. Define the purpose of the project (extracted from logframe)

To design appropriate guidelines to manage game vertebrates and other nontimber resource populations in large multiple-use tropical forest reserves, helping the Brazilian federal and state governments in developing, stimulating and implementing effective community-based wildlife management programs that are grounded in the socioeconomic reality of Amazonian Extractive and Sustainable Development Reserves, and Indigenous Territories.
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5. Principals in project. Please provide a one page CV for each of these named individuals

Details	Project Leader	Other personnel	UK	Main project partner and co-ordinator in host country/ies
Surname	Peres			Marinelli
Forename (s)	Carlos Augusto			Carlos Eduardo
Post held	Reader			Wildlife Biologist and Reserve Implementation Programme Coordinator
Institution	University of East Anglia			Secretaria de Estado do Meio Ambiente e Desenvolvimento Sustentável do Amazonas (SDS)
Department	School of Environmental Sciences			Criação e Implementação de Unidades de Conservação Estaduais do Amazonas

1. Has your organisation received funding under the Darwin Initiative before? If so, give details

Reference No	Project Leader	Title
12014/Round 11	Peres, Carlos	Biodiversity and functional value of Amazonian primary, secondary and plantation forests (Brazil)
11021/Round 10	Springate-Baginski, Oliver	Institutionalising Participatory Integrated Forest Management Assessment (Nepal)
3023/Round 1	Watkinson, Andrew	Management of Tall Grasslands for the Conservation of Biodiversity and Sustainable Utilisation (Nepal)

7. Describe briefly the aims, activities and achievements of your organisation. (Large institutions please note that this should describe your unit or department)

<p>Aims</p> <p>The School of Environmental Sciences at the University of East Anglia (ENV/UEA) aims to integrate, through teaching and research, the physical, chemical, biological, social and geotechnical sciences into the study of natural and human environments.</p>
<p>Activities</p> <p>With over 100 research staff, including >60 faculty members, ENV/UEA is one of the longest established, largest and most fully developed Schools of Environmental Sciences in Europe. In December 2005, Professor Sir David King, the UK Government's Chief Scientific Advisor claimed that "The School of Environmental Sciences at UEA is the strongest in the world". Over £8 million in grant income was raised in the last 12 months.</p>
<p>Achievements</p> <p>Our holistic approach to teaching and research into the study of natural and human environments is truly a modern philosophy for the new millennium. In the most recent Research Assessment Exercise the School was rated 'double 5*', the highest possible research ranking, and in the most recent Teaching Quality Assessment we were awarded an 'excellent' rating.</p>

8. Please list the UK/collaborative (where there are partners in addition to the applicant organisation) and host country partners that will be involved, and explain their roles and responsibilities in the project. Describe the extent of their involvement at all stages, including project development. This section should illustrate the capacity of host country partners to be involved in the project. Please provide written evidence of partnerships.

<p>Partner</p> <p>Secretaria de Estado do Meio Ambiente e Desenvolvimento Sustentável do Amazonas (SDS), Manaus, Brazil</p>	<p>SDS (www.sds.am.gov.br/) is the Environmental and Protected Areas Agency of Amazonas, the largest state in the Brazilian Amazon. SDS has been instrumental in decreeing one of the two focal reserves (RDS Uacari) where the project will be executed, and is charged with the implementation programme of all State of Amazonas reserves, although it lacks the appropriate funding to do so. SDS will cover local salaries of a GIS specialist and up to four wildlife biologists working on the project (see letter); and together with IPAAM (Institute of Environmental Protection of Amazonas; www.ipaam.br/) will assist in the post-project extension programme in other reserves based on the project results.</p>
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<p>Partner</p> <p>Brazilian Institute of the Environment and Natural Renewable Resources (IBAMA), Brazil</p>	<p>IBAMA (www.ibama.gov.br/) is the nation-wide wing of the Brazilian Ministry of Environment charged with managing all federal conservation units, including the Médio Juruá Extractive Reserve, where part of the project will take place. Close coordination with the IBAMA office in Manaus and Carauari will be necessary at all stages of the project. IBAMA manages over 66.2 million hectares (or 13.1%) of Amazonian forest in over 100 strictly-protected and sustainable development reserves. Successful dissemination and application of project results will depend on close collaboration with IBAMA/CNPT, which oversees all federally-managed Amazonian extractive reserves, accounting for 5.5% of the entire region.</p>
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Partner Instituto Nacional de Pesquisas da Amazônia (INPA), Manaus, Brazil	INPA (National Institute of Amazonian Research; www.inpa.gov.br/) is the largest research institute in Amazonian ecology. We will collaborate with researchers at the Ecology Department (e.g. Dr Flávia Costa) on a sub-project examining the demographic responses of non-timber forest resource populations to subsistence and commercial exploitation at the two focal reserves. INPA will also be a source of postgraduate (MSc) students who will become involved in the project.
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9a. Have you consulted stakeholders not already mentioned above?	X Yes
If yes, please give details:	
1) The local communities of Uacari Sustainable Development Reserve (see letter and >250 signatures)	
2) The local communities of Médio Juruá Extractive Reserve (see letter and signatures)	
9b. Do you intend to consult other stakeholders?	X No
If yes, please give details:	
9c. Have you had any (other) contact with the government not already stated?	X Yes
If yes, please give details:	
I have also contacted the relevant wing of IBAMA national head-office in Brasília, D.F, which will officially oversee the work at the Médio Juruá Extractive Reserve, and assist with the subsequent basin-wide extension of project results, including the community-based wildlife management (CBWM) protocol developed as part of this study.	

