Darwin Initiative for the Survival of Species

Annual Report

1. Darwin Project Information

Project Ref. Number	*162/11/013*
Project Title	*Conserving the critically endangered Darwin's fox on Chiloé Island, Chile*
Country(ies)	*C hile*
UK Contractor	*Institute of Zoology, Zoological Society of London*
Partner Organisation(s)	
Darwin Grant Value	*£158,006*
Start/End dates	*21 June 2002 - 31 March 2005*
Reporting period (1 Apr 200x to 31 Mar 200y) and report number (1,2,3..)	*1 May 2003 to 31 April 2004* *Annual report no 2*
Project website	*www.darwinfox.org*
Author(s), date	*Stephan M Funk, 1 July 2004*

2. Project Background

- Briefly describe the location and circumstances of the project and the problem that the project aims to address.

*The Darwin's fox (*Pseudalopex fulvipes*) is almost entirely restricted to Chiloé Island, southern Chile. The species is critically endangered and is considered to have the highest extinction risk of any mammal in Chile. In addition to the threats posed by the rapid destruction of its obligate habitat - the unique southern temperate forests - and direct persecution by humans, the species faces a high extinction risk due to potential transmission of viral diseases from domestic dogs. Aside from limited ecological studies, no quantitative information on density and distribution, habitat use, population dynamics, social organization, population genetic structure and disease exists for Darwin's foxes on Chiloé island. Moreover, no data are available on density, distribution and disease status of the increasing sympatric domestic dog population.*

Being the largest carnivore species on the island, the Darwin's fox is a perfect model species for protecting biological diversity through environmental education and research on its ecology, epidemiology and genetics. The conservation of the Darwin's fox will, by acting as an umbrella, promote the conservation of its habitat –the pristine forest- and, hence, will conserve the biodiversity of entire and functional ecosystems.

3. Project Purpose and Outputs

- State the purpose and outputs of the project. Please include your project logical framework as an appendix and report achievements and progress against it (or, if applicable, against the latest version of the logframe).

  To provide a range of essential information on fox density and distribution, population genetic structure and exposure to canine diseases of foxes, to assess the threat to fox conservation by feral dogs and to develop the capacity for demographic, genetic and disease monitoring of biodiversity on Chiloé Island. Using a mixture of basic genetic, epidemiological and ecological research on the fox and on rural dogs, combined with a proactive environmental education program, we will

  1. *estimate fox density and distribution, determine its genetic structure and assess the risk to viral diseases transmitted by domestic dogs;*
  2. *implement capacity and train a group of Chilean scientists and conservation managers to conduct independent field research and to use molecular techniques for conserving biodiversity;*
  3. *increase awareness and raise enthusiasm of local communities, land users, conservation managers and students for conserving entire and functional forest ecosystems in a compatible way with the sustainable use of the resources.*

  The Logical Framework is attached. (Appendix 1).

- Have the outputs or proposed operational plan been modified over the last year, for what reason, and have these changes been approved by the Darwin Secretariat? (Please note that any intended modifications should be discussed with the Secretariat directly rather than making suggestions in this report).
- *Neither objectives nor the proposed operational plan were modified.*

4. Progress

- Please provide a brief history of the project to the beginning of this reporting period. (1 para)
- *Following deliberations at the Canid Biology and Conservation Conference in Oxford, 2001, the Canid Specialist Group (IUCN) identified the Darwin's fox, together with the Cannel Island Fox, the most endangered canid species worldwide. There are only limited ecological studies, no information on conservation threats posed by the increasing sympatric domestic dog population due to spill-over of viral diseases, and no assessment of the effects of the rapid destruction of its habitat, the Valdivian forest. Subsequently, a conservation and research proposal was submitted and a Darwin Initiative grant was offered. During the first year, significant slippage occurred mainly as a result of administrative difficulties in the host country. Most of the initial gaps were filled in the first year, mainly because of the exemplary enthusiasm of all project staff. Although there is carry-over for the 2nd year, the project achieved significant progress in GIS mapping much in advance of the original schedule..*
- Summarise progress over the last year against the agreed baseline timetable for the period and the logical framework (complete Annex 1). Explain differences including any slippage or additional outputs and activities.

  After the delays in 2002/3, progress over the last year was significant. We not only caught up with all slippage occurred during 2002/3, but we achieved the targets for

2003/4 due to the exemplary enthusiasm of project members. Although most activities were achieved on time, some activities required re-scheduling due to organizational and logistic necessities. There is only one significant slippage and one less significant slippage (Manuscript submitted in peer reviewed journal and training if ULA staff in GIS, respectively). The reasons and solutions are outlined in section 9. A total of 18 additional outputs and activities were achieved in 2003/4.

Progress over the last year is shown in Table 0 and summarized in Annex 1.

Table 0 refers to the activities listed in table A of the project schedule. Several activities were not specifically listed in column "measurable indicators" of that table, requiring amendment as follows:

Research

1.4 Estimation of fox density and distribution across Chiloé island using random sites.

4.1 Dissemination of research results by seminars to students

4.2 Dissemination of research results by presentations at conferences

4.3 Dissemination of research results by organizing an international conference

Environmental Education and Awareness

10.3 Training of national and international volunteers

13. Production and dissemination of a series of mini documentaries

14. Quantification of human attitudes to conservation of biodiversity in general and the Darwin's fox in particular

14.1 Quantification of baseline attitudes

14.2 Quantification of the impact of our education activities on attitudes

Table 0. Timetable of project activities and achievements during 2003/2004. Proposed completion dates are according the implementation table 0b of the 1st annual report). Activity numbers follow the measurable activity indicators as outlined in Table A of the project schedule and, if not originally listed, as amended above (R: Research, ICB: Institutional Capacity Building, EEA: Environmental Education and Awareness). Details can be found in the appendix.

