



## Darwin Initiative Annual Report



Important note:

To be completed with reference to the Reporting Guidance Notes for Project Leaders – it is expected that this report will be about 10 pages in length, excluding annexes

Submission deadline 30 April 2009

### Darwin Project Information

Project Ref Number	162/16/005
Project Title	Biodiversity inventory and monitoring for conservation of threatened Sumatran forest
Country(ies)	Indonesia
UK Contract Holder Institution	The RSPB
Host country Partner Institution(s)	Royal Botanic Gardens, Kew
Other Partner Institution(s)	Burung Indonesia
Darwin Grant Value	£259,159
Start/End dates of Project	1 December 2007 – 30 November 2010
Reporting period (1 Apr 200x to 31 Mar 200y) and annual report number (1,2,3..)	April 2008 to March 2009 Annual report 2
Project Leader Name	Jeremy Lindsay
Project website	<a href="http://www.harapanrainforest.org">www.harapanrainforest.org</a>
Author(s) and main contributors, date	David Lee, William Rombang, Jeri Imansyah, Jeremy Lindsay, Ian Rowland April 2009

### 1. Project Background

Sundaic lowland forest is one of the most biodiverse habitats in the world yet one of the most threatened. Current pressure to convert forest to oil palm for biofuel production has resulted in the large-scale loss of lowland forest from Sumatra. Very few areas of lowland forest remain outside of protected areas and large areas of logging concessions are at risk of permanent conversion to alternative landuse. In response to this, the Indonesian government recently introduced a new management category for production forests: ecosystem restoration. Harapan Rainforest, in south-central Sumatra (Jambi and South Sumatra provinces), is the first (and so far only) area to be designated to this category. The management licence for this site has been awarded to PT Restorasi Ekosistem Hutan Indonesia (PT REKI), a company established by a consortium of the RSPB, Burung Indonesia and BirdLife International, specifically to hold the licence. The shareholding of the company is held by a not-for-profit foundation, Yayasan Konservasi Ekosistem Hutan Indonesia (Yayasan KEHI), established by the consortium to undertake the day-to-day management of Harapan Rainforest.

Management activities on the site have now commenced. Effective management of the site requires good quality biological data to inform management decisions and to monitor progress. This Darwin project is focussing on collecting good baseline data through inventory fieldwork and establishing a monitoring system for ongoing assessment. This is being delivered through the development of a research centre in the forest and the provision of training to project staff.

## 2. Project Partnerships

Project partnerships:

Management structure of research section:

There have been some important and valuable additions to the research team over the reporting period. Two Indonesian counterparts have been appointed, Willy Rombang in June 2008 and Jeri Imansyah in December 2008. Both have considerable experience working in ecology and conservation in Indonesia, with Willy's background primarily in birds and Jeri's in herptiles, having worked in Komodo National Park. Both are employed as project Biodiversity Officers and report directly to the lead scientist, David Lee (DL). They are responsible for assisting in all aspects of the research programme, including organising field surveys, training field staff in survey techniques and data recording and entry, producing training materials and managing biodiversity data. Six forest patrol staff are currently working full-time on the research programme, conducting mammal and hornbill survey work and having ongoing training. Two other key staff under DL's management are Paul Hultera, a GIS specialist, and Yafid Gunawan who spends c. 50% of his time with DL, primarily managing the herbarium, library and research equipment.

Collaborations/partnerships:

Following the visit in March-April 2008 by members of the herbarium at Royal Botanic Gardens, Kew, the project has provided Kew with duplicates of all plant specimens collected at the site. So far, 180 plant specimens have been sent to Kew for identification. This collaboration is maintained through regular email communication, through which the project receives specimen identification updates and ongoing guidance in plant collecting and herbarium techniques, including the building of the on-site herbarium facility. New identifications are added to the project's specimen database and specimens held in the on-site herbarium.

The project continues to collaborate successfully with Bogor Herbarium, Indonesian Institute of Sciences (LIPI). The project has sent duplicates of all botanical specimens to Bogor Herbarium for identification and to strengthen their own collection. Two staff from Bogor Herbarium, led by Dr Teguh Triono, the Head of the Taxonomy and Research Group, who assisted on the Kew training course held at Harapan Rainforest in March-April 2008 continue to support the research and restoration activities. They have assisted Willy Rombang in translating into Indonesian the Forest Research and Restoration Unit (FORRU) publication *How to Plant a Forest - The Principles and Practice of Restoring Tropical Forest*. This will be freely available via the new Harapan Rainforest website and also electronically disseminated to all collaborating and potential partners in Indonesia. One of the herbarium staff visited Harapan Rainforest in October 2008 to assist our Herbarium Officer in classifying some of the specimens collected in the site. He also spent time in the surrounding forest identifying tree species and adding considerably to our current botanical list. His visit coincided with that of Dr Steve Elliott (The Forest Restoration Research Unit at Chiang Mai University, Thailand (FORRU); see below) and helped in providing some broad classifications of forest type and possible suitable restoration strategies. They continue to provide guidance on tree species inventories and forest restoration. Discussions are ongoing over the possibility of sending two Harapan Rainforest project staff to Bogor Herbarium for a two-week mentoring programme in herbarium and plant identification techniques. This would be alongside the best botanists and plant taxonomists in Indonesia, while working on specimens collected from the Harapan Rainforest site. This would improve the project's capacity to identify tree species; assist in identifying habitat relationships of important birds and mammals; continue successful plant collection; help develop the on-site herbarium; and aid understanding of the plant communities at the site.

Formal presentations describing the project's research programme have been made to the biology and forestry departments of Jambi (Jambi Province), Andalas (West Sumatra Province), and Sriwijaya and Muhammadiyah (South Sumatra Province) Universities. The presentations included identifying research areas where local universities can engage and inviting research proposals from those institutions. These have proven very promising with all four universities expressing interest in developing joint research activities at Harapan Rainforest. Jambi University has an interest in sustainable community development, while Sriwijaya University has a strong background in environmental monitoring for impact assessment, which links directly with the project's commitments to the Ministry of Forestry. The project is also offering the opportunity to graduate students to join project survey activities and conduct field research on a range of ecological and conservation topics, and two students from Muhammadiyah University are visiting Harapan Rainforest in May for 2-3 months' field experience in a range of restoration and conservation activities.

Andalas University has especially strong interest in tropical ecology and conservation, and discussions with them have involved Dr Novarino Wilson, the IUCN Tapir Specialist Group's country coordinator. He is supporting a tapir research proposal the project is submitting for external funds and is keen to develop a research programme with Harapan Rainforest. One of the University's staff accompanied a visiting overseas researcher (Ms Fangyuan Hua, University of Florida) to Harapan Rainforest in June-July 2008 and assisted her research on understorey bird populations in mixed forest habitats.

The project continues to collaborate with FORRU in Chiang Mai, Thailand (under their Darwin project: Facilitating Forest Restoration for Biodiversity Recovery in Indochina). Sean Marron, the executive head of the Harapan Rainforest Initiative, gave a presentation at a conference convened by the Forest Research and Restoration Unit in Chiang Mai in April. This resulted in agreement to translate into Indonesian the Darwin Initiative-funded FORRU book *How to Plant a Forest - The Principles and Practice of Restoring Tropical Forest*. This has now been done and is available via the project's website. Dr Steve Elliott, the lead project member of FORRU, visited Harapan Rainforest in October 2008 to provide training to key nursery and forest restoration staff. Two project staff will now visit one of FORRU's forest restoration sites.