PROJECT DETAILS

10. Please provide a Concept note (Max 800 words) (repeat from Stage 1, with changes underlined)

Sustainable use reserves comprise the fastest growing land use category in remaining tropical forest regions. Since 2002, Brazil's largest state (Amazonas \approx 6.5 times the size of the UK) created 9 strictly protected and 27 sustainable development forest reserves (mean size = 494,651 ha), encompassing 17.8 Mha. Some 51% of Amazonas is currently protected 'on paper', 74% of which within multiple-use reserves that are legally occupied by extractive communities. Through an unprecedented conservation blueprint, it is expected that >80% of the State of Amazonas will be nominally protected by 2010. A similar process has occurred in other Amazonian states, with a growing number of sustainable use and indigenous reserves now accounting for about a third of the entire Brazilian Amazon.

Although only 3.3% of the State of Amazonas is deforested, most conservation units under either state or federal management face growing forest resource management challenges, not least because of high human population growth rates (2.5-5% per year). Extractive activities of questionable demographic sustainability, including hunting, collection of other nontimber forest products (NTFPs), and fishing are legally permitted in all multiple-use reserves, but these practices invariably lack a rational set of guidelines or a management plan to inform resource use policy. For example, populations of harvest-sensitive game species have been driven to local extinction or declined in several extractive reserves. This will become increasingly typical of sustainable use and indigenous reserves throughout the Amazon basin. In particular, the key issue of the internal 'zoning' of no-take areas and different intensities of use within protected areas remains a rhetorical discourse lacking appropriate scientific underpinning and has yet to be implemented and monitored.

This project aims to develop a sustainable co-management protocol to inform the sustainable use of game vertebrates and other nontimber forest resources by rural communities in the Brazilian Amazon. The project will be conducted at two contiguous reserves along the Rio Juruá: (1) the 632,949 hectare Uacari Sustainable Development Reserve (RDS), and (2) the 253,227 hectare Médio Juruá Extractive Reserve (ResEx). Management protocols developed at these reserves will be designed to provide a generalised pan-Amazonian model that can be extrapolated to other multiple-use Amazonian forest reserves. The participatory implementation of the project will include 25 of 27 rural communities (~1300 people, 47% are children) at RDS Uacari and 15 of 22 communities (~700 people) at ResEx Médio Juruá. These reserves sustain one of the highest levels of terrestrial vertebrate diversity, including the most species-rich primate assemblage anywhere (20 species). The research programme will include daily household-level records of all animal protein consumed (terrestrial game, fish, other aquatic sources of protein, domestic livestock); human

nutrition; detailed game harvest profiles; line-transect censusing of game populations in both seasonally-flooded and unflooded forest; monitoring of key “problem-species” presenting conflicts with human interests; spatially-explicit mapping of village catchment areas used by hunters carrying GPS units; forest inventories within 1-ha floristic plots; and assessments of forest resource productivity. Specific emphasis will be allocated to the demographic responses to exploitation of two key NTFPs harvested at these reserves: the medicinal oil of *Copaifera multijuga* trees and the oil seeds of *Carapa guianensis* trees. For the first time we will also implement an experimental source-sink harvest zoning scenario in which several forest wildlife refuges of 4,000 to 7,000 ha — to be set aside as supra-annual no-take areas — will be delimited using natural geographic boundaries in both low and high productivity areas with the help of local communities. Subsequent comparative analysis of population density estimates within experimental wildlife refugia (before and after they become established) will consider game responses to local hunting pressure, and game offtake and hunter responses to the spatial structure of the experimental harvest mosaic. A theoretical spatial modelling approach parameterized by field data will also complement the empirical component of the project.

This project will be executed in strict and close partnership with the Amazonas Secretariat of the Environment and Sustainable Development (SDS; www.sds.am.gov.br/), the Institute of Environmental Protection of Amazonas (IPAAM; www.ipaam.br/), the Brazilian Institute of the Environment and Natural Renewable Resources (IBAMA; www.ibama.gov.br/) the National Institute of Amazonian Research (INPA; www.inpa.gov.br/) and the local communities of both reserves, *who are very willing to cooperate*. Our research partners will include investigators and post-graduate students at INPA and SDS, the latter also providing partial logistical support and salaries. RDS Uacari and ResEx Médio-Juruá fall under the administrative jurisdiction of IPAAM and IBAMA, respectively, which will become instrumental in setting-up the research programme and implementing the applied results both in these reserves and elsewhere in Brazilian Amazonia. The project is expected to provide clear scientific rationale and a policy incentive to implement community-based wildlife management (CBWM) programmes in large multiple-use reserves, most of which are still inhabited by relatively sparse human populations. In particular, the project will shed much needed light on crucial reserve design issues related to the internal zoning of large multiple-use reserves (>100,000 ha), including the proportion of a reserve that should be protected from hunting, and the size, lifespan, spatial configuration, and habitat productivity of no-take areas (wildlife refugia). The project will inform the revision of the Brazilian Faunal Protection Law (of 3 January 1967), which does not consider the issue of subsistence hunting.

11a. Is this a new initiative or a development of existing work (funded through any source)?

This is an entirely new initiative, but the principal investigators have an extensive amount of experience with natural resource management in neotropical forests, while working on previous projects outside the scope of this study.

11b. Are you aware of any other individuals/organisations/Darwin Initiative projects carrying out similar work?