Completion date	Proposed completion date	Title	Activity no.	Details in Appendix	Code No.
15-May-03	N/A.	1st part of children's story	EEA 11A	Res2 #01	16A, 16B
4-Jul-03	ongoing	Radio interview (recorded) for Radio Estrella del Mar	EEA 11B	Res2 #02	19C
10-Jul-03	ongoing	Radio broadcast (online) at Radio Stylo FM	EEA 11B	Res2 #03	19C

Table 0 continued.

Completion date	Proposed completion date	Title	Activity no.	Details in Appendix	Code No.
21-Jul-03	2003/09	Training of ULA staff in analysis of serological and epidemiological data	ICB 7	Res2 #04	6A, 6B
21-Jul-03	2003/09	Training of ULA staff in genetic methodology (part 1)	ICB 5	Res2 #05	6A, 6B
1-Aug-03	2004/01	Double-course "principles of biological conservation and conservation genetics" at FSD field station	EEA 10.1	Res2 #06	4C, 4D and 4C, 4D
4-Aug-03	ongoing	Radio interview (recorded) for Radio Chiloé	EEA 11B	Res2 #07	19C
4-Aug-03	ongoing	Radio interview (recorded) for Radio Estrella del Mar	EEA 11B	Res2 #08	19C
6-Aug-03	ongoing	Three "Recorded messages to the community¨ at Radio Stylo	EEA 11B	Res2 #09	19C
31-Aug-03	2003/08	Mitochondrial DNA and microsatellite analysis of samples collected so far	R2.2, R2.3	Res2 #10	no number
2-Sep-03	ongoing	Radio interview (recorded) for Radio Estrella del Mar, Ancud	EEA 11B	Res2 #11	19C
2-Sep-03	ongoing	Radio interview (recorded) for Radio Estrella del Mar, Castro	EEA 11B	Res2 #12	19C
28-Sep-03	2003/09	Density and distribution of dogs estimated: questionnaires for dog owners	R 3.1	Res2 #13	no number
1-Oct-03	2003/12	*Article in* Lifewatch*, UK.* Lifewatch *is published by ZSL*	EEA 11B	Res2 #14	15C
9-Oct-03	ongoing	Radio interview (recorded) for Radio San Carlos de Chonchi, Chonchi	EEA 11B	Res2 #15	19C
15-Nov-03	2003/08	Expanded 1st newsletter released	EEA 11A	Res2 #17	16A, 16B
1-Dec-03	N/A	Questionnaires to assess human attitudes to biodiversity and conservation	EEA 13 (not listed)	Res2 #16	no number
15-Dec-03	N/A	2nd part of children's story	EEA 11A	Res2 #18	16A, 16B
15-Dec-03	N/A	Three posters produced	EEA 11A	Res2 #19	16A, 16B, 23
18-Dec-03	2003/12	First round of non-invasive sampling of foxes, density estimate of foxes and density estimate of dogs in random sites	R 1.4 (not listed)	Res2 #20	no number
31-Dec-03	2003/12	Sixteen short documentaries on Darwin's foxes to be produced for Canal 4 Ancud and financed via a grant from CNTV (Consejo Nacional de Television).	EEA 13 (not listed)	Res2 #21	18C, 23
15-Jan-04	N/A	Vectronic Aerospace GmbH: GPS equipment as contribution in kind	R 3.2	Res2 #22	23
29-Jan-04	N/A	Design of a Chilean stamp for the Darwin's fox	EEA 11B	Res2 #23	no number
2-Feb-04	N/A	Seminar at Universidad Arcis Patagonia	R 4.1 (not listed)	Res2 #24	14A
28-Feb-04	N/A	Volunteer program started via Global Vision International (GVI), UK	EEA 10.3 (not listed)	Res2 #25	no number

Table 0 continued.