Strong collaboration has developed between Harapan Rainforest and the Wildlife Conservation Society – Indonesia Program (WCS-IP). Meetings have taken place to discuss collaborative projects on large mammals, particularly tigers and elephants, while Hariyo Wibisono, the Tiger Conservation Program Coordinator, and one of his staff have lead a week-long training programme at Harapan Rainforest in mammal survey techniques. WCS-IP have an island-wide survey grid for Sumatran tigers, and four of the grid cells fall over Harapan Rainforest. Since Harapan Rainforest is identified as an important site for tigers in the province, the project will invite WCS-IP staff to the site later in the year to assist and train staff further in carrying out these tiger surveys. Hariyo Wibisono has also written a letter of support for a recently successful funding application to the International Bear Foundation (IBA) to study Malayan Sun Bear *Helarctos malayanus* in Harapan Rainforest.

Discussions are underway with Bogor Agricultural University (IPB) for their involvement in amphibian and reptile surveys at Harapan Rainforest. The project research team is scheduled to give a formal presentation to IPB in May to outline the project's requirements and to draft a research agreement that will include a herptile training programme at Harapan Rainforest, led by staff of IPB, and an ongoing herptile survey.

Regular communication has taken place with the Indonesian Nature Conservation Agency (Balai Konservasi Sumber Daya Alam, BKSDA). The head of BKSDA-Jambi, Didy Wuryanto, has visited Harapan Rainforest three times over the reporting period and expressed a strong interest in supporting the research activities of the project. He has written letters of support for two recently submitted funding applications: one to the United States Fish & Wildlife Service (USFWS) Great Apes fund for a population study of gibbons, and one to the USFWS Elephant fund for a DNA-based population study of Asian elephants, both of which include a strong training component for local conservation staff.

DL met the Singapore Hornbill Project in September 2008 to discuss a hornbill nest box scheme at Harapan Rainforest and has been in communication with various other regional specialists concerning hornbill nest boxing schemes, including Prof. Pilai Poonswad of Mahidol University (Thailand) and the Hornbill Research Foundation, the Malaysian Nature Society (MNS) and the Philippine Biodiversity Conservation Program (PBCP). DL attended the 5<sup>th</sup> International Hornbill Conference held in Singapore in March 2009, where he displayed a poster about hornbill conservation work in Harapan Rainforest (Annex 14). Many useful regional contacts were made on hornbill conservation as well as other key areas such as seed dispersal, forest restoration, large mammal surveys and training programmes. Dr Tomasso Savini (King Mongkut's University of Technology, Thailand) and Dr Anak Pattanavibool (Director of WCS-Thailand) expressed interest in the project and provided advice on mammal survey techniques, while Drs Margaret Kinnaird and Tim O'Brien (WCS) gave guidance on hornbill seed dispersal studies and possible PhD projects and funding.

The project has also received guidance and input from a number of other individuals: Simba Chan (Senior Conservation Manager at BirdLife International's Asia Division) is producing a field manual for forest waterbirds to help develop the bird identification skills of forest patrol staff, and particularly to aid them in accurately identifying the globally threatened Storm's Stork *Ciconia stormi*; Burung Indonesia for bird survey techniques; Nick Brickle (WCS-IP) for mammal survey techniques and, from this, helping to structure our mammal survey design to fit in with Sumatra-wide methods used by a number of conservation organisations (e.g. WCS-IP, Flora and Fauna International, FFI, Leuser International Foundation, LIF); Dr Susan Cheyne (Sebangau Gibbon Behavioural Ecology Project, SGBEP, and Wildlife Conservation Research Unit, University of Oxford) and Dr Anna Nekaris (Oxford Brookes University) have both provided scientific input to planned gibbon surveys at Harapan Rainforest; Dr. Noviar Andayani and Donny Gunaryadi (WCS-IP), Dr Ariyanti Oetari (Head of the Center for Excellence Indigenous Biological Resources-Genome Studies (CoE IBR-GS), University of Indonesia (UI)), Dr Simon Hedges (WCS-Elephant Coordinator), Mr. Gono Semiadi and Mrs. Teti Wirdateti (LIPI) have all provided scientific input to a project proposal submitted for a fecal DNA capture-recapture survey of Asian elephants in Harapan Rainforest; Dr Matthew Linkie and Debbie Martyr (FFI) have provided advice on large mammal work in Harapan Rainforest.

Matt Struebig of the Kalimantan Bat Conservation Project is planning to visit the site later in 2009 to run bat survey training along with LIPI counterparts, for species inventories and to develop research into the role that bats may play as seed dispersers in forest regeneration on the site.

Three staff from the Ministry of Forestry's Research and Development Agency (FORDA) carried out an update on previous research into flora, fauna and forest management on a plot set up under the previous logging concession.

J. Lindsell (Darwin project leader) and D. Gibbons (Head of Conservation Science, RSPB) visited the site for a 10-day trip in September 2008. One significant output from this visit was the development of a long-term research and monitoring plan to guide the work of the project, and in particular the research centre being established under this Darwin (see below). Ian Rowland (Tropical Forest Conservation Manager, RSPB) visited Harapan Rainforest six times during the reporting period, for up to two weeks on each occasion. During an April 2008 visit, he facilitated the visit of a forest carbon expert to begin evaluations into the carbon storage and sequestration capacity at Harapan Rainforest.

Most communications between project partners is via email.

#### Other Collaborations:

A number of researchers have visited Harapan Rainforest during the last year:

Richard Moore, a PhD student of Dr Anna Nekaris (Oxford Brookes University) visited Harapan Rainforest in March 2009 to assess the site's suitability for carrying out his proposed research on nocturnal mammals, including the Vulnerable Greater Slow Loris (*Nycticebus coucang*) and, if present, Horsfield's Tarsier (*Tarsius bancanus*). Funding-permitting, it is hoped he will be able to return to Harapan Rainforest later in 2009 to conduct a pilot study on the target species, while this visit would also include training project staff in nocturnal mammal survey techniques.

Fangyuan Hua from the University of Florida conducted two-months of fieldwork in preparation for her PhD on bird communities and forest recovery. Funding permitting, she will return in summer 2009 to continue her research. Mr Simba Chan (Senior Conservation Officer, BirdLife International Asia Division) and a staff member of Andalas University accompanied Miss Fangyuan Hua in a consultancy role.

Two researchers from the Southeast Asia Regional Programme of the World Agroforestry Centre (ICRAF) visited the site to assess whether it is a suitable study site for their Sumatran research on tree distributions at the landscape scale. They are currently finalising the report on their findings. The project is waiting to hear about these findings.

Dr Bambang Irawan, forestry lecturer in the Department of Agriculture at the University of Jambi, has visited the site twice. His PhD was in *Eusideroxylon zwageri* ('Bulian', ironwood) in Jambi and he has offered advice to our nursery staff on germinating this important species. Dr Rosyani, who also works in the Department of Agriculture, University of Jambi and focuses on human ecology and landscape ecology, has also visited the site twice. She also facilitated the formal presentation made to the university.