X No

There are several ongoing resource use studies in tropical forests, but to my knowledge no other project has attempted to empirically test the concept of no-take areas. The study area is ideal and rather unique because of the strong productivity gradient available from upland to seasonally-flooded forests, which allows the role of resource productivity to be investigated. Our project, like many Darwin projects, includes a substantial capacity building component. One other project attempts to devise viable ways to maximise community-based wildlife conservation under a certified peccary pelt scheme (project 14/701), but does not consider the role of un hunted source areas set aside under community agreements. Few projects anywhere in the humid tropics have been able to secure the local collaboration of all occupants of two large, adjacent sustainable development reserves.

12. How does this project meet a clearly identifiable biodiversity need or priority defined by the host country? Please indicate how this work will fit in with National Biodiversity Strategies or Environmental Action Plans, if applicable.

- 1) The project addresses all three main CBD objectives, as ratified in Brazil on 8 Feb 1994: the (a) conservation, (b) sustainable use, and (c) equitable sharing of biological diversity;
- 2) Brazil’s National System of Protected Areas (SNUC) recognizes that biodiversity conservation in all terrestrial biomes will, to a large extent, unavoidably co-exist with the needs of traditional communities of

local resource users who in many cases will be legally empowered to manage their own resources (see <http://www.mma.gov.br/tomenota.cfm?tomenota=/port/sbf/dap/capa/index.html&titulo=Parques>)

3) Article 13 of the SNUC law of 22 August 2002 declares that the use concession of extractive and sustainable development reserves to local communities depends on a Management Plan based on appropriate local studies of resource use, distribution and productivity, and its associated biodiversity.

4) The recently decreed Federal Act of 13 July 2006 revises the National Commission of Sustainable Development of Traditional Communities (<http://www.mct.gov.br/index.php/content/view/29138.html>) and calls for cooperative projects that can inform the consolidation of sustainable development initiatives in extractive reserves, and stimulates the decentralization of the management process of natural renewable resources, thereby delegating resource management to local communities who can rarely count on technical assistance based on appropriate scientific research.

5) Within Brazil alone, these legal provisions apply to an aggregate protected area acreage of nearly 40% of the entire Amazon region (~1.86 million km²), including all Indian Lands and Indigenous reserves which operate under the jurisdiction of FUNAI (<http://www.funai.gov.br/funai.htm>) and amount to ~21% of Brazilian Amazonia.

6) The Department of Extrativism and Sustainable Development (DADS) of the Secretariat of Sustainable Development Policies of the Brazilian Ministry of Environment (MMA) considers "the formulation of public policies via projects addressing the sustainable development of traditional and indigenous communities who depend on natural resources" a high-priority initiative as long as "respect for the socio-cultural diversity of these rural populations" is explicitly considered.

13a. How will the project assist the host country in its implementation of the Convention on Biological Diversity? Please rank the relevance of the project to the relevant article(s) of the CBD thematic programmes and/or cross-cutting themes by indicating percentages.

Articles	% Relevance	Themes	% Relevance
5. Co-operation		Access and Benefit Sharing	
6. General measures for Conservation and Sustainable Use	50	Agricultural Biodiversity	
7. Identification and Monitoring	40	Alien Species	
8. <i>In-situ</i> Conservation	60	Biodiversity and Tourism	
8h. Alien Species		Biosafety	
8j. Traditional Knowledge	20	Climate Change and Biodiversity	
9. <i>Ex-situ</i> Conservation		Economics, Trade and Incentives	
10. Sustainable use of components of Biological Diversity	100	Ecosystems approach	30
11. Incentive measures		Forest Biodiversity	100
12. Research and Training	100	Global Strategy for Plant Conservation	
13. Public education and awareness		Global Taxonomy Initiative	
14. Impact assessment and minimizing adverse impacts	50	Impact Assessment, Liability and Redress	
15. Access to genetic resources		Indicators	20
16. Access to and transfer of technology		Inland Waters Biodiversity	
17. Exchange of information	50	Marine and Coastal Biodiversity	
18. Technical and scientific co-operation	50	Mountain Biodiversity	
19. Handling of biotechnology and distribution of its benefits		Protected Areas	100
20. Financial resources		Public Education and Awareness	
21. Financial mechanism		Sustainable Use and Biodiversity	100
22. Relationship with other international conventions		Traditional Knowledge, Innovations and Practices	20
23. Conference of the Parties			
24. Secretariat			
25. Subsidiary Body on Scientific,	40		

Technical and Technological advice	
26. Reports	30

13b. Is any liaison proposed with the CBD national focal point in the host country? Yes No
If yes, please give details:

However, IBAMA is the relevant Protected Areas wing of the Brazilian Ministry of Environment (MMA) which together with the Ministry of Science and Technology (MCT) is charged with the implementation of the Biodiversity Convention within Brazil. This maximises integration between this project and other MMA initiatives, including the ARPA protected areas programme in the Brazilian Amazon.