Completion date	Proposed completion date	Title	Activity no.	Details in Appendix	Code No.
29-Feb-04	2004/04	Second newsletter circulated	EEA 11A	Res2 #26	16A, 16B
12-Mar-04	2004/01	Course "Practical Introduction to Conservation Genetics" at Universidad de Conceptión	EEA 10.1	Res2 #27	4A, 4B, 4C, 4D
12-Mar-04	N/A	Design for t-shirts	none	Res2 #28	no number
31-Mar-04	2004/04	Dog samples collected for serology and health surveys	R 3.3	Res2 #29	no number
31-Mar-04	N/A	Foxes radio-tracked & home ranges determined	R 1.1	Res2 #30	no number
31-Mar-04	N/A	Two leaflets produced	EEA 11A	Res2 #31	7
1-Apr-04	2003/10	Establishing sites for a field station and a campsite	ICB 9.2, ICB 9.3	Res2 #32	part of 21
2-Apr-04	2004/03	Second round of non-invasive sampling of foxes, density estimate of foxes and density estimate of dogs in random sites	R 1.4 (not listed)	Res2 #33	23, no number
9-Apr-04	2003/12	Information workshop for dog owners in Quemchi	EEA 12.2	Res2 #34	14A
11-Apr-04	2003/12	Training of ULA staff in genetic methodology and analysis (part 2)	ICB 6	Res2 #35	6A, 6B
20-Apr-04	N/A	Donation of Drontal Plus 10 Kg	none	Res2 #36	23
23-Apr-04	2004/03	PCR cycler for laboratory at Universidad de Los Lagos	ICB 5.4	Res2 #38	23
23-Apr-04	N/A	Invitation for plenary lecture. Annual Meeting Chilean Society of Biology	R 4.2 (not listed)	Res2 #37	14B
25-Apr-04	N/A	Abstract submitted to XIXth International Congress of Zoology, Beijing, CHINA, 23-27 August 2004. Accepted.	R 4.2 (not listed)	Res2 #39	14B
26-Apr-04	N/A	Three abstracts submitted VI Congreso Internacional sobre Manejo de Fauna Silvestre en la Amazonia y Latinoamérica., Iquitos, PERU, 5-10 September 2004	R 4.2 (not listed)	Res2 #40	14B
27-Apr-04	N/A	Agreement with Dr. V. Martinez, Universidad de Chile, to co-organize international Conference on "Molecular Genetics in Biodiversity and Conservation"	R 4.3 (not listed)	Res2 #41	14A
30-Apr-04	2003/10	New field station at Lliuco permanent site established	ICB 9.3	Res2 #46	21
30-Apr-04	2003/12	Target for slideshow achieved (2 hours * 16)	EEA 12.2	Res2 #48	14A
30-Apr-04	2004/04	Analysis methods for non-invasively sampled DNA established	R2.2, R2.3	Res2 #43	no number
30-Apr-04	2004/04	Capture of foxes - All fox samples collected for serology	R 2.1	Res2 #44	no number
30-Apr-04	2004/04	Feral dog activity and space use patterns identified by radiotracking with GPS collars	R 3.2	Res2 #45	no number

Table 0 continued.

Completion date	Proposed completion date	Title	Activity no.	Details in Appendix	Code No.
30-Apr-04	N/A.	South American and overseas volunteers trained in field ecology, animal handling and conservation biology	EEA 10.3 (not listed)	Res2 #47	6A, 6B
30-Apr-04	N/A	Abstract prepared for International Workshop on Artemia	ICB 6	Res2 #42	14B
30-Apr-04	N/A	UK project staff on project work in host country	all	Res2 #49	8

- Provide an account of the project's achievements during the last year. This should include concise discussion on methodologies and approaches by the project (e.g. research, training, planning, assessment, monitoring) and their consequences and impacts as well as results. Please **summarise** content on methodologies and approaches, and, if necessary, provide more detailed information in appendices (this may include cross-references to attached publications).

  The project activities focus on three key areas: Research (R), Institutional Capacity Building (ICB), and Environmental Education and Awareness (EEA).

  Research: All four main topics were addressed by research during 2003/4 and activities focussed on data collection and data logging. Building on the major advance of for GIS mapping in 2002/3, we made significant progress in field research, which was more comprehensive than expected. However, we suffered a major set-back in laboratory (genetic) analyses.

  R1. Density of foxes in ten representative random sites on Chiloé Island. Following the estimation of fox density and space use of individual foxes in three main study sites during 2002/3, we focussed on ten randomly selected sites. Foxes were trapped using cage traps. Indices of trapping success provide estimators for relative density. Relative density was also estimated using scent station methodology and the comprehensive sampling of fox faeces along predefined transects (trails). Faecal samples will subsequently used for genetic analysis, allowing to estimate absolute densities and thus acting as a baseline for the estimates of relative density (details outlined in the 1st annual report). Access to most of the random sites was very difficult because of the terrain (requiring horses and seaworthy boats) and the cold and rainy climate, but the field team overcame these challenges with great enthusiasm.

  R2. Spatial and social organisation of foxes in three main study sites. Trapping and radiotracking was continued from 2002/3. These data provide information on space use and habitat preferences, which will be used to extrapolate fox density and distribution using habitat maps produced by GIS. For more details see Appendix 7 of the 2002/3 report.

  R3. Assessment of demography, heath and space use of domestic dogs. A large number of interviews with local dog owners was conducted. During these interviews, data on the number of dogs per household, turn-over and space use (feral versus domestic), disease and immunization history were collected. Dogs were screened for their heath status and blood samples collected for subsequent serology. GPS collars were purchased from and sponsored by "Vectronic" (see appendix Res2 #22), allowing the identification of behaviour in space of time.

R4. Genetic analysis. Techniques to extract DNA from non-invasively collected samples (feces) and the quantification of genetic diversity by sequencing mitochondrial DNA were successfully implemented. However, two major problems were encountered. Firstly, the application of canine microsatellite markers produced either no interpretable PCR products or showed no genetic variation. Secondly, no genetic variation at mitochondrial loci was detected although we also included cytochrome b (originally, only the control region was proposed). The lack of genetic variability at mtDNA loci is highly unexpected (see appendix Res2 #10 and Res2 #43). This indicates a major historic population bottleneck. Since the lack of variability was identified in the two most variable mtDNA loci, no further sequencing of mtDNA is worthwhile. On the other hand, the application of microsatellite markers requires the development of fox-specific markers, which will require significantly more time, labour and funds as originally anticipated.