23 students of the Jambi University Nature Adventure Group (Mapala) visited Harapan Rainforest and spent the day with the research team. An informal education programme was run for them, during which they were introduced to the restoration and biodiversity activities of the project and were accompanied on a short forest trek.

Jim Glover and Chris Shepard (RSPB sabbatical volunteers) visited the project for two weeks to assess its potential for ecotourism. They also produced a bird species list for a yet unvisited location within the project area.

In January 2009, Fiona Thomson, an RSPB volunteer, spent three weeks at Harapan Rainforest developing a new project website and training Yafid Gunawan, IT/Herbarium Officer, in web design skills. This website has a visible designated research and conservation section, within which details of all research activities will be placed, including recent and archived camera-trap photos. The site also outlines the research interests of the project and provides opportunity for people to approach the project with research ideas.

Other site visitors during the reporting period include: HRH Prince of Wales in November 2008 (Annex 16); the UK Embassy and Clarence House in preparation for HRH Prince of Wales site visit; the Indonesian Minister of Forestry prior to and during the visit of HRH Prince of Wales; representatives of Singapore Airlines; French Development Agency (February 2009); Japan International Development Agency (March 2009); and members of the Taiwan Bird Society (March 2009).

Several local journalists have visited Harapan Rainforest throughout the year, while a number of international journalists visited the project at the time of HRH Prince of Wales' visit.

### 3. Project progress

#### 3.1 Progress in carrying out project activities

Output 1: Baseline biodiversity inventory completed

Indicator 1a: Species lists compiled for birds, mammals, trees, herptiles, Lepidoptera, herbaceous plants

Continued progress has been made in activities towards the baseline inventory. Additional key items have been purchased, including more binoculars for the forest patrol staff working with the research team and reference books. Ten camera traps (Reconyx RC55) have been purchased and the project has secured additional funds to buy another 12 units. The project has field equipment to support two survey teams, e.g. tents, rucksacks, cooking equipment, GPS units, and digital cameras.

The on-site herbarium contains 180 botanical specimens, while a further c.260 species have been identified in the field by staff of Bogor Herbarium (Annex 3).

All observations of important mammal and bird species are being geo-referenced and added to a database linked to the project's GIS. This helps support management, conservation and restoration activities.

Species lists for birds, mammals, herptiles and trees have been added to over the last 12 months. To date, 293 bird species have been recorded in Harapan Rainforest, with 19 of these being new site records added in the reporting period (Annex 4). One of these is of conservation concern - Olive-backed Woodpecker (*Dinopium rafflesii*) listed as Near-Threatened. There have been five recent records of the most threatened bird on the site, Storm's Stork (*Ciconia stormi*) (Endangered), from three general locations that initial surveys suggest may contain suitable swamp forest habitat for this important species. Further species-specific surveys are planned for later this year.

Of the 54 mammal species with recent records in the site, no less than 25 are considered of conservation concern in the recent IUCN red-listing (2008) (Annex 5). There are now 1 Critically Endangered, 8 Endangered, 9 Vulnerable and 7 Near-Threatened species known from Harapan Rainforest. Although most of these mammals have been recorded in the region in recent years, six are new records for Harapan Rainforest itself: Dhole (*Cuon alpinus*; Endangered), Clouded Leopard (*Neofelis nebulosa*) and Binturong (*Arctictis binturong*) (both Vulnerable), Asian Golden Cat (*Pardofelis temminckii*) and Black-banded squirrel (*Callosciurus nigrovittatus*) (both Near-Threatened) and Short-tailed Mongoose (*Herpestes brachyurus*). In the last twelve months, forest patrols have recorded Sumatran Tiger on 19 occasions.

Preliminary nocturnal 'lamping' herptile surveys have begun by Jeri Imansyah, who is also preparing a herptile survey training programme with Bogor Agricultural University (IPB).

Field data sheets for mammal surveys (occupancy, line transects, and camera-trap) and hornbill surveys have been agreed with the Wildlife Conservation Society – Indonesian Programme (WCS-IP), and Hornbill Research Foundation and Malaysian Nature Society respectively, translated, and are now in use by the research team. All biodiversity survey data is entered onto computer and stored electronically.

Indicator 1b: Accumulation curves approach asymptote, even geographical coverage achieved, abundance estimated for some groups and habitat structure and condition measured

The bird species accumulation curve, based on monthly accumulation of new species records, is now approaching asymptote for the area visited, although even geographic coverage has not yet been achieved due to access difficulties. It is hoped this problem will be rectified in the coming months.

An intensive tree inventory (IHMB) and some habitat structure data are being collected from survey plots across the concession in order to fulfil the requirements specified by the Ministry of Forestry (MoF) under the terms of the concession agreement. Although the design and methods of this rapid assessment survey are specified by the MoF and it has, by definition, to be implemented extremely rapidly, it will nonetheless provide an extremely valuable dataset on tree species diversity and distributions, approximate stocking levels, carbon density, regeneration potential, levels of human impacts and ground-truthing data for remote sensing interpretation. Although tree identification expertise is required by the project to complete full tree inventories within habitat plots, and it is hoped this can be provided by Bogor Herbarium or Bogor Agricultural University (IPB), currently the only information that is required by the Ministry is for the main timber tree species. To date, 270 of c.350 0.25ha forestry plots in the south of the site have been completed by the forestry team of Harapan Rainforest: there are likely to be a further c.350 plots in the north of the site stipulated by the MoF. These staff were trained by the research team prior to starting the forestry plot surveys. These data are currently being entered electronically and will be analysed to assess habitat structure and condition. The research team help monitor the progress of the forestry team and plan to revisit a sample of these plots in order to verify the accuracy of data collection. These surveys are also being used for training in habitat survey methods and capacity building.

A further requirement under the licence agreement is to establish a series of 1-hectare permanent sample plots in each forest block identified by the MoF. Although their request does not consider habitat type *per se*, the plots do fit our own interests closely and will allow for some verification of the wide scale rapid survey discussed above. These plots will be integrated with the design for mammal and bird surveys.

Indicator 1c: Specimens and photographic records collected for some groups

The 180 botanical specimens collected during the Kew and Bogor herbaria visit/training course in March-April 2008 have all been identified and are housed in the on-site herbarium.

Duplicates are held with the two partner herbaria. Photographic collections of herptiles, butterflies and dragonflies are being added to and stored electronically on-site. Members of the Nature Society Singapore have offered to help identify photos of these taxa. The project is considering whether a photographic database would be more appropriate for these taxonomic groups as opposed to traditional specimen collection. It is hoped that an RSPB member of staff on sabbatical will be able to help compile a reference species list for butterflies likely to occur on the site using published records and collections.