14. If relevant, please explain how the work will contribute to sustainable livelihoods in the host country. (Max 200 words)

Some 4.5 million Brazilians occupy (semi)subsistence “traditional community” land units accounting for 25% of the country. In addition to the 473 active households distributed across 49 local communities within the Uacari Sustainable Development Reserve and the Médio-Juruá Extrative Reserve (totalling 886,000 hectares along 320 km of the Juruá River), who harvest subsistence resources from terra firme and várzea forests, this project is expected to eventually benefit traditional (*caboclo*) communities in all sustainable development forest reserves in the State of Amazonas, if not the entire Brazilian Amazon. Depletion of animal protein sourced from wild vertebrate populations is a severe conservation and socioeconomic problem in tropical forests worldwide. The project will specifically target terrestrial/arboreal game vertebrates harvested by forest dwellers. Many nominal Amazonian ‘sustainable development’ reserves have already become ‘defaunated’ of their large-bodied vertebrate species due to overhunting, and the project seeks empirically-tested spatially-explicit solutions to the ubiquitous problem of community-based resource management. Moreover, future scenarios of spatially (un)structured resource management are likely to be further challenged by the high internal population growth rates of most Amazonian sustainable development and indigenous reserves (2.5-5% yr⁻¹), which in many cases is likely to lead to significant population dispersal through community fissioning. Finally, the work will evaluate the sustainability of extraction of therapeutic oils and seeds, which cannot be commercialized at viable market prices unless the harvest can be certified by a credible research project.

15. What will be the impact of the work, and how will this be achieved? Please include details of how the results of the project will be disseminated and put into effect to achieve this impact. (max 200 words)

This project aims to design realistic, feasible guidelines to manage game vertebrates and other nontimber resource populations in extractive and indigenous forest reserves of Amazonia. The project also expects to demonstrate the landscape-scale benefits (to both prey populations and local communities) of no-take areas that are temporarily protected from hunting offtake. The project aims to instigate community-based wildlife management (CBWM) protocols, which in a wider, more comprehensive programme can be adjusted and refined at each reserve under the auspices of state or federal authorities. The project will closely advise all local communities of RDS Uacari and RESEX Médio-Juruá, and ultimately produce a downloadable, user-friendly, illustrated handbook (in Portuguese) that can be widely distributed through donations by SDS, IPAAM and IBAMA to local communities in legally-occupied reserves of analogous denominations facing the difficult challenges of reconciling biodiversity conservation and sustained human livelihoods. This illustrated handbook will inform rural extension personnel, and prescribe population monitoring and best management practices to local management councils. The National Centre of Sustainable Development of Traditional Populations (CNPT)—created by the IBAMA Act 22 (10 Feb 1992)—will be instrumental in promoting, elaborating and implementing participatory CBWM protocols in other multiple-use forest reserves, including hundreds of community-based sustainable logging concessions where wildlife management issues are sorely neglected.

16. How will the work leave a lasting legacy in the host country or region? (max 200 words)

This is a unique opportunity to work closely with the Environment Secretariat of the largest state of Brazilian Amazonia and the Brazilian Ministry of Environment on tropical forest wildlife and NTFP management issues in vast tracts of sustainable use reserves. These often remote reserves currently lack appropriate

management criteria for harvesting game stocks, despite the ubiquitous perception that many mammal, bird and reptile populations are becoming scarce. At the end of the project, we expect to leave in place clear wildlife management guidelines for the 886,000 ha of two contiguous reserves where source-sink considerations of forest resource harvest will be tested using both a robust empirical approach and spatial models. At a pan-Amazonian scale, we expect that our work will strengthen the science and policy justification for maintaining use-intensity mosaics within large forest reserves that are legally harvested uniformly. This will also strengthen the science of the so-called “internal zoning” (or “ethno-zoning”) systems, which are frequently referred to in reserve management plans, but currently lack a clear set of rational design criteria in terms of the size, habitat configuration, landscape context to maximise source-sink dynamics, and permanence of wildlife refugia. Management protocols will be designed to maximise their generalization power, so that similar approaches can be implemented in other reserves and forest concessions.

17. Please give details of a clear exit strategy and state what steps have been taken to identify and address potential problems in achieving impact and legacy. For example, what steps have been taken to ensure the benefits of the project will continue despite any staff changes in these organisations? (max. 200 words)

SDS and IPAAM are politically stable institutions that cannot be dissolved by future state-level legislators. Given a history of criticism against “paper parks” rubber-stamped by the state government, these agencies are committed to the full implementation process of numerous strictly-protected and sustainable development reserves, but currently lack appropriate resource management technical assistance based on clear scientific rationale. Participatory management protocols designed at RDS Uacari and RESEX Médio-Juruá have to be sufficiently versatile to be exported in an adaptive framework to other state or federal extractive reserves of Brazilian Amazonia. To this end, we will hold a technical workshop in Manaus at the end of the project, to be attended by reserve directors and other reserve-management personnel, which is expected to catalyse applications of a CBWM ‘toolbox’ approach to other conservation units. At a larger scale, we will also count on the institutional cooperation of CNPT/IBAMA which will facilitate political permeability to the 27.4 Mha of Amazonian extractive reserves under IBAMA’s jurisdiction (5.5% of the region). We see a positive model in which all legally-occupied (tribal and nontribal) protected areas of Brazilian Amazonia can eventually be shown how to best comply with a sound set of game management regulations in order to achieve landscape-scale sustainability in subsistence or commercial wildlife use. This is consistent with the National Policy of Sustainable Development of Traditional Communities (signed by the Brazilian President, 13 Dec 2006) to support sustainable resource use programmes throughout the country, although this legislative package remains vague and lacks any detail.