R5. Dissemination of research results. We focussed on the preparation and submission of oral presentations to international conferences (five accepted presentations; see appendix Res2 #39, 40, 42). An invitation for a plenary lecture at the Annual Meeting Chilean Society of Biology, the largest scientific society in Chile, was accepted (Res2 #37). A decision was made to co-organize (with Universidad de Chile) the conference "Molecular Genetics in Biodiversity and Conservation" in December 2004 (see appendix Res2 #41).

Institutional Capacity Building (ICB). We provided training on sample collection, density estimation (radiotracking, scent stations) and principles of genetic analysis to all staff members and the volunteers on a one-to-one basis. Chilean project members were intensively trained in genetic and epidemiological methods and the analysis of serological data was provided at IoZ in London. The trainee in genetic methods, Patricia Beristain, utilized her free time during the stay in London to receive training in additional laboratory methodologies and analysis techniques. She applied this to an evolutionary study on brine shrimp. Results will be presented at a workshop in Iran and a manuscript will be submitted within the next six months (see appendix Res2 #42). Subsequently, Mrs Beristain has been offered a PhD studentship at the University of Ghent. The equipment of laboratory facilities at Universidad de los Lagos was facilitated (appendix Res2 #38).

Environmental education and awareness (EEA):. A total of 5.4 weeks of training courses were offered for university graduate and post-graduate students. The course consisted of lectures and the workshop consisted of discussions based on pre-selected representative articles published in high-ranking journals. Courses have proven to be popular and we now have received requests from additional Chilean universities and universities in neighbouring countries. The production and dissemination of information materials (posters and leaflets) was followed up from 2002/3. Classes for schools children were held and reached a very wide audience (over 1700 children and 90 teachers. See appendix Res2 #48). The initial organization and scheduling of classes was time consuming, but classes showed to be so popular that now teachers and schools contact the project for such classes. After having achieved a significant surplus of press releases in 2002/3, we focussed on radio and TV features. Noteworthy is the production of a series of 16 mini-documentaries in conservation in general and Darwin's foxes in particular by a professional production company (Cabala productions). The documentaries were mainly finances by the Chilean TV network CNTV (see appendix Res2 #21). The

production constitutes not only a significant contribution in kind, but we can expect that the screening over three months with three mini-documentaries per day will have a significant impact on environmental education and awareness on Chiloé Island. We introduced the assessment of human attitudes by questionnaires into the project (below).

-

- Discuss any significant difficulties encountered during the year and steps taken to overcome them.
- *During 2002/3, we encountered a significant number of difficulties. Most of those could be solved or significantly reduced according to the staregies outlined in the 1st report. These include: effects of the delays in set-up of the project, employment status of project employees, qualification and turnover of staff, Weather conditions, and use of study site at Communidad Ahuenco.*
- *In 2003/4, many of the administrative problems were solved (see section 6). However, the time and effort required to general administration and the administration of the budget at ULA remain significant and exceed by far the original expectations as expressed in the application. For example, staff employed on the basis of free-lance contracts ('a honorario') is legally not allowed to purchase any consumables (including bus tickets) directly from the project budget (this applies in particular to the field assistant and the GIS specialist). This requires extra efforts of the project coordinator (employed as "contrata') and the Chilean principle investigator. Consequently the Chilean principle investigator relies on (originally not budgeted) secretarial support, which is remunerated on a per-diem basis. In total, both principle investigators have spent in excess of their originally scheduled working time in the project (approx 50%).*
- *Attitudes to work in Chile. Although Chilean project staff is exceptionally enthusiastic, there are significant differences in approaches to work schedules and achievements when comparing Chile to the UK. For example, some Chilean staff is not used to work proactively and under 'loose' supervision. Even though we have implemented a line-management structure and a tight reporting scheme, reports are regularly delayed and achievements only completed under very tight supervision. The continuing presence of Eve Leegwater, the voluntary "Project Development Officer", at the study sites has allowed to intensify training and to produce a more efficient logistic and organizational infrastructure (see appendix Res2 #49). Eve Leegwater will continue as voluntary "Project Development Officer" during 2004/5.*
- *One significant technical problem occurred with regard to the genetic methodology. The problem and the strategy to overcome the problem are outlined above (see R4 in this section).*
-
- Has the design of the project been enhanced over the last year, e.g. refining methods, indicators for measuring achievements, exit strategy?

  The design of the project has enhanced by refining methods and by introducing new methodology to measure achievements.

  1. *Refinement of methods: We successfully introduced GPS collars to replace traditional radiotracking of dogs (time consuming and expensive). We intended*

to introduce camera traps to replace scent stations (unreliable because of weather conditions), but no camera traps on the marked are sufficiently waterproof in order to withstand the local climate.

2. *Assessment of human attitudes by questionnaires. Circumstantial evidence indicates that there is increasing interest for conservation of the Darwin's fox on Chiloé Island. However, there is the fundamental problem of quantification of human attitudes to nature conservation, which is required if changes in attitudes due to our information campaigns and education programs should be assessed. This problem was not addressed in the original proposal in line with most studies, which in general do not quantitatively assess the impact of education and information programs. We have now designed and implemented a questionnaire that is suitable for quantifying human attitudes and changes of thereof (see appendix Res2 #16).*

3. *Volunteers and project students: As a consequence of the unforeseen level of administrative duties of staff, which reduces the time available for field work (see paragraph 'significant difficulties' – above), and the high interest we received for volunteer positions, we now allow volunteers to participate in the project. Chilean project staff is overcommitted for administrative duties, field work and data analysis and could not provide training and organizational infrastructure for volunteers. However, we have attracted a dedicated UK volunteer, Miss Eve Leegwater, who acts as voluntary volunteer coordinator. This is a win-win situation since it helps us to achieve the goals of data collection more efficiently and it provides additional expertise of international volunteers in conservation biology (see appendix Res2 #49). We now have started a volunteer program with Global Vision International (GVI), UK, which will allow to financially support Miss Leegwater (see appendix Res2 #25).*