Output 2: Understanding of relationship between forest condition and species response yields practical outcomes

Indicator 2c: Key outstanding research needs identified

A document providing an overview of the priority research areas that should be addressed by the Harapan Rainforest research station has been produced (Annex 12). This takes into consideration the requirements of the Ministry of Forestry under the terms of the concession as well as the key areas pertinent to forest restoration and conservation. At present this document is largely aspirational since resources are limited but it provides framework for decisions making and future planning. In order to increase the delivery of work under this document, the project and its key research needs have been presented to four local universities, inviting research proposals on these topics from them. A fifth university (Bogor Agricultural University - IPB) is being visited in May 2009. Secondly, funds are being sought from a variety of sources to help support key research activities. Proposals have been submitted to Busch Gardens for expansion of the hornbill nest-box programme, the People's Trust for Endangered Species for a survey of Asian Tapir *Tapirus indicus* and purchase of more camera-traps, and the United States Fish and Wildlife Service Great Ape and Asian Elephant funds to study gibbons and elephants respectively. The project has successfully raised \$9,500 from the International Bear Foundation to study sun bears in Harapan Rainforest and these funds will help support and expand the ongoing camera-trapping programme.

Disney Conservation Funds have been used to build and erect twenty artificial nest boxes for hornbills. These are in place to provide a key resource to these species, for which natural nest sites are considered limiting in Harapan Rainforest. These are monitored regularly by the research team. To date, no breeding activity has been recorded at the nests, although similar projects in Thailand state that, on average, it takes three years from inception for hornbills to start using artificial nest boxes.

Output 3: Plan for monitoring key taxonomic groups established

Indicator 3a: Monitoring protocols conform with published best practice and agreed by independent relevant taxa experts

Baseline surveys are ongoing; they are conducted in parallel with ongoing training activities for project staff. Some areas of the site have yet to be visited due to access difficulties; as much of this is related to season, it is hoped these areas will be visited in the coming dry season. The monitoring methods for mammals, which are largely finalised, have developed from the baseline survey approach; the remaining gap is for small mammals, which will require specific trapping surveys to complete this species list. Bird monitoring protocol is finalised for hornbills, a key species group for site restoration, and is largely agreed for all other species. Habitat survey requirements are largely defined under the MoF requirements.

Monitoring of birds, mammals and habitat will include the requirements of the MoF, and these are based on a block-by-block survey approach to the whole site (Annex 9). The MoF does not specify exactly what is required within each survey block, except that all work is scientifically defensible. Annual monitoring will include one habitat block which will change year to year in addition to five permanent survey locations proportionally representing the main habitat types.

Within each of these the following will be carried out, with approximate survey effort:

Camera trapping (between 12-16 locations for six weeks at each site)

Mammal occupancy survey (2 x occupancy survey cells = c.42km recce transect)

Distance sampling line transects of some mammal and bird species (5 x 4.2km transects)

Distance sampling point transects for most bird species (10 x 1.4km transects of 8 points)

Habitat survey plots at each point transect (80 x 0.2ha plots)

The methods for mammal surveys are largely finalised, after discussions with regional experts in large mammal surveying including Hariyo Wibisono, Simon Hedges and Nick Brickle (all of WCS). The main emphasis is on following methods that are being implemented across Sumatra concentrating on assessing tiger prey distribution through occupancy surveys. This is an internationally recognised and standard method for assessing a key correlate of tiger abundance (Karanth *et al.*, unpub. 2007). The method entails recording the presence (from direct observations and signs) of tiger prey species in a grid of sample squares. Each square is 3.6 km x 3.6 km and divided into quarters with each quarter taking one day to survey. Six squares have been surveyed as part of the ongoing mammal survey training programme and baseline mammal surveys, and new/fresh evidence of the Critically Endangered Sumatran Tiger (*Panthera tigris sumatrae*) was recorded in five of the squares: in two cases, tracks were less than six hours old. Eleven local forest patrol staff were formally trained in these survey techniques, including mammal sign identification, by experienced WCS-IP staff for one week in December 2008. Since then six forest patrol staff have been retained by the research team as part of a continuing training programme and for the baseline survey work. Two additional forest patrol staff have joined each mammal survey since December on a rotating basis as part of the project's commitment to increase capacity in the forest patrol staff (Annex 7).

Tiger prey surveys will be complemented by line transect surveys of arboreal and more visible species and supplemented with automatic camera surveys. All three survey types will be carried out at each survey location visited in Harapan Rainforest, and will include the annual species and habitat survey blocks specified by the Ministry of Forestry. Ten automatic cameras have been purchased (Reconyx Rapidfire RC55) and are undergoing field trials at present with very encouraging results (Annex 16). 25 mammal species has so far been recorded by the cameras, including Mitred Langur (*Presbytis melalophos*) and Sunda Pangolin (*Manis javanicus*), both recently uplisted by IUCN to Endangered, Western Bearded Pig (*Sus barbatus oi*) and Pig-tailed Macaque (*Macaca nemestrina*), both now listed as Vulnerable, and the Critically Endangered Sumatran Tiger (*Panthera tigris sumatrae*), Malayan Tapir (*Tapirus indicus*) and Dhole (*Cuon alpinus*) (both Endangered), and Malayan Sun Bear (*Helarctos malayanus*), Binturong (*Arctictis binturong*) and Banded Palm Civet (*Hemigalus derbyanus*) (all Vulnerable). Five ground bird species have been 'captured', including the Vulnerable Crestless Fireback (*Lophura erythrophthalma*). WCS-IP staff have offered training and input to mammal survey design and implementation. They have also supported the project's successful bid for funding Sun Bear research at Harapan Rainforest. FFI have also provided input to the design of mammal survey work at Harapan Rainforest.

Dr. Noviar Andayani and Donny Gunaryadi (WCS-IP), Dr Ariyanti Oetari (Head of CoE IBR-GS, UI), Dr Simon Hedges (WCS-Elephant Coordinator), Mr. Gono Semiadi and Mrs. Teti Wirdateti (LIPI) have all guided and advised on the appropriate survey techniques for surveying elephant populations in situations like Harapan Rainforest and helped shape a recent funding proposal for this research.

Dr Novarino Wilson (IUCN Tapir Specialist Group) has provided advice on surveying tapir, particularly using camera-traps.

Siew Te Wong (Bornean Sun Bear Conservation Trust and the University of Montana) has provided a great deal of support for all Sun Bear work at Harapan Rainforest: he is very keen to help develop with Harapan Rainforest shared and standard methods for work on this species in the region. He has also advised on camera-trap work and transect survey design with this species in mind.

Proposed gibbon survey work has received technical advice from Dr Susan Cheyne (SGBEP and Wildlife Conservation Research Unit, University of Oxford) and Dr Anna Nekaris (Oxford Brookes University).

The Hornbill Research Foundation, MNS, Singapore Hornbill Project and PBCP have all provided advice on hornbill nest boxing schemes and surveying hornbill populations.

FORRU has provided input to restoration activities at Harapan Rainforest and supported the successful Sun Bear funding proposal.

Kew and Bogor Herbarium have been consulted over plant specimen collection techniques and on-site storage and management of herbarium specimens and provide continual input to these activities.

Output 4: Capacity of local staff to undertake monitoring established and secured

Indicator 4a: Majority of monitoring data collected by project-trained staff in accordance with protocols

A number of training courses coordinated by the research programme have taken place over the reporting period involving local staff members.