18. How will the project be advertised as a Darwin project and in what ways will the Darwin name and logo be used? (max 100 words)

The concept of no-take areas in tropical forests is gaining a prominent position in conservation policy, yet its science underpinnings remain poorly understood. The project is novel in its landscape-scale experimental approach to examine the effects of forest productivity in population responses to a harvest regime. It will bring together forest ecologists, terrestrial vertebrate and fish biologists, reserve managers, community extension workers and policy makers under a common goal. Based on our own experience with a previous Darwin project, this applied research project is likely to become widely known in Amazonian institutions. The outputs resulting from this project, including all talks, peer-reviewed publications, popular science articles, brochures and manuals in Portuguese, will explicitly acknowledge Darwin funding and the project will be recognised as a Darwin Initiative funded by DEFRA/UK.

19. If your project includes training and development, please indicate a) who the trainees will be, b) the criteria for selection, c) what the level and content of training will be, d) how many people will be involved, e) which countries will they be from, f) how will you measure the effectiveness of the training, g) will those trained then be able to train others and h) how will trainee outcomes be monitored after the end of the training? (max 300 words)

We propose a two-tiered capacity-building structure within the scope of this project based on level of education. The first will target local 'monitors' from 49 focal communities; and the second will target mainly Brazilian MSc students from INPA and Universidade do Amazonas (FUA), and extension/technical personnel from SDS, IPAAM and IBAMA. Most of our local 'monitors' will be semi-literate so the project will offer an appropriately-designed training period in forest resource monitoring protocols of up to 1 month (to approx. 20 villagers per year), many of whom will continue to work with the project. These protocols will include distance-based line-transect censusing, GPS navigation, mapping of (un)harvested areas and resources, floristic and phenological surveys, inventories of the (st)age structure of plant populations, and standardised game, fish and NTFP harvest profiles. Sampling protocols and data quality-control in this project will ultimately depend on effective deployment of these training periods and subsequent supervision. Trainees will include primarily community leaders and key Heads of Households selected on the basis of their political position and willingness to participate. The second training component (a two-week field course) will involve research-students and technical staff from our collaborating institutions, selected on the basis of employment status and the admissions criteria of INPA and FUA. Because of INPA's recruitment policy, some of our students are expected to come from neighbouring Amazonian countries, but most students and PIs involved in the project will be Brazilian. At least five Brazilian researchers expected to be involved in the project already have extensive experience in field sampling, so will be able to train, reinforce training and supervise community monitors and MSc students. Monthly sampling protocols flowing from training sessions and field courses will be verified throughout the study. We expect that ~90 people will benefit from the training component of this project, which is also likely to provide synergistic benefits to our more senior research collaborators who are already professionally established in Brazil.

LOGICAL FRAMEWORK

20. Please enter the details of your project onto the matrix using the note at Annex C of the Guidance Note. This should not have substantially changed from the Logical Framework submitted with your Stage 1 application. Changes are underlined.

Project summary	Measurable Indicators	Means of verification	Important Assumptions
Goal: 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.			
<p>Purpose</p> <p>To design appropriate guidelines to manage game vertebrates and other key NTFP resource populations in large multiple-use tropical forest reserve, helping the Brazilian federal and state governments in developing, stimulating and implementing effective community-based <u>forest resource management</u> programmes that are grounded in the socioeconomic reality of Amazonian Sustainable</p>	<p>New and unique knowledge on the spatial structure of extractive activities in tropical forest reserves, and how these relate to natural mosaics of habitat productivity.</p> <p>Quantitative estimates of sustainable harvest quotas of target species, assuming both a closed and an open population scenario where depletion can be balanced by immigrants from source areas.</p> <p>An experimental study of the source-sink</p>	<p>Field surveys and spatial modelling data.</p> <p>Successful implementation of a viable <u>spatially-structured</u> experimental harvest programme that can be co-managed by local communities.</p> <p>Publication and wide distribution of an illustrated user-friendly management handbook that can be understood by the semi-literate rural population of Amazonian <u>extractive and sustainable development</u> reserves.</p> <p>Publications in high-</p>	<p><u>That focal communities will maintain their active participation in the project and uphold the experimental manipulation of hunting throughout the length of the project.</u></p> <p>That new knowledge will actually be used by state-level and federal government agencies to instigate, facilitate, design and implement community-based wildlife management (CBWM) programmes in a growing number of Amazonian multiple-use forest reserves.</p> <p>That any resulting policy changes will be implemented effectively via SDS-Amazonas, IPAAM, and IBAMA (state and federal branches).</p> <p><u>That IBAMA's National Centre of Sustainable Development of</u></p>