With regard to the exit strategy, no changes were made from the exit strategy as outlined in the original proposal. After completion in 2005, the project will have established local expertise (GIS, population genetics, epidemiology and veterinary medicine) and local infrastructure (laboratories for GIS and population genetics, field stations). The exit strategy is based on the principle investigator's and the main project partner's intention of long-term collaborations that will involve exchange of students between ULA and ZSL (Institute of Zoology). Although Universidad de los Lagos is primarily a teaching university, it has acknowledged the need for future research in conservation biology and has exemplified the intention to intensify this line of research by granting of a visiting professorship (not enumerated) to the principle investigator in 2002/3.

- Present a timetable (workplan) for the next reporting period.
- *The timetable is based on Table D (Project implementation timetable) of the project schedule. Changes of delivery dates and reasons of thereof indicated in bold.*

April	*Second density estimation in four study sites completed*
April	*10 Foxes captured in four study sites for hair sample collection*
April	*Analysis methods for non-invasively sampled DNA established: mitochondrial DNA*

April	*Feral dog activity and space use patterns (radio-tracking) completed*
April	*All dog samples collected for serology*
April	*All fox samples collected for serology*
September	*GIS fox mapping of fox habitat across Chiloe island completed*
September	*Mitochondrial DNA analysis samples collected during 2nd field session*
September	*Serology results for CDV and CPV in dogs received and analysed*
September	*Serology results for CDV and CPV in foxes received and analysed*
September	*Three conferences attended and five presentations given (**carry-over of one conference from March 2004 but earlier achievement of 3rd presentation, scheduled for March 2005**).*
September	*Manuscript for peer reviewed journal submitted (**carry-over from September 2003 – justified in section 9)***
November	*Training in GIS modelling completed. **Was scheduled for April 2004. However, to re-scheduling for October/November (when most GIS modelling takes place) will increase efficiency.***
November	*Estimation of fox density and habitat across Chiloe island completed. Was scheduled for September. **However, the application of a habitat model to the GIS mapping (completed in September) will require a rescheduling by two months.***
October	*Third half year report submitted*
November	*Draft for conservation management plan produced*
November	*2 week workshop completed*
December	*2 x 1 week training courses completed (**this was re-scheduled by one month in order to be immediately after the conference at Universidad Magellanes, which is co-organized by the project**).*
December	*Analysis of population genetic structure and genetic diversity of foxes completed: mitochondrial DNA*
February	*Conservation management plan produced*
February	*Draft for IUCN Action Plan produced*
February	*Analysis methods for non-invasively sampled DNA established: microsatellite DNA (**re-scheduling as a consequence of unexpected technical challenges – justified in section 9. MtDNA analysis will be completed as originally scheduled)***
February	*Second manuscript for peer reviewed journal submitted (originally scheduled for September. The rescheduling of the submission of the first manuscript requires the rescheduling of the second - **justified in section 9**)*

March	*Non-invasively sampled DNA analyzed with microsatellite markers* ***(re-scheduling as a consequence of unexpected technical challenges – justified in section 9. MtDNA analysis will be completed as originally scheduled)***
March	*IUCN Action Plan and conservation management plan produced* ***(the conservation management plan was scheduled for January, but the joint completion of both plans increases efficiency)***
March	*Target for slide show achieved – 2 hours x 32*
March	*Third newsletter circulated*
March	*Final 50% of press releases and popular articles produced*
April	*Annual report (1.4.2004 to 31.3.2005)*
June	*Final report*

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

- Have you responded to issues raised in the review of your last year's annual report? Have you discussed the review with your collaborators? Briefly describe what actions have been taken as a result of recommendations from last year's review.
- *The review was intensively discussed with the project collaborators. The main implication, the improvement of the management structure, was addressed by intensifying the line-management structure, by setting deadlines on reporting for all staff and by improved communication through internal bulletins.*

6. Partnerships

- Describe collaboration between UK and host country partner(s) over the last year. Are there difficulties or unforeseen problems or advantages of these relationships?
- *The collaboration with the main Chilean project partner (Prof. Jaime E. Jiménez, ULA) and the second partner (Prof. Juan Armesto, FDS) has worked very well. However, we encountered continuing significant administrative burden at the main partner institution, ULA, especially for financial administration. ULA and especially Mrs Pilar Alvarez-Santullano Busch (Research Division Head) have made any effort to minimize administration and to support the project. ULA continues to fully support the new offices for the project (inaugurated in March 2003).*
-
- Has the project been able to collaborate with similar projects (Darwin or other) in the host country or other regions, or establish new links with / between local or international organisations involved in biodiversity conservation?
- *During the first two years, we focussed our attention on establishing and developing the project. Therefore, we did not actively pursue the establishment of new links, but we established three links.*
- *1. Following a mass mortality of foxes in northern Chile, we offered logistic support to CONAF, the forestry department, and SAG, the Ministry for the Environment. The offer was rejected. However, SAG and the project agreed to jointly organize a one-day workshop in June 2004.*