Willy Rombang and Paul Hultera led a one-week training course in forest inventory and survey methods for 12 project forestry staff (August 2008). This training followed the Ministry of Forestry requirements and methods for surveying forest for restoration. Topics included how to mark out sample plots and to collect vegetation data. A summary field manual was produced along with field data sheets (Annex 10). The project's two forestry officers were also in attendance. The ability and consistency of the 12 forestry field team members have since been re-evaluated by the project's forestry officers to help maintain data collection quality (Annex 11).

In December 2008, Hariyo Wibisono, the WCS-IP Sumatran Tiger Project Coordinator, and one of his staff lead a week-long training programme at Harapan Rainforest in large mammal survey techniques (Annex 6). Eleven local project staff attended and were trained in camera-trap usage, line transect and occupancy survey techniques, including conducting the surveys, data recording and data entry. They were also taught basic mammal ecology to help them better understand the reasons for choosing certain survey approaches for particular mammal species. Training included three days practical sessions and resulted in recording Sumatran Tiger (*Panthera tigris sumatrae*) within 2 km of the main project camp. All trainees were assessed by the WCS-IP staff (Annex 7) and given certificates reflecting their theory and practical ability (Annex 8). Six of these 11 staff are now being training as project biodiversity survey staff. WCS-IP left their complete mammal survey training syllabus with Harapan Rainforest for future internal training programmes and ongoing development of individual project staff.

A one-month tree climbing training course was run at Harapan Rainforest by Rakata Adventure Group, Jakarta in December 2008. Eight project forest patrol staff were trained in various climbing techniques and safe procedures for working at heights. During this time 20 artificial nest boxes for hornbills were erected. The ability of the trainees was evaluated by the four trainers from Rakata and certificates awarded (Annex 13). This training was to build project capacity in two areas: to maintain and develop the hornbill nest box scheme; and to enable staff to build fire platforms in trees from which potentially vulnerable areas of the site can be monitored during the dry season for possible fires. Four complete sets of climbing equipment were purchased by the project.

Dr Steve Elliott (FORRU) spent one week in October 2008 developing project capacity in forest restoration techniques, including nursery management, tree planting, and phenology studies (Annex 15). Fifteen project staff attended, and included the project forestry officers and some of the forest survey staff, alongside the Biodiversity Officers and DL. This has resulted in an improved understanding of nursery skills and tree planting. Due to project staffing limitations and the pressing need to complete the Ministry of Forestry survey requirements, the phenology skills have yet to be employed in the field. It is hoped this will begin in combination with biodiversity surveys from July 2009.

Nine forest patrol staff have been trained in hornbill survey techniques and eight staff in methods to search for potential hornbill nesting trees (**Error! Reference source not found.**).

All mammal and hornbill survey trainees have received map-reading and GPS training.

In total, 31 project staff have received at least one-week (and up to five weeks) formal training during the reporting period. Six forest patrol staff have now spent three months working full-time with the research team being continually trained in and conducting mammal surveys.

Urip Wiharjo, the project's restoration officer, participated in the International Tropical Timber Organisation and Ministry of Forestry's training for criteria for sustainable forestry. DL undertook an intensive 4 week language training course on Java at the outset of this reporting period and is now proficient with his language skills so he can operate independently of translators in all areas of his work.

Paul Hultera, the GIS officer, spent three days in June with the South Sumatra Forest Fire Management Project, Palembang, learning about capturing (collecting), storing (management) and analysing forest fire (MODIS hotspot) data. The research programme has also helped him secure a global scholarship to attend in July 2009 a two-week Society for Conservation GIS (SCGIS) training course in the application of GIS for the conservation of species and natural resources, and to attend and present at the ESRI User and SCGIS Annual Conferences in California.

Most project training courses have been accompanied by an assessment of each trainee given by the course leader (see Annex 7 for examples).

#### Output 5: Research and training centre established

The research section of Harapan Rainforest now has a physical premises for research and training (Annex 16). Two shipping containers have been salvaged from old logging activities and arranged side by side with a roof over the intervening space. One container has been air conditioned to provide climate control for herbarium specimens. The second container is being developed into an on-site library and research equipment store. The library consists of books (>100 books, manuals, reports), paper copies of journals, and will include a wireless-connected desktop computer (due in May 2009) that will hold electronic journals (>700 including paper copies), along with biological data useful for visiting researchers. Research field staff will use this computer to enter field data. A reference library of plaster casts of animal footprints has been started. The premises will house other materials besides the herbarium collection, providing they are compatible. This building also functions as a focus of research and monitoring activities, being the office space for the Biodiversity Officers and where research meetings and classroom training takes place

##### Indicator 5a: Regular collaboration with visiting researchers by year 3

The project has already received one visiting researcher from the University of Florida and her field team, and a PhD student from Oxford Brookes University. The former is investigating the impacts of forest fragmentation in the landscape on the bird communities, and the latter is studying nocturnal prosimians. Interest has also been received from a number of other researchers with a range of interests from herpetology to remote sensing.

Visitors to Harapan Rainforest provide training opportunities for project staff and data for the project's databases. Where appropriate, visiting researchers are requested to share their data with the project and to work with project staff to broaden their experience. They are also requested to enter significant biodiversity records in a visitors' book.

##### Indicator 5b: Regular training courses being held by year 3

A number of training courses have been held during this reporting period, detailed under output 4. These have arisen from the requirements of the core research activities since this grounds the training more effectively as the trainees then immediately apply what they have learned.

All training activities at Harapan Rainforest follow simple internal enrolment procedures to enable the temporary release of staff from their normal work department to join a training course run by the research section. Where appropriate, staff are assessed prior to the training course as well as after in order to allow some measure of improvement to be made as a result of the course.

Plans are underway to run a 3-week training course in August 2009 and to include herpetile, bird and bat survey techniques. This would include Harapan Rainforest staff as well as others from external organisations.

##### Indicator 5c: International recognition achieved

The Harapan Rainforest initiative has achieved high profile coverage during 2008. A six page photo feature about Harapan Rainforest was printed in the Saturday Telegraph (with teaser on the front cover of the magazine) in October. HRH Prince Charles visited Harapan Rainforest in early November and this was covered in numerous outlets including BBC news, Google news, Times Online, Daily Mail and several regional UK news outlets. Over the course of the year, a steady flow of researchers has been in contact inquiring about using Harapan Rainforest as a field site for their own.

### **3.2 Progress towards Project Outputs**

#### Output 1: Baseline biodiversity inventory completed

Formal survey work commenced with a short botanical survey undertaken by Kew Royal Botanical Gardens' South East Asian team in April 2008, which resulted in 180 botanical specimens collected and identified, kept on site, and early training in collection techniques for project staff.

121km of mammal occupancy survey recce transects have been walked and 21 camera-trap locations have been surveyed for a total of 512 camera trap days. Hornbill survey data are also collected from the occupancy transects, while six supra-transects (21-29km long and split into 2km lengths) running the length and width of Harapan Rainforest have been surveyed. Eight of the nine Sumatran hornbill species have been recorded from these six transects, with simple relative abundance measures calculated for each species. Arrangements for bird survey training are underway. Opportunistic bird list surveys have added 19 species to the site list.