<p>Development and Extractive Reserves, and Indigenous Territories.</p>	<p>dynamics of game populations using <u>multiple</u> large no-take areas <u>mapped with the assistance of</u> and enforced with the help of local communities.</p> <p>Results that provide the State of Amazonas and the Brazilian federal government with <u>practical management</u> information helping them fulfill commitments to the Convention on Biological Diversity.</p>	<p>impact international scientific journals.</p> <p>Reports in Brazilian high-circulation popular science magazines (e.g. <i>Ciência Hoje</i>; <i>Natureza & Sociedade</i>).</p> <p>Reports to state-level and federal environmental agencies in Brazil including SDS-State of Amazonas, IBAMA, and Ministério do Meio Ambiente (MMA).</p>	<p><u>Traditional Populations (CNPT) can help promote participatory CBWM protocols in all Amazonian extractive reserves under its management jurisdiction.</u></p> <p>That several of the lessons and insights from this project will be generalised to other multiple-use Amazonian forest reserves, including Extractive Reserves, Sustainable Development Reserves, National Forests, and Indian Reserves.</p> <p>Project results can be fed through to the revision process of the now obsolete federal Faunal Protection legislation act of January 1967.</p>
<p>Outputs</p> <ol style="list-style-type: none"> 1. Assessment of forest resources extracted, and levels of offtake. 2. Quantitative assessment of the demographic sustainability of forest resource extraction. 3. Local monitors, field technicians and students able to assess and monitor forest biodiversity using quantitative methods. 4. Local communities at at RDS Uacari and RESEX Medio-Jurua, and other reserves are able to effectively apply large-scale management recommendations. 	<ol style="list-style-type: none"> 1a. Daily records of the identity, weight, sex and reproductive condition of animals consumed, including game vertebrates and fish. 1b. Spatially-explicit mapping of hunting trips and resources harvested. 2a. Seasonally repeated census data from at least 100 line-transects of 5 km in length in both hunted and nonhunted várzea, paleo-várzea, and terra firme forests, on both banks of the Rio Juruá. 2b. <u>Mapping of the spatial distribution of key NTFP populations, including <i>Copaifera</i> and <i>Carapa trees</i>.</u> 2c. A study of the demographic impact of extractive practices on key NTFP resource populations. 2d. Sustainable harvest models under 	<ol style="list-style-type: none"> 1. Survey reports, biodiversity and resource databases and correspondent files from collaborators. 2a. Survey reports, data and correspondent files from internal collaborators. 2b. Survey reports, data and correspondent files from internal collaborators. <u>2c. Survey reports, data and correspondent files from internal collaborators.</u> 2d. <u>Development of spatially-explicit sustainable harvest models.</u> 3. Field survey reports, correspondent files from collaborators detailing student involvement and skills gained. Skills certification schemes for those involved. 4a. Wildlife 	<ol style="list-style-type: none"> 1. Proposed methods will allow standardised quantification of offtakes and resource densities. 1&2. Level of acceptability of simplified protocols is sufficiently high, and data acquisition can be sustained. 1&2. Harvest zoning agreements can be established and maintained. 2. A competent spatial modeller can be recruited to apply empirical results to a series of harvest mosaic scenarios based on spatio-temporal simulations. 2&3. Adequate students can be attracted from within partner institutions. 3. Assimilation by local community ‘monitors’ and MSc students of field course information is satisfactory. 4. Impact of the SDS/INPA Technical Workshop and publications are sufficiently significant to influence wildlife management policy through IBAMA, IPAAM, and MMA (Ministry of Environment). 4. Level of receptivity and uptake of resource management guidelines at RDS Uacari and RESEX Medio-Jurua are satisfactory.

	<p>different source-sink scenarios.</p> <p>3. Minimum of 49 local monitors and 10 Brazilian students trained in quantitative biodiversity surveys, and harvest assessments.</p> <p>4a. A user-friendly, illustrated <u>community-based</u> wildlife management (CBWM) handbook that can be distributed to rural communities of lowland Amazonia.</p> <p>4b. Publications, presentations and SDS workshop, Manaus.</p>	<p>management handbook successfully developed and widely disseminated.</p> <p>4b. Twelve papers in peer-reviewed scientific journals, and high-circulation Brazilian science magazines.</p> <p>4a & 4b. Copies of all publications, conference abstracts and workshop proceedings sent to DEFRA (Darwin Initiative).</p>	<p>4. Results are adequate to provide novel publications with national and international impact.</p> <p>4. Level of receptivity and uptake of resource management guidelines are satisfactory in other State of Amazonas reserves where the project 'toolbox' approach is applied.</p>
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Activities	Activity Milestones	Assumptions
<p>GIS mapping of the reserves and forest types, establishment of harvest and population census protocols, experimental design and considerations of spatial scale;</p> <p>Training of local community monitors, Brazilian <u>MSc</u> students and reserve staff;</p> <p>Field research programme involving the delimitation and implementation of experimental no-take areas following wide consultation with <u>at least 20 of the 49</u> local communities.</p> <p>Data analysis and spatial modelling;</p> <p>Dissemination of results;</p> <p>SDS/INPA Workshop.</p>	<p>Yr1: Formal assessment of RDS Uacari and ResEx Médio Juruá, including spatial mapping of forest types, local communities, and stream subcatchment basins, and establishment of harvest protocols (4 months; Sept-Dec 2007).</p> <p>Yr1: Leaders of all <u>49</u> local communities attend the initial planning meetings and training sessions; Selection of Brazilian students from collaborating institutions; Initiation of short field courses and supervised training programme; Experimental no-take areas are delimited and begin operating (6 months; Sept – Feb 2007/08).</p> <p>Yr1 - Yr3: Sampling protocols agreed by July 2007. Household-level surveys targeting specific resource types and fieldwork begin, including 24 month quantification of seasonal changes and phenological patterns of resource populations and their food supply (Sept 2007 - Aug 2009).</p> <p>Yr 3: Ongoing analysis and spatial modelling conducted throughout the period of data collection will be enhanced and finalised within a 6 month period following termination of field data collection (Sept 2009 – Feb 2010).</p> <p>Yr 3 – Yr4: SDS/INPA Workshop; First high-impact publication and management handbook (March 2010) followed by others both in Portuguese and English. Information summarised and presented to the State of Amazonas and Brazilian Federal Government.</p>	<p>GIS mapping can be completed both at UEA and SDS on the basis of high-resolution satellite images and initial field surveys.</p> <p>INPA and SDS contacts are in place; Fieldwork logistics can be implemented at Carauari, Amazonas; <u>boats and other equipment</u> are purchased and field station is refurbished.</p> <p>Local communities become willing collaborators, as indicated by partner institutions.</p> <p>Deployment of experimental no-take areas can be agreed upon following mapping of catchment areas, as indicated by collaborating institutions.</p> <p>Theoretical and applied results are written-up. Illustrator completes hand-drawings. Workshop is well attended by IPAAM, SDS, IBAMA and INPA staff.</p>