- *2. Mr Gerardo Acosta, who participated on two previous DI projects in his capacity as veterinarian, successfully submitted a joint application for a travel grant toy the British Ecological Society for training in genetic methodology and analysis of the population structure of the endangered humuel deer. Mr Acosta will visit the IoZ laboratory in August 2004. Further, Mt Acosta applied for a scholarship in Chile (Grant of the President) and an EU scholarship (Alban) to conduct his PhD research on disease and conservation in Chile in conjunction with IoZ (S. M. Funk) and Edinburgh University (Dr S. Cleaveland). The results are pending.*
- *3. The project will jointly co-organize a conference with Universidad de Chile, to be held at Universidad Magellanes (see appendix Res2 #41). The principle investigator has been invited as a keynote speaker by the Chilean Society of Biology (see Res2 #37).*

7. Impact and Sustainability

- Discuss the profile of the project within the country and what efforts have been made during the year to promote the work. What evidence is there for increasing interest and capacity for biodiversity resulting from the project? Is there a satisfactory exit strategy for the project in place?
- *The work has been promoted by training courses, which were attended by students from all leading Chilean universities, by press, radio and TV releases and by information and education campaigns on Chiloé Island. Evidence for increasing interest and capacity for biodiversity includes the requests for training courses (e.g. Universidad de Conceptión), the invitation to co-organize a conference in conjunction with Universidad de Chile and Universidad Magellanes, the invitation as a key-note speaker by the Chilean Society of Biology and by the application for training and PhD studies by Chilean postgraduate students (see section 6). The impact of information and education campaigns on the population of Chiloé Island can currently not be quantified, but methodology has been put in place allowing the assessment of these campaigns (see section 4).*
- *There is a satisfactory exit strategy for the project in place, as outlined under section 4.*

8. Post-Project Follow up Activities (max 300 words)

This section should be completed ONLY if your project is nearing completion (penultimate or final year) and you wish to be considered to be invited to apply for Post Project Funding*. Each year, a small number of Darwin projects will be invited to apply for funding. Selection of these projects will be based on promising project work, reviews to date, and your suggestions within this section. Further information on this scheme introduced in 2003 is available from the Darwin website.*

- From project progress so far, what follow-up activities would help to embed or consolidate the results of your project, and why would you consider these as suitable for Darwin Post Project Funding?
- What evidence is there of strong commitment and capacity by host country partners to enable them to play a major role in follow-up activities?

9. Outputs, Outcomes and Dissemination

- Explain differences in actual outputs against those agreed in the initial 'Project Implementation Timetable' and the 'Project Outputs Schedule', i.e. what outputs were not or only partly achieved? Were additional outputs achieved?

- *There are two scheduled significant outputs not achieved in 2003/4. First, the submission of manuscript to a peer-reviewed journal was scheduled for April 2004. The first two years were mainly used to establish the project and to collect data in the field. This did not allow to extensively analyze data and to produce a manuscript. In retrospect, the scheduling of a manuscript by April 2004 was over-enthusiastic. We augmented the lack of progress by submitting abstracts to international conferences, which exceeds originally proposed numbers. Sufficient data have now been collected to realistically expect a submission by October 2004. Secondly, training for GIS was postponed. As outlined in the 1st annual report, GIS analysis advanced faster and more comprehensively as scheduled for 2002/3. This made training not necessary at this stage. Training will be offered between October and December 2005 instead, at the time when the GIS data base has been completed and more advanced analyses are required.*
- *We achieved 18 additional outputs, which were originally not planned. Details are given in Table 0.*
- Provide details of dissemination activities in the host country during the year, including information on target audiences. Will dissemination activities be continued by the host country when the project finishes, and how will this be funded and implemented?
- *Details on the broad range of dissemination activities are given in section 4 ("Provide an account of the project's achievements during the last year."). We plan to continue dissemination activities by the host country when the project finishes. Firstly, this will be conducted by Fundación Senda Darwin, which's specific purpose and goal is environmental education. All materials produced by the project will be available for this purpose. Secondly, we currently investigate whether the volunteer program, which is being implemented, can become self-sustaining (see appendix Res2 #25). If so, voluntary contributions will be used to facilitate dissemination.*
- Please expand and complete Table 1. **Quantify** project outputs over the last year using the coding and format from the Darwin Initiative Standard Output Measures (see website for details) and give a brief description. Please list and report on appropriate Code Nos. only. The level of detail required is specified in the Guidance notes on Output Definitions, which accompanies the List of Standard Output Measures

Table 1. Project Outputs (According to Standard Output Measures). Only outputs listed in the Darwin Initiative Standard Output Measures are shown.

Code No.	Quantity	Description
4A, 4B, 4C, 4D	5, 1.7, 14, 1.7	Course "Practical Introduction to Conservation Genetics" at Universidad de Conceptión [Activity number: EEA 10.1; Appendix: Res2 #27]
4C, 4D plus 4C, 4D	15, 2 plus 17, 1.7	Double-course "principles of biological conservation and conservation genetics" at FSD field station [Activity number: EEA 10.1; Appendix: Res2 #06]
6A, 6B	10, 104	South American and overseas volunteers trained in field ecology, animal handling and conservation biology [Activity number: EEA 10.3 (not listed); Appendix: Res2 #47]