The completion of a preliminary landcover classification from satellite imagery provided the basis for stratifying the wider survey of vegetation, trees and birds that will be commenced in the next phase. This has been delayed due to changes in the Ministry of Forestry (MoF) monitoring requirements from a system based on habitat areas to one based on predefined forest blocks. Each block covers 1,200-2,800ha and one block is visited each year for a ten year cycle. The design of the overall survey is being reconsidered to include this requirement, whilst maintaining a robust sampling strategy.

The indicators for this output remain appropriate and realistic and the assumptions continue to be upheld.

The baseline survey is the most important output from this project and the one that is least likely to fail. Some taxonomic groups proposed may only have a partial survey completed, but it is fully expected that collaborations with other researchers will result in coverage of groups not listed. Work on this is progressing well.

Output 2: Understanding of relationship between forest condition and species response yields practical outcomes.

The project is currently considering whether to modify the details of this output and will come back to Darwin for their views if any changes are planned.

Output 3: Plan for monitoring key taxonomic groups established

Continued progress has been made into reviewing appropriate methods for monitoring, drawing on the experience of the project leader in West Africa and the lead scientist in the Philippines, and with input from regional experts in mammal and bird surveys.

It is now considered that appraisal of individual staff activities by qualified trainers would be a more appropriate way of indicating the success of the field manual, rather than attempting to make statistical comparisons of two datasets that may vary for a number of uncontrollable reasons. Otherwise, the indicators remain appropriate.

Output 4: Capacity of local staff to undertake monitoring established and secured.

Good progress continues to be made in training key staff of Harapan Rainforest in biological survey methods with the successful completion of a mammal survey training programme, a tree climbing course, a forest restoration course, and ongoing mammal and hornbill survey training programme. Six local staff are currently assigned to the research programme full-time and receive regular training and development, and it is hoped they will remain with the research team permanently. The current assumption seems entirely reasonable since these staff are local to the area.

Output 5: Research and training centre established

At present, activities are based out of the site headquarters situated on the northeast edge of the concession area. Originally, plans were underway to establish forward camps at various sites around the concession to improve access to the site, although this has since been put on hold while the project's overall site protection strategy is reviewed. However, two locations identified as permanent survey locations have been partially developed for supporting field teams. There is a steady stream of interest in undertaking research in the concession area and some work has already commenced.

### **3.3 Standard Measures**

#### **Table 1 Project Standard Output Measures**

Code No.	Description	Year 1 Total	Year 2 Total	Year 3 Total	Year 4 Total	Total to date	Number planned for this reporting period	Total planned from application
5	10 Indonesian staff trained in survey techniques to conduct field data collection for baseline survey and monitoring over three years.	21	10			31	10	10
6A	30 people trained during course of 3 training programmes (one per year) of 4 weeks duration. Covering design, basic survey techniques, and analysis.		21			21	10	30
6B	12 weeks in total	2	12			14	4	12
7	5 training manuals produced to cover survey design, survey techniques for birds, mammals and trees, data analysis		2			2	2	5
8	18 weeks in total for J Lindsell and others	2	5			7	6	18
9	Data supplied for the management plan for forest		1				1	1
10	1 field manual covering elements of monitoring protocol for the forest		1			1	1	1
11A	1 paper published with initial observations from survey work							1
11B	3 papers submitted to journals covering forest inventory, wildlife-habitat relationships and human impacts							3
12A	4 databases developed covering wildlife, habitat, human impacts	2	2			4	2	4

	(including logging history) and geographic information							
13A	3 collections established covering essential trees and shrubs, invertebrates and herptiles	1	1			2	1	3
13B	3 national collections enhanced (herbaria, invertebrates and herptiles)	1				1	1	3
14B	3 conferences attended	1	1			2	1	3
15A	3 national press releases, one in each year						1	3
15B	6 local press releases, two per year							6
15C	2 UK national press releases, one at the beginning and one in year two		2				1	2
17A	1 research station website to be established		1			1	1	1
18A	1 in each year (local TV)						1	1
18B	1 (UK TV)							1
19A	1 in each year (Local radio)	1				1	1	1
19B	1 (UK radio)							1
20	£46,205							
21	1 research and training centre established in the forest		1			1	1	1
22	Up to 1,000 habitat and wildlife monitoring plots (0.2 ha in size) established throughout the forest		270			270		
23	£208,400 raised from other sources							

**Table 2 Publications**

Type (e.g. journals, manual, CDs)	Detail (title, author, year)	Publishers (name, city)	Available from (eg contact address, website)	Cost £
Manual, CD	How to Plant a Forest: The Principles and Practice of Restoring Tropical Forest	FORRU	www.harapanrainforest.org	Free
Magazine	From the field: Harapan Rainforest. David Lee. 2008.	International Newsletter of the World Pheasant Association	www.pheasant.org.uk	na
Brochure	Selamat dating di Harapan Rainforest	Restorais Ekosistem Indonesia	www.harapanrainforest.org	Free

### 3.4 Progress towards the project purpose and outcomes

The purpose level indicator supposes that the results of biodiversity inventory work will inform the development of the management plan. The ongoing results of the biodiversity survey work are indeed being integrated into management planning. However a preliminary management plan will have to be produced well before the completion of this Darwin project so this indicator may only partially reflect the success of the project. The establishment of sustainable capacity to undertake biodiversity monitoring for the restoration project is the key outcome and this will be evidenced by the ongoing activities of the research and monitoring department of the Harapan Rainforest management team. The assumptions remain valid.

### 3.5 Progress towards impact on biodiversity, sustainable use or equitable sharing of biodiversity benefits

The project is contributing directly to clear progress in the goal. The conservation status of numerous globally threatened mammals in Sumatra has improved with the implementation of the Harapan Rainforest initiative since threats from hunting and habitat destruction have been considerably reduced. The baseline surveys are revealing that the site holds important populations of Sumatran Tiger and Asian Tapir, for example, and that these are under a measure of protection that they did not enjoy previously.

## 4. Monitoring, evaluation and lessons

There is constant communication between the project leader and lead scientist to monitor progress of all aspects of the project and address any unforeseen difficulties that may arise, e.g. site access, changes in MoF requirements. The lead scientist provides weekly research updates to the project leader.

Harapan Rainforest staff that participate in training exercises are assessed by the trainers, who may be Harapan Rainforest research staff or from organisations other than Harapan Rainforest. The ability of trainees is normally assessed using simple tests, e.g. multiple choice questions, before and after the training programme. Their overall grade of ability takes into account the amount of improvement they have shown over the training course. All trainers must agree on a final grading of a trainee's efforts, ability and potential.

Currently, fieldwork periods are carried out for one week every month (with a few days to collect camera-traps put out c.25 days previously). The duration of each fieldwork period will

increase as team capacity and site accessibility increase, which will enable survey locations further from the main camp to be visited.

Correspondence with regional and taxa experts regarding survey design and research questions for particular groups has helped validate all survey design decisions thus far.

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

See half year report.

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

The survey design has been required to take on board commitments under the terms of the licence agreement with the Ministry of Forestry. This has made planning more complicated but ensures that the outputs from this work will feed directly into the management of the site and inform national institutions at the highest level.