21. Provide a project implementation timetable that shows the key milestones in project activities.

Project implementation timetable		
Date	Financial year	Key milestones
Sept 2007	Apr-Mar 2007/08	Consultation meeting in Brasília with CNPT/IBAMA head office.
Sept 2007	Apr-Mar 2007/08	Planning meeting in Manaus with SDS and IBAMA, that is also attended by INPA collaborators.
Sept 2007	Apr-Mar 2007/08	Purchase of project equipment in Manaus, including boats and outboard motors.
Sept-Oct 2007	Apr-Mar 2007/08	Refurbishment and upgrading of Research Station at the Community of Bauana, RDS Uacari; installation of solar panels to power laptops.
Sept – Jan 2007/08	Apr-Mar 2007/08	Formal assessment of RDS Uacari and ResEx Médio Juruá, including spatial mapping of forest types and stream subcatchment basins; mapping of the spatial distribution and census of the human population of both reserves, mapping of

		local community harvest areas of different resource types.
Sept–Feb 2007/08	Apr-Mar 2007/08	Establishment of sampling protocols including game harvest profiles, line-transect censuses, mapping and first census of key NTFP populations, phenological monitoring, and permanent tree plots.
Oct 2007	Apr-Mar 2007/08	Leaders of all 49 local communities attend the initial planning meetings and training sessions; Selection of Brazilian students from collaborating institutions; Initiation of short field courses and supervised training programme.
Dec 2007	Apr-Mar 2007/08	All sampling protocols designed, agreed and in place.
Dec 2007	Apr-Mar 2007/08	Experimental no-take areas are delimited within each focal community territory and begin operating.
Sept–May 2007/08	Apr-Mar 2007/08 Apr-Mar 2008/09	Household-level surveys targeting specific resource types and fieldwork begin, including 24 month quantification of seasonal changes and phenological patterns of resource populations and their food supply.
Sept 2008	Apr-Mar 2008/09	Full compilation of Yr 1 data, accompanied by data summaries to be presented to local communities of both reserves at Bauana (RDS Uacari) in first Review Meeting.
Sept 2008	Apr-Mar 2008/09	Spatial mapping of hunting catchment areas of the 49 communities completed; spatial distribution of all key NTFPs mapped within the territories of ~25 communities.
Oct 2008	Apr-Mar 2008/09	Second field course and training sessions
Sept - Feb 2009/10	Apr-Mar 2009/10	Ongoing analysis conducted throughout the period of data collection will be enhanced and finalised within a 6 month period following termination of field data collection.
Sept - Feb 2009/10	Apr-Mar 2009/10	Realistic harvest scenarios are simulated using a spatial modelling approach based on project data (Yr 1 and 2)
Sept 2009	Apr-Mar 2009/10	Full compilation of Yr 1 and 2 data, accompanied by data summaries to be presented to local communities of both reserves at Bauana (RDS Uacari) in second Review Meeting.
Sept 2009	Apr-Mar 2009/10	Camera-trapping sampling programme completed.
Oct 2009	Apr-Mar 2009/10	Third field course and training sessions.
March-May 2010	Apr-Mar 2009/10	First high-impact publication, followed by others both in Portuguese and English. Information summarised and presented to the State of Amazonas and Brazilian Federal Government.
Aug 2010	Apr-Mar 2010/11	Final report to SDS and Integrated Reserve Management Plan for RDS Uacari and RESEX Médio-Juruá.
Sept 2010	Apr-Mar 2010/11	Printing and distribution of CBWM handbook begins.
Sept 2010	Apr-Mar 2010/11	SDS/INPA technical workshop in Manaus

22. Set out the project's measurable outputs using the separate list of output measures.

PROJECT OUTPUTS		
Year/Month	Standard output number	Description (include numbers of people involved, publications produced, days/weeks etc.)
<u>TRAINING</u>		
By Aug 2010	6A	A total of approximately 60 local community 'monitors' trained in resource monitoring field techniques
Oct 2007, Oct 2008, Oct 2009	6B	Three field-courses delivered to local-community 'monitors' over 9 weeks in 3 consecutive years
By Aug 2010	4A	12 Brazilian undergraduate students from the State of Amazonas trained in resource monitoring field techniques
By Aug 2010	4C	20 post-graduate students (from Brazil and neighbouring Amazonian countries, e.g. Bolivia, Peru, Colombia) trained in resource monitoring field techniques
Nov 2007, Nov 2008, Nov 2009	4D	Three field-courses delivered to undergraduate and post-graduate students over 9 weeks in 3 consecutive years
By Sept 2010	2	A minimum of 5 MSc theses completed by Brazilian students
By Sept 2010	3	A minimum of 3 BSc theses completed by Brazilian students
Throughout the project	6A	Two full-time MSc-level project staff members, who will help to manage the project, receive the above training plus extensive training in project management
By Sept 2008	6A	Five Brazilian wildlife biologists trained in line-transect census and camera trapping techniques, and correspondent data analysis
By Sept 2009	6A	Reserve personnel in Carauari trained in reserve spatial mapping, including the use of a GIS
Sept 2010	7	A Community-Based Wildlife Management Handbook (in Portuguese) is produced to be widely disseminated by SDS, IPAAM and IBAMA across local communities and reserve directors of Amazonian sustainable development and extractive reserves
Sept 2010	7	A condensed version of the above [7] is produced in the form of an illustrated leaflet (approx. 20 pages)
Sept-Nov of 2007, 2008 and 2009	8	A minimum of 32 weeks to be spent by UK project staff (C Peres and Spatial Modeller) at the two focal reserves. This excludes advisory, administrative and political meetings to be held in Manaus and Brasília.
Sept 2010	9	An Integrated Reserve Management Plan is produced for the adjacent reserves of RDS Uacari and RESEX Médio-Juruá.
<u>RESEARCH</u>		
By Dec 2010	11A	Approximately 15 papers to be published in peer-reviewed journals in the areas of conservation biology, tropical ecology,