6A, 6B	1, 2	Training of ULA staff in analysis of serological and epidemiological data [Activity number: ICB 7; Appendix: Res2 #04]
6A, 6B	1, 2	Training of ULA staff in genetic methodology (part 1) [Activity number: ICB 5; Appendix: Res2 #05]
6A, 6B	1, 14	Training of ULA staff in genetic methodology and analysis (part 2) [Activity number: ICB 6; Appendix: Res2 #35]
7	2	Two leaflets produced [Activity number: EEA 11A; Appendix: Res2 #31]
8	31.5 weeks	UK project staff on project work in host country [Activity number: all; Appendix: Res2 #49]
14A	1	Agreement with Dr. V. Martinez, Universidad de Chile, to co-organize international Conference on “Molecular Genetics in Biodiversity and Conservation” [Activity number: R 4.3 (not listed); Appendix: Res2 #41]
14A	2, 9 attendants	Information workshop for dog owners in Quemchi [Activity number: EEA 12.2; Appendix: Res2 #34]
14A	1 hour, 35 attendants	Seminar at Universidad Arcis Patagonia [Activity number: R 4.1 (not listed); Appendix: Res2 #24]
14A	37, attended by ~1700 children & ~90 teachers	Target for slideshow achieved (2 hours * 16) [Activity number: EEA 12.2; Appendix: Res2 #48]
14B	1 abstract	Abstract prepared for International Workshop on Artemia [Activity number: ; Appendix: Res2 #42]
14B	1 abstract	Abstract submitted to XIXth International Congress of Zoology, Beijing, CHINA, 23-27 August 2004. Accepted. [Activity number: R 4.2 (not listed); Appendix: Res2 #39]
14B	1 invitation	Invitation for plenary lecture. Annual Meeting Chilean Society of Biology [Activity number: R 4.2 (not listed); Appendix: Res2 #37]
14B	3 abstract	Three abstracts submitted VI Congreso Internacional sobre Manejo de Fauna Silvestre en la Amazonia y Latinoamérica., Iquitos, PERU, 5-10 September 2004 [Activity number: R 4.2 (not listed); Appendix: Res2 #40]
15C	1	Article in Lifewatch, UK. Lifewatch is published by ZSL [Activity number: EEA 11B; Appendix: Res2 #14]
16A, 16B	1, 250	1st part of children's story [Activity number: EEA 11A; Appendix: Res2 #01]
16A, 16B	1, 250	2nd part of children's story [Activity number: EEA 11A; Appendix: Res2 #18]
16A, 16B	1, 225	Expanded 1st newsletter released [Activity number: EEA 11A; Appendix: Res2 #17]
16A, 16B	75	Second newsletter circulated [Activity number: ; Appendix: Res2 #26]
16A, 16B, 23	3, 450, approx £200	Three posters produced [Activity number: EEA 11A; Appendix: Res2 #19]
18C, 23	16, approx. £7200 in kind	Sixteen short documentaries on Darwin’s foxes to be produced for Canal 4 Ancud and financed via a grant from CNTV (Consejo Nacional de Television). [Activity number: EEA 13 (not listed); Appendix: Res2 #21]

19C	10	Radio broadcasts ([Activity number: EEA 11B; Appendix: Res2 #02, #03, #07, #08, #09, #11, #12, and #15]
21	1	New field station at Lliuco permanent site established [Activity number: ICB 9.3; Appendix: Res2 #46]
23	approx. £100	Donation of Drontal Plus 10 Kg [Activity number: none; Appendix: Res2 #36]
23	approx £3000	PCR cycler for laboratory at Universidad de Los Lagos [Activity number: ICB 5.4; Appendix: Res2 #38]
23	€ 4,290	Vectronic Aerospace GmbH: GPS equipment as contribution in kind [Activity number: R 3.2; Appendix: Res2 #22]
23	approx £1200	Second round of non-invasive sampling of foxes, density estimate of foxes and density estimate of dogs in random sites [Activity number: R 1.4 (not listed); Appendix: Res2 #33]

- In Table 2, provide full details of all publications and material produced over the last year that can be publicly accessed, e.g. title, name of publisher, contact details, cost. Details will be recorded on the Darwin Monitoring Website Publications Database. Mark (*) all publications and other material that you have included with this report.

Following the presentation at the 1st Workshop on Research and Conservation of Neotropical Carnivores, May 13 - May 18 2003, São Paulo, Brazil, a manuscript for publication in the proceedings volume was requested by the organisers (see: note 4 of Table 1 of the 1st annual report) and submitted: Impact of viral infections in wild carnivore populations by Sarah Cleaveland, Karen Laurenson, Stephan Funk, and Craig Packer. Publication was scheduled for end of 2003 /early 2004, but the book has not been published yet due to delays outside this project

Table 2: Publications

Type * (e.g. journals, manual, CDs)	Detail (title, author, year)	Publishers (name, city)	Available from (e.g. contact address, website)	Cost £
Posters, leaflets	As described in Table 1	Darwin's fox project	www.darwinfox.org	N/A

10. Project Expenditure

- Please expand and complete Table 3.