## **7. Sustainability**

This project is part of a long term commitment (100 years) to the management of the Harapan Rainforest. The overall project is receiving very high profile within Indonesia and internationally. The site was visited by the Indonesian Minister of Forestry on 19th September with the Director General of Production Forestry and Director of Natural Forests. In November 2008, HRH The Prince of Wales visited the site and discussed the work at length with the lead scientist, David Lee (Annex 16) Harapan Rainforest is now one of only three forest conservation projects featured on the Prince of Wales's Rainforest Trust website, [www.princesrainforestsproject.org](http://www.princesrainforestsproject.org)

There has been significant progress in the development of biodiversity capacity amongst the project staff. The development of numerous contacts in the Sumatran university system it is anticipated will lead to research collaborations with long term consequences. As is made clear in the research strategy that was developed during this year, the work programme for the research station that is developed under this Darwin is long term and substantial. Good progress has already been made in developing mechanisms for undertaking this programme, including fundraising. In the long term the Harapan Rainforest programme will be funded from a trust fund being established by the consortium of partners involved. This will provide for the ongoing financial requirements for continuing this work.

## **8. Dissemination**

Presentations have been made to four local universities, with a fifth university to be visited in May 2009, and to BKSDA-Jambi, the governmental wildlife conservation agency. The new Harapan Rainforest website is about to go live and will reach a global audience of researchers and students.

## 9. Project Expenditure

**Table 3** Project expenditure during the reporting period (Defra Financial Year 1 April 2008 to 31 March 2009)

Item	Budget	Expenditure	Variance
Rent, rates, heating, overheads etc			
Office costs (e.g. postage, telephone, stationery)			
Travel and subsistence			
Printing			
Conferences, seminars, etc			
Capital items/equipment (specify)			
Others (specify)			
Salaries (specify by individual)			
TOTAL			

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

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

## Annex 1 Report of progress and achievements against Logical Framework for Financial Year: 2008/09

Project summary	Measurable Indicators	Progress and Achievements April 2008 - March 2009	Actions required/planned for next period
<p><b>Goal:</b> <i>To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but constrained in resources to achieve</i></p> <p><i>The conservation of biological diversity,</i></p> <p><i>The sustainable use of its components, and</i></p> <p><i>The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources</i></p>		<p><i>(report on any contribution towards positive impact on biodiversity or positive changes in the conditions of human communities associated with biodiversity eg steps towards sustainable use or equitable sharing of costs or benefits)</i></p>	<p><i>(do not fill not applicable)</i></p>
<p>Purpose Biodiversity inventory undertaken and monitoring methods and capacity developed for management of one of the last remaining lowland forests in Sumatra</p>	<p>-Management plan is informed by and incorporates biodiversity inventory and monitoring strategy</p>	<p>Baselines surveys underway for trees, mammals and hornbills; monitoring methods agreed for some groups and training of project staff well advanced for some groups.</p>	<p>Ongoing training in survey methods for new groups (especially birds) and in implementation of baseline survey. Consolidation of permanent biodiversity team.</p>
<p>Output 1. Baseline biodiversity inventory completed</p>	<ul style="list-style-type: none"> <li>- Species lists compiled for birds, mammals, trees, herptiles, Lepidoptera, herbaceous plants</li> <li>- Accumulation curves approach asymptote, even geographical coverage achieved, abundance estimated for some groups and habitat structure and condition measured</li> <li>- Specimens and photographic records collected for some groups</li> </ul>	<p>Plant, tree, hornbill and mammal surveys are underway in systematic fashion. Bird records currently acquired on ad hoc basis. Herptile and Lepidoptera work are in planning stage.</p> <p>c. 440 plant species identified to date. 180 specimens in herbarium.</p> <p>293 bird species recorded to date including several records of the Endangered Storm's Stork.</p> <p>54 mammal species recorded to date, 25 of conservation concern. Camera trap photos acquired of Tiger, Dhole, Tapir (multiple), Sun Bear and numerous other species (25 in total).</p> <p>270 tree plots surveyed on a systematic grid over the site.</p> <p>Indicators remain appropriate.</p>	
<p>- All survey equipment purchased by end of yr 1.</p>		<p>Purchase of 10 camera traps for mammal surveys.</p>	

-Training workshop for survey staff with input from UK expertise in first four months of yr 1 and yr 2.		11 staff trained in mammal survey methods. 9 staff trained in hornbill survey methods. 8 staff trained in hornbill nest site searching. 8 staff trained in tree climbing. 12 staff trained in tree plot survey methods.
- Completed datasheets from surveys in multiple plots across forest by end yr 2 and 3.		270 tree plots completed out of 350. 6 mammal plots surveyed.
- Herbarium storage facility constructed yr 2. Samples added yrs 2-4.		Herbarium facility completed. 180 specimens already housed.
- Computer facilities and storage space for data repositories established yr 2.		Storage, office space and training rooms completed. Records georeferenced and entered into computerised database.
- Field data collection 80% completed yr 3. Data computerised for analysis yr 3. Baseline survey report published yr 4.		
Output 2. Understanding of relationship between forest condition and species response yields practical outcomes	<ul style="list-style-type: none"> <li>-Models of influence of forest condition predict distributions in other parts of the forest with statistical significance</li> <li>-Management prescriptions developed</li> <li>-Key outstanding research needs identified</li> </ul>	A research strategy for Harapan Rainforest has now been developed (Annex 12).
-Historic data on forest condition and logging sourced yr 2. Data accessible and computerised yr 3.		These data are not available to us.
-Predictive models developed yr 3. Models tested yr 3.		
-Report published yr 3. Research papers in review and submissions for publication acknowledged yr 3.		
Output 3. Plan for monitoring key taxonomic groups established	<ul style="list-style-type: none"> <li>-Monitoring protocols conform with published best practise and agreed by independent relevant taxa experts</li> <li>-Field manual test data statistically indistinguishable from baseline data.</li> </ul>	Wide consultation has been undertaken for mammal and hornbill survey methods which are now being implemented. Similar consultation is underway for key species including gibbons, elephant, tiger, tapir and sun bear.
-Initial consultation of literature and taxa experts made in yr 2. Detailed		

discussion in yr 3. Review in yr 4.		
-Draft monitoring manual in review yr 2. Final draft produced yr 3.		Mammal, hornbill and tree plot method are well defined.
-Trainee surveyors test protocols in field in yr 3. Adjustments made to manual yr 4.		Testing of methods is already underway for some groups and forms a part of the training process.
<b>Output 4.</b> Capacity of local staff to undertake monitoring established and secured	-Majority of monitoring data collected by project-trained staff in accordance with protocols	Almost all data are being collected by project-trained staff from the outset, under supervision of the lead scientist. A great deal of progress has been made on this output. The indicator remains appropriate though the distinction between training for baseline surveys and monitoring work is no longer relevant.
-Local staff trained for baseline surveys yr 2.		Numerous staff trained – see output 1.
Monitoring training programme for project staff yrs 3 and 4.		This now forms part of the initial training programme for the baseline survey.
Comparison of trainee data with baseline data yrs 3 and 4.		Personal assessments by trainers have been undertaken and prove practical when undertaken alongside pre and post training tests.
<b>Output 5.</b> Research and training centre established	-Regular collaboration with visiting researchers by year 3 -Regular training courses being held by year 3 -International recognition achieved	A steady flow of interest from external scientist demonstrates that the profile of the project is already being raised. Some inquiries have come via the Darwin website. Press coverage has been good with coverage in UK daily papers. Representation at two regional conferences has also raised the profile of the project. A site visit by HRH Prince Charles ensured high profile. Good facilities have been established on site to provide a focus for research activities. Much progress has been made in developing links with local universities and other institutions.
-Lead scientist appointed early in yr 1. Remainder of staff during yr 2.		Besides a core of biodiversity staff, many other Harapan Rainforest staff (especially forest patrol staff) are receiving training through this project to improve the value of data that they can collect when in the forest.
-Initial training provided in yr 2. Rolling programme developed by yr 3.		Several training courses provided in year 2.
-Initiation of international research collaborations yr 4.		Two collaborations already underway – birds and landscape fragmentation and nocturnal prosimians. Others are being discussed and developed.