		wildlife management, and applied plant population ecology.
By Dec 2010	11A	Four or more popular science papers, illustrated by colour plates, to be published in Brazilian newsstand magazines such as <i>Ciência Hoje</i> , <i>Natureza & Sociedade</i> , and <i>Terra da Gente</i> .
Sept 2010	12A	Fifteen datasets and dynamic databases to be established and handed over to SDS and IBAMA.
Sept 2010	13A	At least 10 species checklists coded by forest types to be made available to SDS and IBAMA.
Sept 2009	13A	A reference catalogue of dung-beetles of Rio Juruá, illustrated by digital photos is made widely available.
<u>DISSEMINATION</u>		
Sept 2010	14A	Yr 3 Project Workshop in Manaus, to be attended by SDS/IPAAM, IBAMA, and INPA staff and reserve managers, synthesizing the applied project results, and how these can be extended to other reserves.
July 2011	14A	A symposium containing a strong input from project members and reporting project results to be presented at the 2011 congress of the Society for Conservation Biology
From July 2009	14B	At least 5 papers presented in national and international conferences organized by academic societies.
<u>PHYSICAL ASSETS</u>		
Sept 2010	15A	Three articles released to contact-journalists writing for the Environment weekly of <i>Folha de São Paulo</i> , the largest broadsheet newspaper in the southern hemisphere.
Jan 2008	20	Bauana Field Station at RDS Uacari refurbished and equipped (costing ~£3,000)
Sept 2010	20	One laptop and a desktop, equipped with the appropriate software, handed over to reserve office in Carauari.
Sept 2010	20	Two 8-m aluminium boats powered by 30HP outboard engines to be handed over to reserve office in Carauari.
Sept 2010	21	Bauana Field Station adequately developed and equipped to serve as a permanent research station and logistical base for future Amazonian forest ecology field courses
March 2009	22	Thirty 1-hectare permanent tree plots (established according to RAINFOR guidelines) to be recensused over many years after the project is discontinued.
March 2009	22	Approximately 4,000 number-tagged trees included in phonological monitoring available for future studies
From Sept 2008	22	Twenty 'no-take areas' in sub-catchment basins >5,000 ha, established within 20 community territories, to be monitored post-project.

<u>FINANCIAL</u>		
From Sept 2007	23	US\$30,000 to be allocated to project operational costs raised from Conservation International
From Sept 2007	23	Some £220,000 in salaries effectively allocated to SDS, IBAMA and INPA staff expected to work with the project.
From Sept 2007	23	A substantial support in kind in terms of office and laboratory facilities at SDS-Manaus, IBAMA-Manaus, INPA-Manaus, the SDS and IBAMA offices in Carauari, and the field station of Bauana (value cannot be estimated at present).
From Sept 2010	23	Future extension and application of project results to be funded by Brazilian (state- or federal-level) reserve management agencies.

PROJECT BASED MONITORING AND EVALUATION

23. Describe, referring to the Indicators in the Logical Framework, how the progress of the project will be monitored and evaluated, including towards delivery of its outputs and in terms of achieving its overall purpose. This should be during the lifetime of the project and at its conclusion. Please include information on how host country partners will be included in the monitoring and evaluation.

The project will be conducted in close collaboration with SDS-Amazonas and IPAAM. SDS organizes and deploys small annual expeditions to the reserves they created to hold meetings with the leadership council of local communities, assess compliance with regional scale reserve regulations, adherence to the reserve Management Plan, if one exists, and discuss new proposals. This is an opportunity to independently verify project activities and performance, and evidence-based conservation dividends. In addition, following the initial training period, we will maintain continuous research presence based at the SDS research station (located at the Bauana community) by hiring a full-time MSc-level project field coordinator who will be in charge of project logistics, organizing data acquisition, and reinforcing training. SDS staff, including three wildlife biologists and a GIS expert will also spend approximately 3 months per year at RDS Uacari, ensuring further physical presence of investigators and continuity of project activities. The day-to-day running of the project will also be assisted by both the IBAMA and ASPROC (Association of Rural Producers of Carauari) in the nearest town, which will provide office support to both RDS Uacari and RESEX Médio-Juruá. Daily contact between the reserve headquarters and this office is possible using a two-way radio, which will facilitate purchases of field supplies and reinforce verification of project activities. Project monitoring will also be able to count on email communication via the project office in Carauari. Both IBAMA and SDS/IPAAM are likely to implement a technical extension programme in other state-level forest reserves, following the project outcome presented at the Manaus Workshop in August 2010. The subsequent policy impact of project results throughout the network of Amazonian Sustainable Development and Extractive Reserves can be measured by possible changes in reserve management legislation and the emergence of new community-based resource management programmes in many other reserves.