Table 3: Project expenditure during the reporting period (Defra Financial Year 01 April to 31 March)

Item	Budget (please indicate which document you refer to if other than your project schedule)	Expenditure	Balance

11. Monitoring, Evaluation and Lessons

- Discuss methods employed to monitor and evaluate the project this year. How can you demonstrate that the outputs and outcomes of the project actually contribute to the project purpose? i.e. what are the indicators of achievements (both qualitative and quantitative) and how are you measuring these?
- *Methods employed to monitor and evaluate the project follow the DI Standard Output Measures and the Implementation Time Tables (see tables 0 and 1). Measurable impact indicators include:*
- *Research: Acceptance of five presentations at international conferences and the development of partnerships (see section 6).*
- *Institutional Capacity Building: Attendance at courses; request for courses from Chilean universities and universities in neighbouring countries; acceptance of a Chilean project member, trained in genetic methodologies at the IoZ laboratories, for a PhD program at the University of Ghent; successful application by Mr G. Acosta for a British Ecological Society travel grant for training in genetic methodologies and analysis of the genetic structure of the endangered humuel deer (Mr Acosta received his first genetic training at the course at Universidad de Conceptión).*
- *Environmental Education and Awareness: Attendance at classes for school children; production of mini-documentaries for Chilean TV (see section 12). We define as indicators of achievements not only the number of information materials produced and distributed, but the actual impact on human attitudes to conservation. To this end, we have designed and implemented a monitoring strategy which will allow us to quantitatively measure changes in human attitudes in Chiloé Island during our project (see section 4).*
-
- What lessons have you learned from this year's work, and can you build this learning into future plans?

- *We have collected a significant body of field and laboratory data, which we will analyze in 2004/5 alongside with further data collection.*
- *We have significantly underestimated the administrative burden for project staff. We have successfully implemented strategies to minimize the impact, allowing us to operate in a more logistically structured project. For future conservation-related research in South America, extra staff, time and resources must be budgeted.*

12. OPTIONAL: Outstanding achievements of your project during the reporting period (300-400 words maximum)

In January 2004, an expedition to San Pedro Island was undertaken. On San Pedro Island, Charles Darwin observed the Darwin's fox and collected the first known specimen for the subsequent scientific description. During our expedition, no trace of foxes was found. The reason for the apparent absence remains unknown, but human inference is unlikely on this isolated, virtually uninhabited island. On the other hand, we confirmed the continuing presence of foxes in the North East of Chiloé Island, where the habitat is extremely disturbed and foxes were thought not to exist.

In collaboration with Cabala Productions and the national TC council, a series of mini-documentaries for regional TV was produced. Screening is scheduled as three documentaries per day over a period of three months, thus provide intensive education and information for the population on Chiloé Island.

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

In this section you have the chance to let us know about outstanding achievements of your project over the year that you consider worth highlighting to ECTF and the Darwin Secretariat. This could relate to achievements already mentioned in this report, on which you would like to expand further, or achievements that were in addition to the ones planned and deserve particular attention e.g. in terms of best practice. The idea is to use this section for various promotion and dissemination purposes, including e.g. publication in the Defra Annual Report, Darwin promotion material, or on the Darwin website. As we will not be able to ask projects on an individual basis for their consent to publish the content of this section, please note the above agreement clause.

Annex 1 Report of progress and achievements against Logical Framework for Financial Year: 2003/2004

Project summary	Measurable Indicators	Progress and Achievements April 2003-Mar 2004	Actions required/planned for next period
Goal*:* To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but poor in resources to achieve • The conservation of biological diversity, • The sustainable use of its components, and • The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources			
Purpose *(insert original project purpose statement)*	*(insert original purpose level indicators)*	*(report impacts and achievements resulting from the project against purpose indicators – if any)*	*(report any lessons learned resulting from the project & highlight key actions planning for next period)*
Outputs			
(insert original outputs – one per line)	*(insert original output level indicators)*	*(report completed activities and outcomes that contribute toward outputs and indicators)*	*(report any lessons learned resulting from the project & highlight key actions planning for next period)*
1. Determination of Darwin's fox abundance and distribution and assessment of conservation threats by feral dogs	*1. International scientific and conservation community endorses the results*	*Presentations at international conferences accepted*	Key actions: data analysis and manuscript preparation Genetic and epidemiological analysis
2. Establishment of a high quality long-term mammal monitoring program using ecological and epidemiological methodology, and non-invasive population genetic techniques that will be applicable to	*2. Training needs fulfilled*	New research and conservation programmes launched (humuel deer conservation genetics at Conceptión, evolutionary genetics on *Artemia* at ULA)	Key actions: Organization of conference on "Molecular Genetics in Biodiversity and Conservation" Establishment of a information network with Chilean universities and NGOs

techniques that will be applicable to biodiversity monitoring on Chiloé Island and across Chile.			Development and maintenance of the project web page
3. Establishment of a university teaching programme in conservation science through which candidates for further training can be identified, and through which increased national awareness of conservation issues can be raised.	*3. Training needs fulfilled*	High attendance at training courses. Training courses requested from several Chilean and South American universities	Key actions: Plenary lecture at Annual Meeting Chilean Society of Biology Intensification of training program
4. Raising awareness of conservation managers and owners of domestic animals for conservation threats by domestic animals	*4. NGO and government interest in conservation management sustained*	Collection of baseline data on dog demography and heath status Information materials produced	Intensified contacts with Chilean government (SAG)
5. Constituency in support of Darwin's fox conservation developed on Chile and Internationally	*5. Interest by media and local communities sustained*	Large number of radio interviews Production of a series of mini-documentaries for Chilean TV	Monitoring impact of education and information campaigns on human attitudes to conservation
6. Field and laboratory facilities established and equipped where necessary	*6. Facilities operational*	Laboratories for ecology and genetics fully or partially equipped, new field stations created and operational	Continuing equipment of the genetic facilities at Universidad de los lagos

Note: Please do NOT expand rows to include activities since their completion and outcomes should be reported under the column on progress and achievements at output and purpose levels.