## Annex 2 Project's full current logframe

Project summary	Measurable Indicators	Means of verification	Important Assumptions
<p>Goal:</p> <p>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 benefits arising out of the utilisation of genetic resources</p>			
<p>Purpose</p> <p>Biodiversity inventory undertaken and monitoring methods and capacity developed for management of one of the last remaining lowland forests in Sumatra</p>	<p>-Management plan is informed by and incorporates biodiversity inventory and monitoring strategy</p>	<p>-Interim management plan for “the forest”</p>	<p>Political changes in Indonesia do not impede management of “the forest” by the conservation consortium</p>
<p>Outputs</p> <p>1. Baseline biodiversity inventory completed</p>	<p>-Species lists compiled for birds, mammals, trees, herptiles, Lepidoptera, herbaceous plants</p> <p>-Accumulation curves approach asymptote, even geographical coverage achieved, abundance estimated for some groups and habitat structure and condition measured</p> <p>- Specimens and photographic records collected for some groups</p>	<p>Field data sheets and computerised database of records.</p> <p>Biodiversity survey reports.</p> <p>Specimen and photographic collections (including herbarium).</p>	<p>Political conditions or natural disasters do not prevent fieldwork</p>
<p>2. Understanding of relationship between forest condition and species response yields practical outcomes</p>	<p>-Models of influence of forest condition predict distributions in other parts of the forest with statistical significance</p> <p>-Management prescriptions</p>	<p>Report on predictive modelling</p>	

	<p>developed</p> <ul style="list-style-type: none"> <li>-Key outstanding research needs identified</li> </ul>	<p>Research reports and papers</p>	
<p>3. Plan for monitoring key taxonomic groups established</p>	<ul style="list-style-type: none"> <li>-Monitoring protocols conform with published best practise and agreed by independent relevant taxa experts</li> <li>-Field manual test data statistically indistinguishable from baseline data.</li> </ul>	<ul style="list-style-type: none"> <li>-Accreditation from relevant experts</li> <li>-Field manual comparison report</li> </ul>	
<p>4. Capacity of local staff to undertake monitoring established and secured</p>	<ul style="list-style-type: none"> <li>-Majority of monitoring data collected by project-trained staff in accordance with protocols</li> </ul>	<ul style="list-style-type: none"> <li>-Training assessment reports, field data sheets</li> </ul>	<p>Sufficient numbers of trained staff are retained by the project</p>
<p>5. Research and training centre established</p>	<ul style="list-style-type: none"> <li>-Regular collaboration with visiting researchers by year 3</li> <li>-Regular training courses being held by year 3</li> <li>-International recognition achieved</li> </ul>	<ul style="list-style-type: none"> <li>-Visitors book</li> <li>-Training course enrolment records</li> <li>-Coverage in independent media</li> </ul>	
<p>Activities</p> <p>1. Baseline inventory</p>	<p>Activity Milestones</p> <ul style="list-style-type: none"> <li>-All survey equipment purchased by end of yr 1.</li> <li>-Training workshop for survey staff with input from UK expertise in first four months of yr 1.</li> <li>-Completed datasheets from surveys in multiple plots across forest by end yr 1 and 2.</li> <li>-Herbarium storage facility constructed yr 2. Samples added yrs 2-3.</li> <li>-Computer facilities and storage space for data repositories established yr 2.</li> <li>-Field data collection 80% completed yr 2. Data computerised for analysis yr 2. Baseline survey report published yr 3.</li> </ul>	<p>Assumptions</p>	

2. Improvement of understanding of forest condition–species response link	<ul style="list-style-type: none"> <li>-Historic data on forest condition and logging sourced yr 1. Data accessible and computerised yr 2.</li> <li>-Predictive models developed yr 3. Models tested yr 3.</li> <li>-Report published yr 3. Research papers in review and submissions for publication acknowledged yr 3.</li> </ul>	
3. Planning of monitoring	<ul style="list-style-type: none"> <li>-Initial consultation of literature and taxa experts made in yr 1. Detailed discussion in yr 2. Review in yr 3.</li> <li>-Draft monitoring manual in review yr 1. Final draft produced yr 2.</li> <li>-Trainee surveyors test protocols in field in yr 2. Adjustments made to manual yr 3.</li> </ul>	
4. Capacity-building	<ul style="list-style-type: none"> <li>-Local staff trained for baseline surveys yr 1. Monitoring training programme for project staff yrs 2 and 3. Comparison of trainee data with baseline data yrs 2 and 3.</li> </ul>	
5. Centre establishment	<ul style="list-style-type: none"> <li>-Lead scientist appointed early in yr 1. Remainder of staff during yr 1.</li> <li>-Initial training provided in yr 1. Rolling programme developed by yr 2.</li> <li>-Initiation of international research collaborations yr 3.</li> </ul>	

<b>Annex 3</b>	<b>Botanical list</b>
<b>Annex 4</b>	<b>Bird list</b>
<b>Annex 5</b>	<b>Mammal list</b>
<b>Annex 6</b>	<b>Mammal training programme</b>
<b>Annex 7</b>	<b>Mammal training assessment</b>
<b>Annex 8</b>	<b>Mammal training certificate</b>
<b>Annex 9</b>	<b>Mammal survey layout</b>
<b>Annex 10</b>	<b>IHMB training manual</b>
<b>Annex 11</b>	<b>IHMB team review</b>
<b>Annex 12</b>	<b>Research strategy</b>
<b>Annex 13</b>	<b>Tree climbing certificate</b>
<b>Annex 14</b>	<b>Hornbill conference poster</b>
<b>Annex 15</b>	<b>FORRU site visit report</b>
<b>Annex 16</b>	<b>Photos</b>

### ***Checklist for submission***

	Check
<b>Is the report less than 5MB?</b> If so, please email to <a href="mailto:Darwin-Projects@ltsi.co.uk">Darwin-Projects@ltsi.co.uk</a> putting the project number in the Subject line.	
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<b>Have you included means of verification?</b> You need not submit every project document, but the main outputs and a selection of the others would strengthen the report.	
<b>Do you have hard copies of material you want to submit with the report?</b> If so, please make this clear in the covering email and ensure all material is marked with the project number.	
Have you involved your partners in preparation of the report and named the main contributors	
Have you completed the Project Expenditure table fully?	
Do not include claim forms or other communications with this report.	